DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA725)

Current Human Exposures Under Control

Facility Name: Genaral Electric Co - Fort Edward Plant Site
Facility Address: 581 Broadway, Fort Edward, New York
Facility EPA ID #: NYD093256063

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) 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 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 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? **(Note: This determination addresses contaminated media regulated under New York State's Inactive Hazardous Waste Disposal Site Remedial Program.)**

   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 check the "IN" status code.

Facility Information:

General Electric Company's Capacitor Products Division (GE Fort Edward) facility is located approximately 800 feet east of the Hudson River between the Villages of Fort Edward to the south and Hudson Falls to the north and is approximately 32 acres. Residential areas border the facility to the north, south and east. The site is bounded by Broadway on the east, Park Avenue on the south, and Lower Allen Street and D&H Railroad tracks on the west. A 200-foot wide parcel west of the main portion of the site, between Allen Street and the Hudson River, is also part of the site.

There are seven permanent buildings on the site, including the main manufacturing building, which is comprised of several joined structures constructed over a span of 25 years, and the aluminum rolling mill (Building 40, the "Foil Mill"). The remainder of the site is made up of parking areas and a concrete basin, part of the existing wastewater management system. See Figure 1 (attached).

The facility manufactured selsyn motors between 1942 and 1946. From 1946 to the present, industrial capacitors were manufactured at the site. Operations related to capacitor manufacture have included aluminum rolling, tin plating, polypropylene film manufacture, and refining and blending of capacitor dielectric fluids. A tank farm was used for storage, refining, and distribution of capacitor dielectric fluids. Prior to 1977, the capacitor dielectric fluids used were PCB. Industrial solvents were also used at the site. Over the course of industrial operations at the facility, releases of hazardous wastes (including industrial solvents and PCB) occurred at the site in a number of areas, including at the railroad off-loading area, in the tank farm and "treat" areas (where capacitors were filled with dielectric fluids), in the vicinity of Building 40, and from industrial sewers at the facility. Wastewaters were also discharged untreated via the 004 outfall to the Hudson River prior to 1977 which also contained PCB, resulting in contamination of the area near the 004 outfall, and the Hudson River at large. The facility currently has a RCRA Permit for storage, although it has submitted and received approval for implementation of its storage area closure plan.

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)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	x			(see below)
Air (indoors)[2]		x		
Surface Soil (e.g., <2 ft)		x		
Surface Water	x			
Sediment	x			
Subsurf. Soil (e.g., >2 ft)	x			
Air (outdoors)		x		

____ 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:

Since 1976, numerous hydrogeologic investigations have been conducted at and in the vicinity of the GE Fort Edward facility (Geraghty & Miller 1983; Lawler, Matusky & Skelly 1989; O'Brien & Gere 1997). The results of these investigations have revealed the presence of volatile organic compounds (VOCs) and PCBs in soil and groundwater.

Between July 1995 and January 1997, a supplemental RI was conducted at the facility pursuant to Order on Consent #A5-0316-94-06 between NYSDEC and GE. The RI report and a subsequent feasibility study (FS) were submitted to NYSDEC in January 1997. Based on the results of the RI/FS, a Record of Decision (ROD) for the GE Fort Edward Plant Site was issued by NYSDEC for OU3 and OU4 in January 2000. Operable units 3

[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.

and 4 are the result of ongoing monitoring associated with the GE Fort Edward Site, and the Hudson River.

Description of Operable Units

Reviews (in 1994) of the performance of the remedial programs for OU1 and OU2, along with the discovery of additional sources of contamination not identified in the original RI/FS for the site resulted in the issuance of two Orders on Consent by the Department which address the additional investigations in the vicinity of the manufacturing buildings at the site (OU3), and additional investigations and Interim Remedial Measures (IRMs) in the vicinity of the former 004 Outfall which conveyed wastewater from the site to the Hudson River (OU4).

