DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Resource Conservation and Recovery Act (RCRA) Corrective Action Environmental Indicator (EI) RCRAInfo Code (CA725) Current Human Exposures under Control

Facility Name: GE Industrial of Puerto Rico LLC, Arecibo FacilityFacility Address: 980 San Luis Ave., Zeno Gandía Industrial Park, Arecibo, PRFacility EPA ID#: PRD090383860

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The 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 "Current Human Exposures under Control" EI (CA725)

A positive "Current Human Exposures under Control" EI determination ("YE" status code) indicates that there are no unacceptable human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all 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 objectives of the RCRA Corrective Action program, the EIs are near-term objectives, which are currently being used as program measures for the Government Performance and Results Act of 1993 (GPRA). The "Current Human Exposures under Control" EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation and Recovery Act Information System (RCRAInfo) national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

The General Electric (GE) Industrial of Puerto Rico LLC Arecibo facility (Site), formerly known as Caribe GE Electric Meters, is located in an industrial zoned region of the City of Arecibo, on the north central coast of Puerto Rico. The address of the Site is San Luis Avenue #980, Zeno Gandía Industrial Park, Arecibo, Puerto Rico. The Site covers approximately five acres of fenced property owned by the Puerto

Rican Industrial Development Company and is surrounded by the industrial park. Since 1992, the facility has been operating as a Large Quantity Generator.

The regional climate of the Site is characteristic of a tropical marine climate with high humidity. The average annual temperatures are within the range of 75° to 80° F, with slightly cooler temperatures in the winter (Ref. 2). The average annual precipitation is 53 inches. The Site is situated in a relatively flat area of Arecibo with an elevation between 30 and 40 feet above mean sea level. The Atlantic Ocean is located approximately 1 mile to the north while the Rio Grande de Arecibo River and its tributaries flow north to the Atlantic approximately 1.5 miles east of the site. The soils within the area of the Site are classified as urban land consisting of deep, sandy and loamy soils (Ref. 1). These are underlain by Oligocene to Pliocene age karstic limestones up to 2,000 meters thick resting on a basement of folded and faulted Cretaceous and lower Tertiary sedimentary and igneous rock (Ref. 3).

The Site began operations in August 1973 and has remained active since that time. The Site currently consists of two main buildings that encompass approximately 56,900 square feet used for office space as well as manufacturing of industrial circuit breakers (Ref 1 &2). Current Site activities include manufacturing processes of industrial circuit breakers, including plastics molding, steel welding, metal stamping, painting, electroplating, and assembly of circuit breakers. In addition to manufacturing processes, a wastewater treatment plant is located onsite to treat the residuals from electroplating activities (Ref. 2). Electroplating activities include five separate plating lines: multi-line plating, silver-line plating, manual-line plating, salt hand plating, and barrel hand plating. Copper, nickel, silver, and zinc are used in the electroplating process (Ref. 2). The process wastes are treated at the wastewater treatment plant. Sludge generated from electroplating processes is drummed at a rate of 4 to 5 drums per week (Ref. 2).

A groundwater pumping well is located onsite. This well is located on the west side of the manufacturing building and was installed to a depth of approximately 200 feet below ground surface. The well continually pumps 16 hours per day at a rate of approximately 150 gallons per minute (Ref. 2). Hydrogeological investigations have not been conducted at the Site.

In November 1980, GE submitted to EPA the Notification of Hazardous Waste Activity and the Part A Permit Application. The list of wastes managed at the Site included 1,1,1-trichloroethane, wastewater treatment sludge (spent cyanide plating bath solution from electroplating operations), plating bath residuals (cyanides), quenching bath residuals (cyanides), soluble cyanide salts, silver cyanide, and sodium cyanide. In March 1982 GE submitted a revised Part A Permit application to EPA to correct an error related to the incorrect identification of a Holding Tank as a surface impoundment. GE reclassified this tank as a Solid Waste Management Unit (SWMU) #2. In April 1985, GE submitted a third revised Part A to only include metallic hydroxide electroplating sludge, 1,1,1-tricholoethane, and paint wastes. At the same time, GE submitted the Part B permit call-in letter to EPA; the remainder of the Part B application was submitted six months later.

In October 1985 GE submitted to EPA separate plans for the closure of the Old Hazardous Waste Storage SWMU#1 and SWMU#2. After several revisions and public review, the closure plans were finally approved on August 22, 1988. In January 1991, GE submitted to EPA the closure reports for SWMU #1 and SWMU #2. On April 11, 1991 EPA granted clean-closure certifications for both SWMUs (Ref. 4).

