DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures Under Control

Facility Name: GE Auburn (Powerex)
Facility Address: West Genesee Street, Auburn, NY
Facility EPA ID #: NYD002231272

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.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) 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).

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			(see below)
Sediment		x		
Subsurf. Soil (e.g., >2 ft)	x			(see below)
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 and Reference(s):

Background

The site consists of 55.4 acres of land located on the boundary of the Town of Aurelius and the City of Auburn in Cayuga County, New York. The General Electric Company (GE) purchased the property, formerly farmland, in 1951 and constructed a manufacturing plant where a variety of electric components, including radar equipment, printed circuit boards for high-fidelity equipment, and high-voltage semi-conductors were manufactured. The site was acquired by Powerex in January 1986. Powerex continued to manufacture high-voltage semi-conductors until May 1990, when the plant was closed. In November 1990, GE purchased the site back from Powerex, largely to facilitate remedial activities. The plant remains inactive today.

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[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.

Past waste solvent handling practices at the site included the disposal of waste solvents into one, possibly two, unlined evaporation pits: the purported West Evaporation Pit and the North Evaporation Pit.

An unknown quantity of solvents was reportedly disposed in the purported West Evaporation Pit located in the field just west of the plant building. Acetone may have been used to ignite fires in this pit to burn offloaded liquids. The practice of burning was apparently discontinued and the purported West Evaporation Pit abandoned in 1962 by bulldozing. However, although volatile organic compounds (VOCs) have been detected in overburden soils and groundwater in the field west of the plant building, the exact location, dimensions, and history of the purported West Evaporation Pit remain unknown. Aerial photographs clearly indicated~ that an evaporation pit was not present in this field in July 1954. Additionally, there is no visible expression of a former evaporation pit in aerial photographs taken in June 1963, and analysis of samples from a series of 49 test pits installed in November 1989 failed to indicate any signs of the purported West Evaporation Pit.

The North Evaporation Pit is located north of the northwestern corner of the plant building. Reports indicate that use of this pit began in 1962 or 1963, after the purported West Evaporation Pit was abandoned. During its use, the North Evaporation Pit received an unknown quantity of waste solvents that were gravity-fed to the pit through pipes from the Drum Storage Building located on the north side of the plant building. Use of the North Evaporation Pit was reportedly discontinued when the underground Waste Solvent Tank was installed in 1966 or 1967.

The Waste Solvent Tank was a 21,000-gallon, underground concrete tank located just outside the northwestern corner of the plant building. Waste solvents were periodically removed from the tank and transported off-site for reclamation or disposal. Powerex discontinued use of the Waste Solvent Tank in August 1988 and closed the tank in December 1988 in accordance with a New York State Department of Environmental Conservation- (NYSDEC-) approved closure plan. The Waste Solvent Tank was subsequently removed as part of the Site Preparation Activities, the first phase of construction for the Shallow Bedrock Groundwater Interim Action.

Waste solvents were also stored in two small underground tanks located along the eastern side of the plant building. These two Laboratory Waste Solvent Tanks, which were apparently installed in 1960, were reportedly used to collect waste solvents that were gravity fed via underground piping from the Engineering Laboratory located just' inside the eastern wall of the plant building. Periodically, the contents of these tanks were reportedly pumped into 55-gallon drums, which were subsequently taken to the Drum Storage Building and emptied into the drain leading to the North Evaporation Pit. Use of the two tanks was reportedly discontinued in 1966 or 1967 when the Waste Solvent Tank and the drain lines that connected it to the Engineering Laboratory were installed. The two Laboratory Waste Solvent Tanks were removed in

February 1994 as part of an Interim Remedial Measure (IRM) performed under the Order on Consent executed with the NYSDEC for the Remedial Investigation/Feasibility Study (RI/FS).

Previous Investigations (Phases I-IV)

Systematic investigations of subsurface environmental conditions at the site began in December 1985, when a Phase I Investigation was initiated to evaluate the vertical extent of contaminants in overburden soils at the North Evaporation Pit. This investigation was conducted by Dunn Geoscience Corporation (Dunn) and is documented in a report dated February 1986.