The facility has been divided into five operable units for investigative and corrective action purposes:

- OU1 was implementation of the offsite overburden groundwater recovery and treatment program in 1989;
- OU2 was the implementation of the onsite overburden and bedrock groundwater recovery and treatment program, DNAPL recovery program, and PCB contaminated soil removal in 1990;
- OU3, the main portion of the plant including contaminated groundwater and soils and PCB non-aqueous phase liquids (NAPL) beneath the facility; and
- OU4, the area of contaminated soils and sediment adjacent to the former 004 outfall on the eastern shore of the Hudson River; and

Operable Unit 01 - Offsite Groundwater

The OU1 remedial program is an ongoing groundwater recovery and treatment program intended to mitigate the shallow groundwater contaminant plume in the overburden soils south of the site. Since implementation of this remedial program, both the areal extent of the plume and the concentration of contaminants within the plume have been significantly reduced (O'Brien & Gere, 1995).

Operable Unit 02 - Onsite Groundwater and Source Removal

The OU2 remedial program was intended to reduce the sources of contamination identified during the original RI/FS at the site in the mid to late 1980's. This remedial program included the removal of contaminated soils in the former railroad offload area and in abandoned leaching pits at the site. This also included the implementation of on-site groundwater recovery and treatment programs in the overburden soils and in the shallow bedrock beneath the site. Recovery of PCB oil from beneath the site was also a portion of the OU2 remedial program.

Operable Unit 03 - Onsite Residual Contamination

OU3 consists of the main portion of the site, including the contaminated groundwater and soil, and PCB non-aqueous phase liquids

(NAPLs) beneath the facility.

Operable Unit 04 - Soil and Sediment Removal Along Shoreline

OU4 consists of the area of contaminated soils and sediment adjacent to the former 004 outfall on the eastern shore of the Hudson River. This area consists of approximately 1350 feet of shoreline at the base of a steep bank. Discharge from the Outfall 004 at the facility resulted in releases of PCBs directly to the Hudson River which have contaminated sediments downstream from the facility.

Summary of Contamination

The GE Fort Edward site is contaminated with several types of compounds, including PCB, a component of the dielectric fluid used in capacitor manufacture, and volatile organic compounds (VOCs), consisting of industrial solvents, and lubricants used during the aluminum rolling process and solvents used to clean parts and machinery.

As described in the RI Report (2000), numerous soil gas, soil, and groundwater samples have been collected at the site to characterize the nature and extent of contamination. Table 1 (attached) summarizes the extent of contamination for the contaminants of concern in the soil and groundwater and compares the data with the Standards, Criteria, and Guidelines (SCGs) for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Overburden Groundwater

During the RI, groundwater samples were collected from 108 on-site monitoring wells, 22 off-site wells, and 4 off-site springs. Groundwater samples from the overburden aquifer were found to contain kerosene constituents, chlorinated solvents (e.g., trichloroethene [TCE], chlorobenzene, 1,1-dichloroethane, 1,1,1-trichloroethane), and PCB. Generally, the groundwater in the bedrock beneath the site had few contraventions of groundwater standards, as the extent of contamination in the bedrock is limited.

In the vicinity of the Foil Mill, shallow groundwater is contaminated above Class GA groundwater standards or guidance values for numerous chemicals, including 1,1-dichloroethane, 1,1,1-trichloroethane, PCB (Aroclor-1242 and Aroclor-1254), and kerosene-related VOCs. Generally, the groundwater quality standards for these chemicals is 5 ppb; PCB have a standard of 0.09 ppb. Selected concentrations of contaminants above standards are 1,1-dichloroethane at 940 ppb, 1,1,1-trichloroethane at 1,100 ppb, kerosene-VOCs from 11 to 1,250 ppb, and PCB (Aroclor-1242 at 310 ppb, and Aroclor-1254 at 5.1 ppb). See Figure 2 (attached) for a map showing the extent of contamination in the overburden groundwater at the site.

A geological unit described as the “transition zone” is located in the southeastern portion of the site. Unlike the rest of the site,

there is a gradual change from the sand aquifer (extending from the surface to approximately 30 feet deep) to the underlying silt and clay layer. This gradual change (called a "gradational contact") resulted in the presence of a series of thin alternating layers of sand and silt/clay. Trichloroethene and/or cis-1,2-dichloroethene were detected at concentrations ranging from 8 to 4,300 ppb, above the 5 ppb groundwater quality water standard for these contaminants. Aroclors 1242 and 1254 were detected at concentrations up to 28.1 ppb.