- 1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from solid waste management units, regulated units, and areas of concern (AOCs)), 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

Summary of SWMUs and AOCs identified at the Site:

In March 1988, a RCRA Facility Assessment (RFA) of the Site was completed by the Puerto Rico Environmental Quality Board (EQB) (Ref. 1). The RFA identified seven (7) SWMUs, and six (6) AOCs. These are described as follows:

SWMU #1 – Old Hazardous Wastes Storage Containers Storage Area

SWMU #2 – Holding Tank

SWMU #3 – Wastewater Treatment Plan

- SWMU #4 New Hazardous Wastes Storage Containers Storage Area
- SWMU #5 Former Electroplating Sumps

SWMU #6 - Chromium, Cyanide, and Alkali/Acid Sumps

SWMU #7 - Chromium, Cyanide, and Acid/Alkali Concentrated Tanks

AOC #1 - Raw Material Storage Area I

AOC #2 – Raw Material Storage Area II

- AOC #3 Electroplating Area
- AOC #4 Old Electroplating Area
- AOC #5 Electroplating Scrubbers and Electroplating Ventilation

AOC #6 – Dust Collectors and Baghouse Collector

Based on the findings and recommendations presented in the RFA Report, the following SWMUs were considered for further investigation:

SWMU #2 – Holding Tank

SWMU #5 - Former Electroplating Sumps

SWMU #6 - Chromium, Cyanide and Acid/Alkali Sumps

SWMU #2 ceased operations in 1984 and clean-closed in 1990. EPA issued a clean-closure certification for SWMU #2 in April 1991 (Ref. 4). In July 2010, EPA decided to exclude SWMU #2 from the RCRA Facility Investigation (Ref. 5).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"¹ above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater		Х		Sampled. See discussion below.
Air (indoors) ²		Х		Not sampled. See discussion below.
Surface Soil (e.g., <2 ft)	X			Sampled. See discussion below.
Surface Water		Х		Not sampled. See discussion below.
Sediment		Х		Not sampled. See discussion below.
Subsurface Soil (e.g., >2 ft)	Х			Sampled. See discussion below.
Air (Outdoor)		Х		Not sampled. See discussion below.

If no (for all media) - skip to #6, and enter YE, status code after providing or citing appropriate levels, and referencing sufficient supporting documentation demonstrating that these levels are not exceeded.

- X If yes (for any media) continue after identifying key contaminants in each contaminated medium, citing appropriate levels (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.
- If unknown (for any media) skip to #6 and enter IN status code.

Rationale:

On March 2012, GE conducted soil and groundwater sampling as part of the RCRA Facility Investigation. A total of 12 surface (0-2 ft) and subsurface (2-4 ft) soil samples were collected beneath the concrete slab at four boring locations around the perimeter of SWMUs #5 and #6. Results indicate that only arsenic exceeded the industrial soil screening level (3.0 mg/kg, January 2015) with concentrations that varied from 0.75-23.1 mg/kg (Ref. 2).

In August 2013 GE conducted additional soil sampling to determine if arsenic exceedances are part of regional soil background concentrations. Surface (0-2 ft) and subsurface (2-4 ft) soil samples were collected

¹ "Contamination" and "contaminated" describe media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Department of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

from 12 boring locations within the perimeter of the Site, in areas historically undisturbed (a total of 36 samples). Results of additional sampling indicate that arsenic in background soil varied from 0.47 to 5.3 mg/kg (Ref. 6). Although many of the background samples show arsenic exceedances slightly above the industrial soil screening level, these were still very low compared with the exceedances obtained at the Site (Ref. 6). Soil arsenic concentrations at the Site do not exceed its generic Soil Screening Level (SSL) for migration to groundwater (i.e. 29 mg/kg), based on a dilution attenuation factor (DAF) of 20 (Ref. 7).

A groundwater sample was collected from the onsite well. Sample was analyzed for Cyanide, Hexavalent Chromium, Total Metals and Volatile Organic Compounds. No exceedances were found in the groundwater sample (Ref. 2).

