DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA725)
Current Human Exposures Under Control

Facility Name: **GE Puerto Rico Investment Inc.**
Facility Address: **State Road 3, Km 122. 9, PO Box 667, Patillas, Puerto Rico 00723**
Facility EPA ID #: **PRD090492109**

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 Current Human Exposures Under Control EI

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 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 Current Human Exposures Under Control EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action programs 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 Determinations status codes should remain in 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).

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 (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

Yes 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

The GE Puerto Rico Investment Inc. (GE) facility is located along State Road 3 at kilometer 122.9, in Patillas. The facility was purchased by Caribe GE Products - Patillas in 1974 from the Kaiser Roth Corporation, and operated by Caribe GE until 1987. The plant was reopened in 1993 with its name changed from Caribe GE Products - Patillas to GE Puerto Rico Investment Inc., and has since been involved in the manufacture of electro-mechanical devices. The manufacturing processes before 1987 included metal electroplating, stamping and cutting operations. GE used a number of industrial chlorinated solvents in their manufacturing process and also generated wastewater containing metals. The area surrounding GE is largely used for agriculture, mostly for growing sugar cane. To the east of the facility, there is some residential development.

It was reported that GE disposed of several thousand gallons of chlorinated solvents into an unlined disposal pit (French Sump) between 1977 to 1980 producing a large contaminant plume in the groundwater. In 1985, these contaminants were detected in a PRASA drinking water supply well which was subsequently shut down. EPA issued a 3008(h) order in 1988 to conduct a site investigation and perform an interim source removal. The removal was conducted in 1989-90 and a RCRA Facility Investigation (RFI), approved by EPA, was performed in 1991. Hazardous Waste Management Units (HWMUs) and Solid Waste Management Units (SWMUs) identified at GE to date are described below:

Container Storage Area: GE submitted a closure plan on 10/24/84, which was public noticed on 10/11/85 and approved on 12/16/85. A report providing certification for closure of the drum storage area was issued in 11/86 by Fernando L. Rodriguez, P.E. and Associates. A letter to GE from EPA, dated 10/20/89, granted the clean closure status to the HWMU.

The Sludge Drying Beds: One source of contamination at the facility are two adjacent sludge drying beds. Caribe GE generated wastewater contaminated with metals from its electroplating operations. They operated a wastewater treatment system to treat the wastewater before disposal. This treatment operation in turn generated metals-contaminated sludge that was treated in the sludge drying beds prior to disposal. There have been several documented releases from this SWMU. An inspection on 08/19/81 found the beds overflowing. The RFA for the facility, completed by EPA on 01/29/86, indicated that sludge had been spread on the ground next to the beds and that untreated wastewater had been dumped in the beds, ultimately

to be discharged into the sewer. The sludge drying beds were taken out of service in 1982 and Caribe GE began a formal closure of the beds in 1983. Part of the closure process for the beds involved the installation of a groundwater monitoring well system and implementation of a three year groundwater monitoring plan to ensure that there was no groundwater contaminant plume coming from the impoundments. The first two years of monitoring program did not detect elevated levels of contamination. In the final year, a number of tests showed slightly elevated levels of chromium in the groundwater, particularly down-gradient of the SWMU, as well as an increase in total organic carbon (TOC). EPA ordered another round of testing which showed elevated chromium levels and TOC levels again. GE has maintained that the heightened levels of chromium and other metals are due to excessive turbidity in the water. Sampling indicates that the levels of dissolved metals are significantly lower than total metals found in the sample. EPA will determine whether to formally approve the closure of this SWMU by the end of FY 2005.

The French Sump: was a rock filled pit with a concrete cover. This pit was used from 1977 to 1980 for disposal of a significant quantity of oils and solvents. These contaminants present a threat to the groundwater aquifer underneath the facility. This threat is magnified by the fact that the local aquifer has been used for the public water supply. In fact, in 1985, a PRASA public water supply well was shut down because the same types of solvents were discovered in the water. Groundwater monitoring wells were installed to observe if the contaminants from the French Sump were migrating. These wells provided further evidence that chlorinated solvents have been moving down-gradient from the source location. The French Sump was removed in 1989 after it was determined to be the source of a contaminant plume in the groundwater.