In the southern portion of the site, groundwater in monitoring wells is contaminated above groundwater quality standards with numerous chlorinated VOCs, such as TCE, cis-1,2-dichloroethene, tetrachloroethene, vinyl chloride, 1,1,1-trichloroethane, 1,1-dichloroethane, chlorobenzene, and 1,2-dichlorobenzene. Total VOC concentrations in the wells ranged from 5 to 10,000 ppb. PCB were detected at concentrations up to 77 ppb. This area is currently controlled by the existing (beginning in 1984) groundwater recovery and treatment system.

As with the on-site areas, off-site wells and springs were contaminated with chlorinated VOCs, including TCE and cis-1,2-dichloroethene (concentrations up to 3,920 ppb). PCB were detected above the groundwater quality standard at concentrations up to 1.9 ppb.

Bedrock Groundwater

During the RI, shallow (generally 45 to 75 feet below grade) bedrock groundwater had several low detections of VOCs. The highest detection was of benzene at 11 ppb (standard of 0.7 ppb) in one well. PCB were detected at concentrations up to 0.92 ppb. Intermediate (generally 75 to 100 feet below grade) bedrock wells had low levels of VOC contamination, mostly below groundwater standards, with the exception of two bedrock recovery wells, which had levels of cis-1,2-dichloroethene up to 7 ppb and vinyl chloride up to 14 ppb. The only detections of PCB above groundwater standards were for Aroclor-1242 in the two recovery wells, with concentrations up to 76 ppb. The deep (generally greater than 100 feet below grade) bedrock wells were not contaminated above groundwater standards for VOCs or PCB.

Supplemental investigations are currently underway to determine if seepage of PCB oil (observed by NYSDEC during implementation of the OU4 remedy along the riverbank in 2003) was indicative of a broader problem in the shallow bedrock in this location. In 2004, six shallow bedrock monitoring wells were installed along the riverbank. The highest concentration of PCB detected in groundwater samples was 86,200 ppb (GeoTrans 2005). The extent of contamination at this location has not yet been determined.

Free-phase liquid

Within the groundwater at the site, there are pockets of

non-aqueous phase liquids, some of which are lighter than water (LNAPLs) or denser than water (DNAPLs). These are usually pure product, such as oils or solvents, which only partially dissolve in water, and float or sink within the aquifer. DNAPLs often pool under water atop surfaces of lower permeability within the aquifer. At the site, DNAPL was observed in the south-central portion of the facility above low-permeability silt and clay deposits. A soil boring program was performed to more closely define the extent of the DNAPL "pool", and the estimate of the volume of PCB oil present in this area is 144,000 gallons. This estimate of PCB oil volume is based upon definition of the volume of soils saturated with PCB oil, and the porosity of the soils.

During remedial activities in 2003, free-phase liquid was observed in the vicinity of the former 004 outfall on the east shore of the Hudson River, indicative of possible bedrock PCB contamination. This issue was discovered during implementation of the OU4 remedy (riverbank soil/sediment removal). Initial investigations by NYSDEC found an area where PCB oil was seeping from the shallow bedrock at and near the former outfall pipe location. The Order on Consent for a preliminary phase of investigation was issued in August 2005.

Soil and Sediment

Historically, soil at the site has been contaminated with VOCs and PCB. The area containing PCB oil in the vicinity of the parking lot (in the south-central portion of the site) was delineated during the RI by a soil boring program in order for alternatives to be developed in the FS to accelerate the recovery of the PCB oil from the soils (O'Brien & Gere 1997). In addition to the extensive soil sampling program in the parking lot area, fifty-three soil samples were also collected from borings drilled under and around the Foil Mill, four were collected from a former leach field, and three were collected along the western boundary of the site. Virtually all of the samples were analyzed for VOCs and PCB.

Near the Foil Mill, the contamination in the soil appears to be limited to the vicinity of the building, and directly related to the oil present in this area, a light, non-aqueous phase liquid (LNAPL) which floats on the water table. This contamination does not appear to extend beyond the plant property. In the former leach field, one boring exhibited elevated levels of PCB in soil (203 ppm). The borings done along the western boundary of the site exhibited PCB concentrations from non-detect to 16 ppm.

