DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99
Revised 11/8/00

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: **Burlington Basket (Former General Electric [GE] Company Facility)**
Facility Address: **West Burlington, Iowa**
Facility EPA ID #: **IAD000678037**

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 #8 and enter"IN" (more information needed) status code.

SWMUs and AOCs identified at Burlington Basket to date are described below. A site map identifying the approximate current or former location of each SWMU and AOC is attached as Figure 1.

SWMU/AOC 1, General Solvent Storage Area: This unit consists of a concrete pad north of Assembly Plant #3 and was used to store virgin solvent in 55-gallon drums and in one 350-gallon aboveground storage tank (AST). Solvents were composed of chlorinated and non-chlorinated volatile organic compounds (VOC). Solvents and wastes include: 1,1,1-trichloroethane (1,1,1-TCA), xylene, methyl isobutyl ketone, toluene, methyl ethyl ketone, and waste oil. During September and November 1986, about 1,500 cubic yards (yd^3) of soil was excavated from this area to a depth of 8 feet below ground surface (bgs), and the excavation was backfilled with clean fill.

SWMU/AOC 2, Storm Sewer Pipe: The storm sewer pipe runs from the northeastern corner of Assembly Plant #3 to the northern edge of the property.

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. Two EIs 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).

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 [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act]) 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 and Reference(s): Burlington Basket is located on Highway 34 in the City of West Burlington, Iowa. The facility layout is shown in Figure 1. From 1974 to 1986, GE manufactured voltage switchgear and switchboard apparatus in both of the facility's buildings. Solvents used in the manufacturing operations at the facility were comprised of chlorinated and nonchlorinated VOCs (Beak Environmental Specialists [Beak] 1997). Fresh and waste solvents were stored in 55-gallon drums and a 350-gallon AST, respectively, within the fenced area underlain by a concrete pad to the north of Assembly Plant 3. BEAK (1997) reported that, according to the U.S. Environmental Protection Agency (EPA)

Resource Conservation and Recovery Act (RCRA) Inspection Report dated 10 July 1986, the plant generated the following wastes:

- Thirty-three 55-gallon barrels per year waste paint-related materials
- About 7 to 9 55-gallon barrels per year waste 1,1,1-trichloroethane (1,1,1-TCA)
- About 1 to 2 55-gallon barrels per month waste oil
- Roll-off boxes (40-yd^3 capacity) of general trash hauled about two times per month

Waste releases from soils within the unguarded fenced area have been determined to be the source of groundwater contamination.

Groundwater samples have been collected periodically from 1987 to 2002. In December 1987; May 1988; February, September, and December 1989; September 1990; April 1993; and May 1994, May 2001, July 2001, November 2001, and May 2002. Dissolved VOCs were identified in groundwater monitoring wells located both on and off of Burlington Basket's property to the north of Assembly Plant 3 (see Figure 2). Several VOCs have been identified in groundwater located in the upper 10 feet of unconsolidated soils. These include: tetrachloroethene; trichloroethene; 1,1-dichloroethene; trans-1,2-dichloroethene; cis-1,2-dichloroethene; 1,2-dichlorothane; 1,1-dichloroethane; 1,1,1-TCA; 1,1,2-trichloroethane; 1,1-dichloroethene; chloroethane, chloroform, vinyl chloride; and methylene chloride.

Groundwater samples collected from wells located near the northern facility boundary (see Figure 2) contain total VOCs at concentrations greater than 1 milligram per liter (mg/L). The lateral distribution of VOCs in the upper 10 feet of unconsolidated soils extends from Assembly Plant 3 to about 250 feet north of Assembly Plant 3, and the concentrations decrease with depth. VOCs have been identified at the bottom of the upper unconsolidated aquifer, near the northern facility boundary. The one bedrock well (Well Number GE-20) at the facility was sampled and contained a maximum concentration of 0.015 milligrams per liter of 1,1-dichloroethene, which is greater than the maximum contaminant level (MCL) of 0.007 milligrams per liter (Harrington Engineering Consultants [HEC] 2002). Tables in Attachment A summarize the contaminants found in each well during each sampling event, the concentration of contaminants, and the contaminants that exceed their respective maximum contaminant levels. Figures in Attachment B show the location of all monitoring wells and the extent of contamination.

The groundwater containing VOCs discharges into a drainage ditch, located about 20 feet. north of the facility's border. Water in the ditch is derived entirely from groundwater discharge under dry weather and augmented with overland flow from upland areas and storm sewer discharge (see Figure 1) from the paved areas during periods of rain and snow melt (Geosyntec 1999). Groundwater discharge is reportedly the only source of VOCs from the facility to surface water; however, sediments in the creek, which can be derived from overland flow, have not been sampled.

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).

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 and Reference(s): The groundwater located in the upper 10 feet of unconsolidated sediments, composed of glacial till, is not a usable water resource because of the high clay content. In addition, the facility and surrounding area are connected to the city water supply, which extracts groundwater from the bedrock aquifer. Drinking water wells will not be drilled in the area of the facility because of city ordinance Chapter 90.03. This ordinance prohibits the extraction of groundwater where access to the city's municipal supply system is available. Groundwater contamination in the upper till at the facility remains in an area located between the former paint waste container and the end of the former storm sewer pipe that drained into the ditch north of the facility. The plume has not migrated horizontally from this area as shown in data collected in quarterly sampling events over the last year from May 2001 to May 2002.