A meeting was held on February 27, 2003 between representatives of EPA and GE to discuss specifically how groundwater contamination issues related to GE facility in Patillas could be acceptably addressed, so that determinations with regard to the GPRA Environmental Indicators CA-725 (no human health exposures) and CA-750 (contaminated groundwater under control) could be made by 2005. While a sufficient amount of groundwater data has been generated in the delineation of the contaminated groundwater underneath of the GE property itself, it was agreed by both parties that there is a grossly inadequate amount of off-site groundwater data available to determine the extent of off-site groundwater contamination. GE agreed to pursue the investigation of the groundwater plume beyond its facility boundary. Recently GE added 7 new wells and is presently collecting additional off-site groundwater data needed to evaluate off-site extent of the contaminated plume. As part of efforts for CA-725 determination, GE has also collected more than 20 soil gas samples above the plume and at the edge of GE property line where the nearby residential homes are situated.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be contaminated 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)?

	Yes	No	?	Rationale / Key Contaminants	
a. Groundwater	X			VOCs in mon wells	(See Note A)
b. Air (indoor)[2]		X		Sampled Soil Gas	(See Note B)
c. Surface Soil (e.g., <2ft)		X		Removed in 1990	(See Note C)
d. Surface Water		X		Never Detected	(See Note D)
e. Sediment		X		Never Detected	(See Note E)
f. Subsurface (e.g., >2ft)		X		Removed in 1990	(See Note F)
g. Air (outdoor)		X		Never Detected	(See Note G)

____ 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 and Reference(s):

A. 1,1,1-trichloroethane (TCA) and its breakdown products 1,1-dichloroethane, (DCA), and 1,1-dichloroethene (DCE)) were found throughout the groundwater plume emanating from the former French Sump at concentrations exceeding Federal Maximum Contaminant Levels (MCLs). Other VOCs were also detected on a lesser frequency, but their locations were also within the plume volume leaving the area of the former French Sump. A synopsis of the historical data presented in the Well Placement Plan (Earth Tech, 2004) indicates that the concentrations of the three principal VOC contaminants (TCA, DCA, and DCE) have been declining over the past several years, from 1992 thru 2004, and that the groundwater at well P-11, installed just down-gradient of the former French Sump location, is now clean of organic contamination altogether. The historical maximum concentrations of TCA at P-11 reached as high as 10,000 µg/L in 1996, but are now below detection levels. Investigations surrounding the former Sludge Drying Beds have indicated no impact to local soil or groundwater quality, and the unit has been capped and clean-closed, although EPA has not formerly approved the closure certification. Groundwater contamination has not been detected at any other area at the facility.

Based on data collected to date, groundwater at this facility flows to the southwest. Groundwater contamination moves southwest with the groundwater and appears to downward within the aquifer. The farther from the former source (i.e., French Sump) of groundwater contamination, the deeper the contaminants appear to migrate in the aquifer.

References:

Sirrine Environmental Consultants, October 1991. Final Report - RCRA Facility Investigation (RFI) Report, General Electric Company, Inc., Caribe General Electric Products Plant, Patillas, Puerto Rico.

SEC Donohue, February 1991. French Sump Stabilization Confirmation Report, Caribe General Electric Products, Inc., Patillas, Puerto Rico.

Earth Tech, May 2001. Letter Report from Jim Cloonan (Earth Tech) to Matthew Schoen (USEPA), Closure of Sludge Drying Beds, GE Caribe Facility, Patillas, Puerto Rico; May 25, 2001.

Earth Tech, April 2004. Well Placement Plan for Supplemental Groundwater Sampling Activities, GE Puerto Rico Investment, Inc., Patillas, Puerto Rico.