Soil sampling was also conducted along the eastern bank of the Hudson River during the RI. Soil samples were found to predominantly contain PCB with some additional volatile and semi-volatile organic compounds. The PCB-contaminated soils were found in areas that were previously at or below the high water level of the Hudson River when the former Fort Edward Dam was still in place. The Fort Edward Dam was removed in 1973, reducing river water levels in this area by approximately 15 feet. Concentrations of PCB in the soils ranged from

0.2 to 44,800 mg/kg (parts per million). In general, the highest levels of PCB were found immediately adjacent to and downstream of the former discharge pipe. The PCB concentrations tended to decrease both upstream and downstream of the former discharge pipe. The results of this sampling demonstrated the presence of PCB at the pre-1974 high water mark; the highest concentrations were found below the pre-1974 water level. The presence of an oil sheen was also observed during the soil sampling event and after OU4 remediation, although recent observations (2004 and 2005) have not confirmed the presence of any oil seeps.

A limited investigation was performed in June 1996 (subsequent to the more extensive soil sampling effort in the same area) to evaluate the presence of free oil at a location near the former 004 discharge pipe. Hand-driven well points were installed at six locations and a test pit was excavated next to one well point to verify the distance to refusal of the well point. The well points were sampled with a bailer to determine if a separate phase oil exists. A sheen was observed in the water removed from the well points; however, there was no evidence of a separate layer of free oil in the well points. The results were consistent with the soil sampling performed previously.

Surface Water

Surface water samples were taken upstream of, at and downstream of the former outfall location to determine the concentration of PCB measured in the water of the Hudson River. Surface water measurements for PCB were taken at the following locations in the Hudson River: 200 feet upstream of the outfall, 4 feet west of where the outfall formerly flowed into the river, and 200 feet downstream of the outfall. The PCB concentrations ranged from less than 0.12 upstream to 16.7 ug/l (parts per billion) adjacent to the outfall location. The surface water standard for PCB is 0.000001 ug/l, or 1 picogram per liter. The highest values were found at the location where the outfall flowed in the river. This information prompted the 1994 rerouting of the outfall to prevent additional PCB loading caused by the discharge water passing through the contaminated material before it entered the Hudson River. Surface water was also sampled upstream and downstream of the former outfall location after the outfall was relocated, which measured concentrations of PCB of 0.172 ug/l upstream of the site, and 0.328 ug/l and 0.410 ug/l adjacent to and downstream of the former outfall location.

In both sampling events, the results indicated higher PCB concentrations downstream of the former outfall location than upstream, indicating that the area is an ongoing source of PCB to the Hudson River. Mechanisms of release to the river could include erosion of contaminated material via scour, groundwater discharging through the contaminated area, rainfall recharge passing through the contaminated area, and river water passing through the contaminated area.

Fish Tissue

Fish samples collected in the Hudson River approximately 1/4 mile

downstream of the 004 outfall deposit showed elevated levels of PCB, ranging from 5.59 to 20.45 ppm. (See Spodaryk, January 1998) These fish would have been exposed to PCB released from both GE plants, at Fort Edward and at Hudson Falls. However, as the water column PCB sampling showed an increase in PCB concentrations as the river passed the 004 outfall deposit, a portion of the PCB found in the fish samples is attributable to the 004 outfall deposits.

Further indications that the 004 outfall deposit is a source of PCB to the river were found in the results of PISCES sampling done by DEC in 1997. PISCES sampling is a method of water sampling which measures the mixtures of PCB present, and relative amounts of PCB present at different locations. The sampling results showed that there was a change in the PCB congener pattern (that is, a change in ratios of which PCB were found in the samplers) from upstream of the 004 outfall deposit to downstream. This change in congener pattern, when evaluated along with the water column sampling described above, indicates that the 004 outfall area is an ongoing source of PCB to the Hudson River.

Indoor Air

In late 2004, the NYSDEC and NYSDOH requested that GE evaluate whether site-related VOCs in groundwater were evaporating into the overlying soil layer and entering nearby buildings through the process of soil vapor intrusion. In response, GE developed and conducted a soil gas investigation to determine if site-related VOCs were present in soil gas (the vapors found within the pore spaces in soil). In addition, the investigation examined homes and businesses in the vicinity of impacted groundwater to determine if vapors in the soil were migrating into overlying buildings and affecting indoor air quality. Figure 3 (attached) is a map showing the sol vapor study area.