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food ³
Groundwater							
Air (indoor)							
Surface Soil (e.g. < 2 ft)	No	No	No	Yes	No	No	No
Surface Water							
Sediment							
Subsurface Soil (e.g., > 2 ft)	No	No	No	Yes	No	No	No
Air (outdoors)							

<u>Summary Exposure Pathway Evaluation Table</u> Potential Human Receptors (Under Current Conditions)

Instruction for <u>Summary Exposure Pathway Evaluation Table</u>:

- 1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
- 2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have checked spaces. These spaces instead have dashes ("--"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- ____ If no (pathways are not complete for any contaminated media-receptor combination) skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X If yes (pathways are complete for any "Contaminated" Media Human Receptor combination) continue after providing supporting explanation.
- ____ If unknown (for any "Contaminated" Media Human Receptor combination) skip to #6 and enter "IN" status code

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish)

Rationale:

On March 2012, GE conducted soil and groundwater sampling as part of the RCRA Facility Investigation. A total of 12 surface (0-2 ft) and subsurface (2-4 ft) soil samples were collected beneath the concrete slab at four boring locations around the perimeter of SWMUs #5 and #6. Results indicate that only arsenic exceeded the industrial soil screening level (3.0 mg/kg, January 2015) with concentrations that varied from 0.75-23.1 mg/kg (Ref. 2).

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- 4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**⁴ (i.e., potentially "unacceptable") because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks?
 - X If no (exposures cannot be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
 - If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
 - _ If unknown (for any complete pathway) skip to #6 and enter "IN" status code.

Rationale:

The Site is currently and anticipated to be utilized for manufacturing purposes in the foreseeable future (Ref. 6). The on-site soils where arsenic exceedances were detected are located beneath concrete or asphalt and are not readily accessible to create a complete exposure pathway to human beings (Ref 2 & 6). These conditions are expected to remain in the foreseeable future (Ref. 6).

⁴ If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a Human Health Risk Assessment specialist with appropriate education, training, and experience.

- 5. Can the "significant" **exposures** (identified in #4) be shown to be within acceptable limits?
 - If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing <u>and</u> referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
 - If no (there are current exposures that can be reasonably expected to be "unacceptable") continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.
 - _____ If unknown (for any potentially "unacceptable" exposure) continue and enter "IN" status code.

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Rationale:

Not Applicable

- 6. Check the appropriate RCRAInfo status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):
 - X YE Yes, "Current Human Exposures under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the GE Industrial of Puerto Rico LLC Site, EPA ID# PRD090383860, located in Arecibo, Puerto Rico, under current and reasonably expected conditions. This determination will be reevaluated when the Agency/State becomes aware of significant changes at the facility.
 - ____ NO "Current Human Exposures" are NOT "Under Control."
 - ____ IN More information is needed to make a determination.

Completed by:

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David Cuevas-Miranda, Project Manager Response & Remediation Branch/CEPD EPA Region 2

Date: 4-09-2015

Ramon Torres, Branch Chief Response & Remediation Branch Caribbean Environmental Protection Division EPA Region 2

Date: 4/14/15

Approved by:

References:

- 1. Environmental Quality Board, 1988. *RCRA Facility Assessment Report*, Caribe G.E. Products Arecibo, Puerto Rico, RCRA EPA ID No. PRD090383860.
- 2. ARCADIS, 2012. *RCRA Facility Investigation Report*, Caribe GE Products, Inc., Arecibo, Puerto Rico. General Electric Energy Management-Industrial Solutions.
- 3. Monroe, W.H., 1980. *Geology of the Middle Tertiary Formations of Puerto Rico*, United States Geological Survey Professional Paper 953.
- Correspondence from Michael Poetzsch, Chief Caribbean Facilities Section, EPA, to Ms. Flor del Valle, Director Land Pollution Control Area, EQB. Re: Caribe General Electric, Arecibo, Puerto Rico; Approval of Clean Closure of CSA and Holding Tank, EPA I.D. No. PRD090383860, April 11, 1991.
- 5. Correspondence from Carl-Axel P. Soderberg, Director Caribbean Environmental Protection Division-EPA Region 2, to Joel Robinson, Global Remediation Manager GE Consumer & Industrial. Re: *RCRA Facility Investigation, Caribe GE Electric Meters, Arecibo, Puerto Rico.* July 12, 2010.
- 6. ARCADIS, 2014. Arsenic Background Study Letter Report, Arecibo, Puerto Rico (EPA ID No. PRD090383860). General Electric Energy Management Industrial Solutions.
- 7. USEPA, 1996. Soil Screening Guidance: Technical Background Document (EPA/540/R-95/128).

Locations where references may be found:

References reviewed to prepare this EI determination have been identified under the Facility Information Section. Reference materials are available at U.S. EPA, Region 2.

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES 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 RISK.

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