In November 1986, Dunn proceeded with the Phase II Investigation to obtain a general understanding of hydrogeologic conditions and to make a preliminary assessment of the nature and extent of chemical constituents, primarily VOCs, in groundwater in the vicinity of the North Evaporation Pit. The Phase II Investigation is described in a report dated July 1987.

Based on the information obtained during the Phase I and II Investigations, the site was formally added to the NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites (Site Code 7-06-006) in October 1987. The site was designated as a Class 2 inactive hazardous waste disposal site, which requires that a remedial program be developed, including performance of a RI/FS.

Dunn initiated the Phase III Investigation in August 1987 to obtain a more thorough understanding of hydrogeologic conditions, further define the extent of VOCs in groundwater, and determine if VOCs were present in surface water at the site. The results of the Phase III Investigation are presented in a May 1988 report and indicated that VOCs were present in the drainage ditch located in the northwestern corner of the site and also in the storm sewer, which passes through the field west of the plant building.

Dunn began the fourth and final phase of voluntary investigation in August 1988. Although the purpose of this Phase IV Investigation was to better define the three-dimensional extent of VOCs within the bedrock groundwater, a considerable amount of information was also collected for both surface water and overburden soils. The Phase IV Investigation is described in a September 1991 report prepared by Dunn Corporation.

Remedial Investigation (ongoing)

An Order on Consent (Index No. A 7-0286-92-08) was executed between GE and the NYSDEC on March 31, 1993. This order requires that GE perform a RI/FS for the site, and a RI/FS Work Plan was approved by NYSDEC and incorporated into the order. The RI/FS is currently in progress. The Order on Consent also allows GE to propose IRMs for the NYSDEC’s consideration. With NYSDEC's approval, GE has completed three such IRMs to date.

GE retained Dunn Engineering Company to perform the RI. Field activities associated with the RI were initiated in May 1993 and included:

- Inspection of the existing groundwater monitoring network to assess the current condition of existing micro-wells, piezometers, and monitoring wells;
- Collection of water-level data on a monthly basis over a specified period of time to assess current conditions of groundwater flow in and between the various hydrogeologic units;
- Collection of surface water samples from selected locations to confirm prior analytical results for VOCs, acquire information for other analytes, and assess background surface water quality;
- Installation of additional overburden monitoring wells in the vicinity of suspected source areas and the fringe of the overburden contaminant plume for potential use in long-term monitoring;
- Collection of subsurface soil samples near the purported West Evaporation Pit for VOC analysis;
- Installation of a monitoring well in the vicinity of the purported West Evaporation Pit to assess groundwater conditions within the shallow bedrock hydrogeologic unit;
- Collection of one round of groundwater samples from all newly-installed wells and selected existing wells for subsequent analysis for VOCs, and analysis of selected samples for various Target Compound List (TCL) and Target Analyte List (T AL) parameters to assess current groundwater conditions, confirm results from previous investigations and assess background groundwater quality;
- Installation of a pumping well and observation well system within the shallow bedrock hydrogeologic unit for the purpose of performing pump tests;
- Performance of a step-rate pumping test to better characterize the shallow bedrock hydrogeologic unit, determine its response to pumping and collect groundwater samples for analysis of VOCs, methanol and selected inorganic parameters;
- Performance of additional hydraulic conductivity testing in four newly-installed overburden monitoring wells and six newly-installed shallow bedrock monitoring and/or observation wells; and
- Performance of a biodegradation study by Beak Consultants, Ltd. (Beak) of Guelph, Ontario, Canada to evaluate the microbial processes occurring within the shallow bedrock hydro geologic unit.

All of the above tasks have been completed. In addition, some of the contingent tasks of the RI have been triggered and have also been completed, including the permanent decommissioning of selected wells, and the subsequent resampling of certain deep bedrock wells and their associated shallow bedrock wells.

Recommendations were also made to improve the groundwater monitoring system by the abandonment, reconstruction and replacement of certain existing monitoring wells. These recommendations were based upon results of the monitoring network inspection, water-Level measurements, and a review of well construction details. Following DEC approval, these recommendations were implemented.