B. An investigation was conducted in late 2003, using passive methods to collect soil gas samples from the local area. The soil gas samples were collected to determine the presence of a down-gradient groundwater plume and to select locations for new monitoring wells. The results from the soil gas modules were converted from mass (µg of detected contaminants) to soil gas concentration ($\mu g/m^3$) by a method developed by Jay Hodny, PhD, of W.L. Gore and Associates, which used, in part, the equations in the Johnson-Ettinger model on the EPA web site. No calculated contaminant concentrations exceeded the soil gas concentrations listed in the EPA guidance for incremental risk of 10^{-6}. The attached table (Table 1) presents the findings of the soil gas study, and confirms that the calculated soil gas concentrations are well below the screening levels in the USEPA guidance. There is no exposure risk for onsite workers, as soil gas readings near the GE and PRASA buildings were all non-detects. To support the soil gas data, the shallow groundwater samples obtained at wells P9, P11 and P4 near the GE building found contaminants below the detection limits in the past several years. At soil gas location 106, where a residential house is located 40 feet away, the sampling detected values several magnitudes lower than that of EPA screening levels.

A second approach to confirm the above assertion was also undertaken by using the Johnson-Ettinger Model recommended by EPA guidance on Evaluating the Vapor Intrusion into Indoor Air to estimate the concentrations of selected constituents in the groundwater that would be needed for those constituent concentrations to exceed the indoor air quality guidelines at specific levels of calculated risk. For the model runs, inputs were made reflecting the depth to groundwater, the local soil types, the local groundwater temperature, and the absence of basements in the local buildings. Table 2 presents the results of that exercise, as well as the data inputs used in the model. As shown in the table, shallow groundwater samples were taken in June 2004 from the newly installed monitoring wells including Well P-16S, the closest well to the residential homes. The samples obtained at

P-16S had no constituent concentrations that exceeded their calculated risk-based concentrations.

The Johnson-Ettinger Model has been designed to estimate the intrusion of soil vapor from groundwater plumes that are in contact with the vadose zone beneath a building. At this site, however, the shallow water table (that part in touch with the vadose zone) is predominately clean (for example, at well P-7, adjacent to the deeper well P-7A), and the plume of contaminated water is traveling in a deeper part of the water table, isolated from the vadose zone by a layer of cleaner water. At well P-4, a shallow water table well and the closest well to the GE buildings, there has been no detection of any constituents since 1992.

References:

Hodny, Jay W, and Harr S. Anderson II, 2004. The Next Step in Passive Organic Vapor Sampling: Concentration Measurements for Risk Evaluation. Draft of a paper to be presented att the Batelle Conference in June 2004.

C. The only contaminated soils at the facility were located in the French Sump, which was excavated in 1990. The excavated soils were shipped to the hazardous waste landfill in Emelle, Alabama for disposal. Sampling of the bottom and walls of the excavation confirmed the removal of the contaminated soils, prior to backfilling with clean materials.

References:

Sirrine Environmental Consultants, October 1991. Final Report - RCRA Facility Investigation (RFI) Report, General Electric Company, Inc., Caribe General Electric Products Plant, Patillas, Puerto Rico.

SEC Donohue, February 1991. French Sump Stabilization Confirmation Report, Caribe General Electric Products, Inc., Patillas, Puerto Rico.

D. During the RFI, multiple surface water samples were collected from the unnamed creek passing the east side of the facility, the Quebrada Mamay-Rio Chico in the agricultural field to the west, and the Rio Grande de Patillas. No sample from any of these bodies indicated any contamination, and as a result, no further study of them has been undertaken.

References:

Sirrine Environmental Consultants, October 1991. Final Report - RCRA Facility Investigation (RFI) Report, General Electric Company, Inc., Caribe General Electric Products Plant, Patillas, Puerto Rico.

E. See Note D, because the sediments were sampled at the same time as the surface water.
F. See Note C, above.
G. Health and safety data collected during the implementation of field studies did not indicate an ambient air problem related to the waste management units at the site.

References:

Sirrine Environmental Consultants, October 1991. Final Report - RCRA Facility Investigation (RFI) Report, General Electric Company, Inc., Caribe General Electric Products Plant, Patillas, Puerto Rico.

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 appropriately protective risk-based levels (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest 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.