According to GeoSyntec (1999), two city wells that are within a half-mile southeast of Burlington Basket pump an estimated 600 gallons of water per minute to the community from the Cambro-Ordovician Jordan Aquifer and are about 1,800 feet deep. The Jordan Aquifer is separated from the upper till by alternating layers of light gray, cherty limestone and less-indurated, light red-brown limestone and shale. The Maquoketa Shale is considered an aquiclude in western Illinois and also exists between the till and the Jordan Aquifer. Although the direction of flow in the Cambro-Ordovician Jordan Aquifer is reported to be toward the southeast, downgradient of Burlington Basket, the great depth of the city wells in the Jordan Aquifer and the existence of the Maquoketa shale aquiclude would prevent contaminants at the site from contaminating the city water wells.

Data has been collected from four monitoring wells installed in bedrock at the facility to determine the extent of contamination in the bedrock aquifer during 2001 and 2002. Only one of the bedrock wells has contained VOCs during the quarterly sampling events. Monitoring well

MW-20 has contained 1,1-dichloroethene at a range of 0.012 to 0.015 milligrams per liter; however, the concentration of 1,1-dichlorethene in MW-20 has decreased over the last two quarterly sampling events. Data collected from the bedrock wells in quarterly sampling events over the past year from May 2001 to May 2002 show that the contamination in the bedrock has not migrated from MW-20 and remains on facility property. Possible human receptors exist southeast of the facility, because groundwater is obtained from wells located there. Several private wells located closest to the facility were sampled in 2002 None of the private wells contained any detectable levels of VOCs.

Previous remedial activities have consisted of excavation and off-site disposal of contaminated soil in the accessible areas of the site that are not located under buildings. During September and November 1986, about 1,500 yd^3 of soil were excavated from an area near the northeastern corner of Assembly Plant 3 to a depth of 8 feet bgs. The on-site portion of the excavation was backfilled with clean fill. The off-site portion of the excavation leads to an adjacent creek and was not filled, but left open. Geosyntec (1999) reports that this action effectively removed the potential source of VOCs to groundwater in the upper till, to the extent practicable and warranted. A Figure in Attachment B shows the location and extent of soil excavated from the site.

[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.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

__**X**__ 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): Harrington Engineering and Construction, Inc. (Harrington Engineering) performed a site inspection of the water seep at the Burlington Basket facility on August 20,1999. Harrington Engineering drove a pipe into the bank at the base of the seep in an attempt to promote groundwater flow from the seep, however, no flow occurred. Harrington Engineering then surveyed the south side slope of the ditch and the length of the ditch from the seep to the railroad culvert to better understand the hydraulics of the ditch. Harrington Engineering (2000) concluded from the survey data and previous groundwater data, obtained

from the RFI (BEAK 1997), that the water observed in the bottom of the seep originated from groundwater coming up through the bottom of the seep.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] 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)?

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___X__ 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[3] 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[3] 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[3] 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): Surface water samples were collected from the nearby creek and from the seep in the ditch north of the facility from 1988 to 2002. Eight VOCs have been detected in the creek and in the seep samples, tetrachloroethene; trichloroethene; cis-1,2-dichloroethene; 1,1-dichloroethene; vinyl chloride; 1,1,1-trichloroethane; 1,1-dichloroethane; and chloroethane. A surface water sampling summary table in Attachment A shows the constituents that were found in the samples. A Figure in Attachment B shows the location of surface water samples.

Sample results from the most current sampling period indicate that concentrations of constituents have decreased to below the detection limits for all VOCs previously detected in the surface water.

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

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[4])?

_____ 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.

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 and Reference(s): Since contamination exists at levels above the MCLs and there are nearby receptors, the remedy selected for the facility will include groundwater monitoring as part of the remedy.

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 **Burlington Basket** facility , EPA ID #**IAD000678037** , located at **Mt. Pleasant Ave, West Burlington, Iowa.** 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) Original signed by Date 08/21/02
(print)Gayle Hubert
(title)EPA Region 7 Project Manager RCAP

Supervisor (signature) Original signed by Date 8/23/02
(print)John Smith
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Locations where References may be found:
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REFERENCES

Beak Environmental Specialists (Beak). 1997. "RCRA Facility Investigation Report." Prepared for: the (Former) General Electric Company (GE). Burlington, Iowa. February.

Geosyntec Consultants(GeoSyntec). 1999. Final Draft-Corrective Measures Study Report. Prepared for: GE (Former). Fort Wayne, Indiana. September 30.

Harrington Engineering and Construction, Inc. (Harrington Engineering). 1999.

Harrington Engineering. 2002. Monitoring Well Installation, Ground Water Sampling and Surface Water Sampling Results Report, Chesterton, Indiana, July 19.

ATTACHMENT A

DISTRIBUTION AND CONCENTRATION OF VOLATILE ORGANIC CONTAMINANTS AT DIFFERENT DEPTHS IN GROUNDWATER

(Four Sheets)

ATTACHMENT B

FIGURE DEPICTING AREA OF EXCAVATED SOIL
TO REMOVE THE SOURCE OF VOLATILE ORGANIC CONTAMINANTS

(One Sheet)