Generally, site-related VOCs, mainly TCE, were detected in soil gas samples collected near contaminated groundwater. The soil gas results indicated that the boundaries of the soil vapor plume were contained within a smaller area than the original boundaries of the study area. All areas where site-related VOCs were detected in soil gas were included within the final delineated area, which is further defined below.

GE also collected sub-slab soil gas samples, indoor air samples, and ambient air samples from more than 60 homes and businesses in the study area. The sub-slab soil gas sample results indicated that concentrations of site-related VOCs, mainly TCE, were present at varying concentrations below several buildings located within the study area south of the GE plant site. These structures and some nearby structures were included in the final delineated area. Generally, TCE was detected in sub-slab soil gas samples collected in the area where concentrations of TCE and its breakdown products are present in groundwater. TCE was generally not detected in soil gas samples or sub-slab soil gas samples collected from areas where TCE and its breakdown products are not present in groundwater. No indoor air sample results collected from

private homes in the study area exceeded the NYSDOH guideline value for TCE in air of 5 micrograms per cubic meter. Some indoor air sample results collected from commercial structures located in the study area south of the site slightly exceeded the NYSDOH guideline value. However, one of the elevated sample results was attributed to a supposed source of TCE within the building and the other was collected within a basement storage space (O'Brien & Gere 2005, draft).

An on-site evaluation of vapor intrusion and indoor air quality within the GE Fort Edward Plant is in the planning phase.

References:

1. Geraghty & Miller, Inc., Hydrogeology of the GE Company Capacitor Plant, January 1983.
2. Lawler, Matusky, Skelly, Revised Remedial Investigation Report, December 1985.
3. O'Brien & Gere Engineers, Inc., Five Year Review of Off-Site Remedial Program, July 1995.
4. O'Brien & Gere Engineers, Inc., Fort Edward Remedial Investigation Report, January 1997.
5. O'Brien & Gere Engineers, Inc., Soil Gas Investigation Summary Report (Draft), September 2005.
6. GeoTrans, Inc., Supplemental Remedial Investigation Work Plan Former 004 Outfall, May 2005.

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
~~Air (indoors)~~	____	____	____				
~~Soil (surface; <2 ft)~~	____	____	____	____	____	____	____
Surface Water	no	no			no	no	no
Sediment	no	no			no	no	no
Soil (subsurface, >2 ft)				no			no
~~Air (outdoors)~~	____	____	____	____	____		

Instructions for Summary Exposure Pathway Evaluation Table:

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 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:

The GE facility is located in a moderately populated section of the Town of Fort Edward. Several homes border the site on the south, east and west, while commercial businesses border the site to the north. The site is essentially flat with a gentle slope toward the south. Areas west and east of the site are bounded by steep elevation drops down to the Hudson River and the old Champlain Canal respectively. The

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

shoreline area along the Hudson River is virtually inaccessible.

Summary of remedial actions

The RI/FS completed in 1989 prompted the following remedial activities:

- collection/treatment of on-site and off-site groundwater,
- recovery of separate phase PCB oil,
- enhancement of the on-site water treatment facility, and
- removal/proper off-site disposal of PCB contaminated soils.

A five-year review of the selected remedies (in 1994) led to the discovery of three homeowner wells near the site impacted by low levels of PCBs. All homes in the area that were not already connected to the public water system have been offered free connection to the system by General Electric (GE). Most homes have been connected to the system, including the three impacted homes. A Consent Order, signed in 1994, called for investigation of PCB contamination near the plant outfall area along the shoreline of the Hudson River. The order also required GE to reroute their outfall pipe so that the discharge no longer passes through the contaminated sediments, but over them within the pipe. Installation of a permanent outfall pipe was done in 1996. A supplemental RI was completed at the site under a 1995 Consent Order.

The following IRMs have been completed at the site.

- 1985 - Two production wells were temporarily sealed to prevent migration of contaminants into the deep bedrock aquifer. These wells were permanently sealed in 1996.
- 1994 - A temporary diversion for the plant outfall was installed. The outfall originally flowed through contaminated sediments on the shore of the Hudson River. The permanent diversion was completed in 1996.
- 1994 - Shoreline protection measures were installed to reduce high flow water velocity over PCB contaminated material in the vicinity of the outfall area.
- 1996 - Former outfall pipeline and approximately 2000 cubic yards of pipe bedding were removed. This pipeline and pipe bedding and soil were contaminated with PCB up to 20,000 ppm. This pipeline extended from the southwestern corner of Building 40 west to the top of the cliff on the east side of the Hudson River.