TABLE 1 Soil Gas Concentrations from Passive Samplers (see next page)

TABLE 1 Soil Gas Concentrations from Passive Samplers

			RESULTS (mg)															
			TCE		1,1-DCE		1,1,1-TCA		1,1,2-TCA		1,1-DCA		1,2-DCA		Chloroform		CB	
ET ID	GORE ID	SAMPLE DATE	Mass	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	Conc
			(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)	(µg)	(µg/m³)
				0.22		2000		22,000		15		5000		9.4		1.1		600
		MDL =>	*0.03*	*0.0016*	*0.08*	*0.0043*	*0.03*	*0.0016*	*0.05*		*0.05*		*0.04*		*0.02*	*0.0011*	*0.02*	*0.0011*
SG- 1	419071	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG- 2	419064	10/20/04	nd		nd		nd		nd		nd		nd		**0.050**	**0.0027**	nd	
SG- 3	418472	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG- 4	419078	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG- 5	419075	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG- 6	419073	10/20/04	nd		nd		nd		nd		nd		nd		**0.090**	**0.0049**	nd	
SG- 7	418471	10/20/04	bdl		nd		nd		nd		nd		nd		**0.220**	**0.012**	nd	
SG- 8	419061	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG- 9	419074	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG-10	419066	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG-11	419076	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG-12	419077	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG-13	418470	10/20/04	nd		nd		**0.06**	**0.0033**	nd		nd		nd		nd		nd	
SG-14	419065	10/20/04	nd		nd		nd		nd		nd		nd		**0.040**	**0.0022**	nd	
SG-15	419079	10/20/04	nd		nd		nd		nd		nd		nd		bdl		nd	
SG-16	419059	10/20/04	nd		nd		**0.09**	**0.0049**	nd		nd		nd		nd		nd	
SG-17	419068	10/20/04	nd		nd		nd		nd		nd		nd		**0.050**	**0.0027**	nd	
SG-18	419070	10/20/04	nd		nd		nd		nd		nd		nd		nd		nd	
SG-19	419063	10/20/04	nd		nd		bdl		nd		nd		nd		nd		nd	
SG-20	419058	10/20/04	nd		nd		nd		nd		nd		nd		**0.100**	**0.0054**	nd	
SG-21	419069	10/20/04	nd		nd		nd		nd		nd		nd		bdl		nd	
SG-22	419060	10/20/04	nd		nd		nd		nd		nd		nd		**0.360**	**0.020**	nd	
SG-23	419072	10/20/04	nd		nd		nd		nd		nd		nd		**0.100**	**0.0054**	nd	
SG- 101	438126	12/29/04	nd		nd		nd		nd		nd		nd		**0.110**	**0.0060**	nd	
SG- 102	438132	12/29/04	nd		bdl		nd		bdl		nd		nd		**0.234**	**0.013**	bdl	
SG- 103	438138	12/29/04	nd		bdl		nd		nd		nd		nd		**0.035**	**0.0019**	nd	
SG- 104	438144	12/29/04	nd		nd		nd		nd		nd		nd		bdl		nd	
SG- 105	438150	12/29/04	nd		nd		nd		nd		nd		nd		**0.072**	**0.0039**	nd	
SG- 106	438127	12/29/04	nd		nd		**0.07**	**0.0038**	nd		nd		nd		**0.093**	**0.0050**	nd	
SG- 107	438133	12/29/04	nd		nd		nd		bdl		nd		nd		**0.064**	**0.0035**	**0.02**	**0.0011**
SG- 108	438139	12/29/04	nd		nd		nd		nd		nd		nd		bdl		nd	
SG- 109	438145	12/29/04	nd		nd		nd		nd		nd		nd		**0.020**	**0.0011**	nd	
SG- 110	438151	12/29/04	nd		nd		nd		nd		nd		nd		**0.066**	**0.0036**	nd	
SG- 111	438128	12/29/04	nd		nd		nd		nd		nd		nd		**0.049**	**0.0027**	nd	
SG- 112	438134	12/29/04	bdl		nd		nd		nd		nd		nd		**0.026**	**0.0014**	nd	
SG- 113	438140	12/29/04	nd		nd		nd		nd		nd		nd		**0.075**	**0.0041**	nd	
SG- 114	438146	12/29/04	nd		nd		bdl		nd		nd		nd		**0.028**	**0.0015**	nd	
SG- 115	438129	12/29/04	nd		nd		nd		nd		nd		nd		**0.062**	**0.0034**	nd	
SG- 116	438135	12/29/04	nd		nd		nd		nd		nd		nd		**0.107**	**0.0058**	nd	
SG- 117	438141	12/29/04																
SG- 118	438147	12/29/04	nd		nd		nd		nd		nd		nd		**0.074**	**0.0040**	nd	
SG- 119	438130	12/29/04	**0.06**	**0.0033**	nd		nd		nd		nd		nd		**0.070**	**0.0038**	nd	
SG- 120	438136	12/29/04	nd		nd		nd		nd		nd		nd		**0.167**	**0.0091**	nd	
SG- 121	438142	12/29/04	nd		nd		nd		nd		nd		nd		**0.082**	**0.0044**	nd	
SG- 122	438148	12/29/04	nd		nd		nd		nd		nd		nd		bdl		nd	
SG- 123	438131	12/29/04	**0.49**	NA	**340**	NA	bdl	NA	**0.48**	NA	**6.31**	NA	**1.50**	NA	**1.315**	NA	nd	NA
SG- 124	438137	12/29/04	**0.48**	NA	**272**	NA	bdl	NA	**0.53**	NA	**4.27**	NA	**1.65**	NA	**0.942**	NA	nd	NA
Trip Blank	419062	10/20/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA
Trip Blank	419067	10/20/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA
method blank	NONE	10/20/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA
Trip Blank	438143	12/29/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA
Trip Blank	438149	12/29/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA
method blank	NONE	12/29/04	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA	nd	NA

Notes: **PCE** Tetrachloroethene, Perchloroethene **DCE** Dichloroethene **DCA** Dichloroethane
TCE Trichloroethene **TCA** Trichloroethane **CB** Chlorobenzene

RECOVERY NOTES

Screening Level (Risk-10^{-6}) for Shallow Soil Gas (Table 2b in the Guidance)
Method Detection Level for the soil gas analysis
module was muddy
module was fairly dry
hard to pull up, rain compacted the soil
easy to pull out, module dry
relatively dry and easy to remove
relatively dry and easy to remove
good seal, module clean and dry
pulled out easily
pulled out easily
hard to retrieve for first 6 inches
hard to pull, good seal
easy to pull, module wet
good seal, module damp
easy to pull out, relatively dry
easy to pull out, relatively dry, cork chewed on
good seal, cork pulled out and chewed on
fairly easy to pull out, fairly wet
moderately easy to pull out, fairly wet
hard to pull out, wet module
cork floating in about 6 inches of water in creek bed
easy to pull out, fairly dry module
easy to pull out, cork chewed, dry module
hard to pull up, fairly wet module
Not Recovered
NOT A soil gas sample. Taken from well P-10A (at 46' in the screen zone)
NOT A soil gas sample. Taken from well P-10A (at 5' in the well headspace)
QA/QC
QA/QC
QA/QC
QA/QC
QA/QC
QA/QC

Table 2

Comparison of Target GW concentrations and Actual GW concentrations

(EPA Johnson-Ettinger Model is used to estimate the target GW concentrations capable of producing indoor air contamination)

			Target GW Concentration (microgram/L) at indoor risk level of 1.00E-06	2004 GW results at Well 16S*
1. Soil Type : LS (Loamy Sand)				
Cas No	Chemical Name	Abbrev		
71556	1,1,1-trichloroethane	1,1,1-TCA	7600	0.4
75343	1,1-Dichloroethane	1,1-DCA	5450	0.4
75354	1,1-Dichloroethylene	1,1-DCE	407	13
79016	Trichloroethylene	TCE	0.12	< 1
2. Soil Type : S (Sand)				
Cas No	Chemical Name	Abbrev		
71556	1,1,1-trichloroethane	1,1,1-TCA	3040	0.4
75343	1,1-Dichloroethane	1,1-DCA	2210	0.4
75354	1,1-Dichloroethylene	1,1-DCE	165	13
79016	Trichloroethylene	TCE	0.048	ND
3. Soil Type : C (Clay)				
Cas No	Chemical Name	Abbrev		
71556	1,1,1-trichloroethane	1,1,1-TCA	247000	0.4
75343	1,1-Dichloroethane	1,1-DCA	123000	0.4
75354	1,1-Dichloroethylene	1,1-DCE	13800	13
79016	Trichloroethylene	TCE	3.5	ND

Input to the Model to calculate risk-based concentration:

LF - Depth to bottom of enclosed space floor (cm)	15 cm
Lwt - Depth below grade to the water table (cm)	200 cm
Ts - Average soil/Groundwater temperature (^{0}C)	27 ^{0}C

- Located 100 feet south-west of the closest residence.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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?