Construction of the selected remedy for OU3 began in September 2002 and was completed two years later in September 2004. The remedy (outlined in the 2000 ROD) involved continued operation of the ongoing remedial programs for Operable Units 1 and 2, expansion of the existing groundwater collection system by the addition of six recovery wells in the transition zone in the southeastern portion of the site, installation of two horizontal recovery wells to collect DNAPL in the southern portion of the site, installation of groundwater recovery trenches to collect the groundwater and LNAPL in the western portion of

the site, and restriction on future uses of the site.

The remedy for OU4 involved excavation of soil and dewatered sediment from areas approximately 160 feet upstream of the former 004 outfall downstream to the northern end of Remnant Site 3. Remediation of the PCB-contaminated soils and sediment along the shoreline was completed in July 2004.

Groundwater

Over the past 20 years, GE has implemented several environmental cleanup programs at the facility that have controlled further movement of TCE-impacted groundwater off the site and effectively reduced the concentration of TCE in the groundwater. Although significant progress has been made, site-related VOCs continue to be found in shallow groundwater in two areas: south of the site extending to West Summit Street and in the northwestern corner of the site near Building 40.

The off-site plume of TCE-contaminated groundwater has been reduced. Both the extent of the off-site plume and concentrations of contaminants within the plume are decreasing (from a high of over 20,000 ppb VOCs) due to the implementation of the OU1 and OU2 remedial programs. This has eliminated concern about contamination at private springs. All residents in the area of the TCE plume are on public water. General Electric sampled all of the remaining private wells in the area and offered to connect all residents to the existing public water. Three wells were identified to contain PCBs, one of which was above the drinking water standard. All three of these have been connected to public water. Remediation has reduced the migration of PCBs to the Hudson River and, therefore, has reduced the potential for human exposure.

The existing bedrock groundwater recovery and treatment system appears to be effective in controlling the contamination in the bedrock beneath the site (O'Brien & Gere, 1995).

Supplemental investigations are currently underway to determine if seepage of PCB oil (observed during the soil, sediment and debris removal along the riverbank in 2003) was indicative of a broader problem in the shallow bedrock in this location. PCB concentrations as high as 86,200 ppb have been measured in the shallow bedrock groundwater here, although the extent of contamination at this location (OU4) has not yet been determined. Figure 4 (attached) depicts the post-remediation conditions in the outfall 004 area and the bedrock groundwater sampling locations proposed (GeoTrans 2005). Access to this area along the riverbank is extremely limited and trespassing is unlikely. In addition, signs are posted warning potential trespassers of the presence of PCB contamination in the area. There are no properties served by private wells in the immediate vicinity which have not been tested, have been connected to public water, or for which there is not an outstanding offer for connection to public water.

Soil and Sediment

Remediation of the PCB-contaminated soils and sediments along the shoreline (OU4), completed in July 2004, involved excavation of soil and dewatered sediment from areas approximately 160 feet upstream of the former 004 outfall downstream to the northern end of Remnant Site 3. Over 23,000 tons of contaminated soil, sediment and debris was removed from the bottom of the bank. Removal was done down to the top of bedrock. No soil or sediment remained in the excavated area. The removal was performed to the top of bedrock and excavated material was disposed off-site. Potential exposure by humans to residual PCB contamination observed in the shallow bedrock is insignificant since access to this area along the riverbank is extremely limited and trespassing is unlikely. In addition, signs are posted warning potential trespassers of the possible presence of PCB contamination in the area.

The EPA Superfund program is in the process of determining what corrective action is necessary for the downstream contaminated sediments in the Hudson River. The downstream sediment program is separate and distinct from this assessment of what additional remedial activities must be done at this facility to ensure control of human exposure and control of groundwater migration. Presently the following institutional controls are in place to prevent human exposures: an advisory against all consumption of fish from the Hudson River between Hudson Falls and Troy; additional species-specific and consumer-specific advisories against consumption of fish between Troy and New York City; and enforcement of a catch-and-release only fishery between Hudson Falls and Troy.