Summary Exposure Pathway Evaluation Table

	Potential **Human Receptors** (Under Current Conditions)						
Contaminated Media	**Residents**	**Workers**	**Day-Care**	**Construction**	**Trespassers**	**Recreation**	**Food**[3]
Groundwater	_No_	_No_	_No_	_No_	_No_	_No_	_No_
~~Air (indoors)~~	____	____	____	____	____	____	____
~~Soil (surface, e.g., <2 ft)~~	____	____	____	____	____	____	____
~~Surface Water~~	____	____	____	____	____	____	____
~~Sediment~~	____	____	____	____	____	____	____
~~Soil (subsurface e.g., >2 ft)~~	____	____	____	____	____	____	____
~~Air (outdoors)~~	____	____	____	____	____	____	____

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors spaces for Media which a 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 check spaces (___). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

__**X**__ 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).

_____ 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.

Rationale and Reference(s):

Groundwater was the only media that was identified to be contaminated above appropriate protective risk-based standards at the GE facility. However, volatile chemicals in the contaminated groundwater can also emit vapors that could migrate through subsurface soils and into indoor air spaces of overlying buildings, the groundwater contamination also has an implication for vapor intrusion into indoor air. Consequently, the groundwater contamination created following potential scenarios for human exposure. They are:

1. Exposure to on-site workers from contaminated groundwater
2. Exposure to on-site workers from potential indoor air vapors
3. Exposure to off-site residents from contaminated groundwater
4. Exposure to off-site residents from potential indoor-air vapors

Based on data and reasons provided in Rationale #2A (contaminated groundwater scenario) and 2B (indoor air exposure scenario), there is no complete pathways exist for exposure of the following onsite or off-site human receptors :

1. Residents There are no homes built, and no private wells installed, inside and above the existing groundwater plume. Groundwater is supplied by a public system. The PRASA water supply well across from GE was shut down. The potential vapor intrusion into indoor air has been measured and calculated to be far below the risk-based concentrations for residents

2. Workers The GE plant and the WWTP across the site from GE are on public water supply, The vapor intrusion into indoor air has been measured and calculated to be far below the risk-based concentrations.

3. Day care There are no schools or day-care facilities over the footprint of the plume,

4. Construction The groundwater plume has migrated to the deeper portions of the aquifer, beneath the depths of normal construction activities that could expect to occur in the future.

5. Trespassers There is no access to the deep groundwater plume by the occasional trespasser.

6. Recreation The area overlying the groundwater plume is occupied by the GE facility, the WWTP, and the agricultural fields to the west. There are no recreational opportunities that could be reasonably be expected in the future.

7. Food The local crops grown on the fields to the west off the GE plant cannot tap into the deeper zone of the aquifer where the contamination is currently located, and the most recent sample (1996) from the water table well in the field (P-12) was non-detect for all contaminants of concern.

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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)?

_____ If no (exposures can not 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 and Reference(s):

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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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 and 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.

Rationale and Reference(s):

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

6. Check the appropriate RCRIS 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):

_YE_ 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 Puerto Rico Investment, Inc.** facility, EPA ID # **PRD090492109**, located at **State Road 3, Km 122. 9, Patillas, Puerto Rico** under current and reasonably expected conditions. This determination will be re-evaluated 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 _____ Date _____
Sin-Kie Tjho, Project Manager
RCRA Programs Branch

Supervisor _____ Date _____
Dale J. `1Carpenter, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by _____ Date _____
Adolph Everett, Chief
RCRA Programs Branch
EPA Region 2

Locations where References may be found:

U.S. Environmental Protection Agency - Region 2
RCRA File Room
290 Broadway - 15th Floor
New York, New York 10007

Contact telephone and e-mail numbers:

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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.