Free-phase liquid

In 1990, two oil recovery wells were installed to collect PCB DNAPL from beneath the south parking area. Approximately 2,000 gallons of PCB oil have been recovered by these two oil recovery wells. In 2004, in accordance with the 2000 ROD, an oil recovery system comprised of two horizontal PCB extraction wells and four vertical recovery wells was installed (GE letter report to NYSDEC dated August 26, 2005). Between September 2004 and June 2005 (nine months), the system has recovered over 6,000 gallons of DNAPL.

Indoor Air (Vapor)

EPA’s Office of Solid Waste and Emergency Response (OSWER) issued “Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils” in November 2002. Among the exposure scenarios discussed in this draft guidance, EPA addressed vapor intrusion into non-residential buildings, including those in occupational settings that may be regulated by the Occupational Health and Safety Administration (OSHA). Specifically, in the Introduction of the Draft Guidance, under Section I.D. (“What Is The Scope of The Guidance?”), OSWER states that “OSHA and EPA have generally agreed that OSHA will take the lead in addressing occupational exposures”, and that

"…EPA does not expect this guidance to be used for settings that are primarily occupational." OSWER reaffirmed this position in a fact sheet titled "Vapor Intrusion and RCRA Corrective Action Environmental Indicators (EI)," issued June 2003.

However, at this time, OSWER is reevaluating the guidance for the vapor intrusion to indoor air pathway in occupational settings. The matter is currently under internal review. OSWER plans to issue updated recommendations on when and how the Draft Guidance should be used.

For purposes of this Human Exposures Under Control EI determination, EPA Region 2 is deferring the determination of whether an unacceptable exposure to human health exists from the vapor intrusion to indoor air pathway in the on-site occupational setting atthe GE Fort Edward facility. Once new draft guidance is issued by OSWER, EPA Region 2 expects to recommend that the vapor intrusion to indoor air pathway be reevaluated at the GE Fort Edward facility to determine if this pathway poses an unacceptable risk to human health in the occupational setting. This deferral applies only to the vapor intrusion to indoor air pathway in the on-site occupational setting exposure scenario.

The results of indoor air sampling from residential structures located off-site indicate that no COCs were detected above the NYSDOH guideline value for TCE in air of 5 ug/m3 within the study area (O'Brien & Gere 2005 draft). However, even though the concentrations of COCs were generally non-detect or below the NYSDOH guideline value for TCE in residential structures, GE has offered to install ventilation/depressurization systems in a total of seventy-seven structures located over the zone where detectable concentrations of COCs were identified in soil gas within the study area. It is anticipated that the ventilation systems will consist of an engineered sub-slab ventilation/depressurization system combined with either sealing probable points of vapor entry through a foundation slab (e.g., cracks and joints in concrete), or placement of an impermeable liner over the earthen subgrade (for structures without foundation slabs). Alternate ventilation options will be considered for implementation (e.g., primarily in larger commercial structures, etc.,) where the installation of the residential-type sub-slab ventilation/depressurization system described above may not be practicable.

References:

1. O'Brien & Gere Engineers, Inc., Five Year Review of Off-Site Remedial Program, July 1995.
2. Ecology & Environment, Outfall 004 Remediation Engineering Certification Report, May 2005.
3. O'Brien & Gere Engineers, Inc., Soil Gas Investigation Summary Report (Draft), September 2005.
4. GeoTrans, Inc., Supplemental Remedial Investigation Work Plan Former 004 Outfall, May 2005.

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): _____

_____

_____

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): _____

_____

[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.

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 Fort Edward Site, located at 381 Broadway, Fort Edward, NY under current and reasonably expected conditions. This determination will be re-evaluated when the 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.

EPA Project Manager: _____ Date _____
Rachel Chaput
New York Section, USEPA Region 2

Supervisor: _____ Date _____
James Reidy
New York Section, USEPA Region 2

Chief: Original signed by: _____ Date: September 30, 2005
Adoph Everett, Chief
RCRA Program Branch, USEPA Region 2

Director Original signed by: _____ Date: September 30, 2005
Walter Mudgan
Division of Environmental Planning and Protection, USEPA Region 2

Locations where References may be found:

References reviewed to prepare this EI determination are identified after each response and are available at the NYSDEC's Central Office at 625 Broadway, Albany, NY 12233.

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.