Based on analytical results obtained from the initial sampling activities, five deep bedrock monitoring wells were found to exceed existing ambient groundwater standards. These wells, along with the associated shallow bedrock monitoring wells, were resampled a few months after completing the well abandonment, reconstruction and replacement activities.

Geology

The site is underlain by 5 to 25 feet of overburden materials which are generally fine-grained and of low permeability. The average thickness is about 15 feet, with 8 feet of glaciolacustrine silts and clays overlaying 7 feet of glacial till. The contact between the overburden and the bedrock is irregular with a relief of about 15 feet.

A thick sequence of carbonate bedrock strata was observed beneath the overburden materials. These strata dip gently to the south at approximately 35 feet per mile. Across the site, approximately 10 feet of change occurs in the elevation of the bedrock strata in a north-south direction. The upper portion of bedrock (i.e., approximately 45 feet) is composed of limestones of the Onondaga and Manlius Formations separated by a thin, intervening remnant of the Oriskany Formation. The deepest bedrock encountered is composed of dolomites of the Rondout, Cobleskill and Bertie Formations which have a total thickness of approximately 120 feet.

Hydrology

With respect to surface water, the drainage ditch flowing northwest from the plant building receives flow from various storm sewer pipes, the drainage ditch running east-west immediately north of the plant building and direct groundwater discharge during wet portions of the year. The mean flow rate in the drainage ditch is approximately 39.6 gallons per minute (gpm) based on measurements at the weir in the on-site trap dam present in the drainage ditch. However, flow in the drainage ditch is "flashy" due to storm water discharge from parking lots, roofs and other impermeable surfaces. Flow exceeds 100 gpm about 10 percent (%) of the time, and exceeds 500 gpm about 0.85% of the time. Surface water flow downstream from the site appears to enter the groundwater regime at a number of swallets located in the stream channel to the northwest. Some surface water flow to Crane Brook appears to occur on an occasional basis during extreme high-flow conditions.

Hydrogeology

A conceptual model of the hydrogeologic system was developed and consists of three units: the overburden materials, shallow bedrock (i.e., Onondaga, Oriskany and Manlius Formations) and deep bedrock (i.e., Rondout, Cobleskill and Bertie Formations). Downward hydraulic gradients exist throughout but are particularly strong between the shallow and deep bedrock units, and water-level differences in excess of40 feet have been observed at some times.

Overburden groundwater flow tends to be directed toward natural surface water bodies except at or near the plant building. Proximate to the plant building, overburden groundwater flows in three ways: to the east-west running drainage ditch north of the plant building; toward storm sewer drains; and/or inward to the plant building. During the RI, the average linear velocity of groundwater flow was calculated as ranging from 0.01 to 0.31 feet per day (feet/day) in the field west of the plant building and from 0.02 to 0.62 feet/day north of the plant building.

Water-level measurements showed that water levels in the shallow bedrock hydrogeologic unit declined substantially during the RI. However, although the water levels declined, the pattern of groundwater flow did not change significantly and is similar to those presented in the Phase IV investigation report. A groundwater divide occurs at the site, although it is somewhat less pronounced during the dry periods than during wet periods. As a result of this divide, groundwater flow within the shallow bedrock unit is believed to be to the northwest and northeast from the plant building. Groundwater flow occurs along individual bedding planes and fractures. The generalized rate of groundwater flow was approximately 5.1 feet/day. This calculation is similar to that reported in previous investigations.

Water levels obtained from deep bedrock wells during the Phase IV investigation and the RI are significantly lower than the elevations of nearby streams. Thus, it appears that groundwater flow in the deep bedrock hydrogeologic unit is toward a more distant, regional discharge zone. Attempts to contour the piezometric surface of this unit have not been successful due to the relatively low hydraulic gradient and anomalous water levels obtained in a few of the deep bedrock wells. Additional activities are planned during the ongoing RI to develop a better understanding of the deep bedrock groundwater system.

Biodegradation Study

As part of the RI, a Biodegradation Study was completed by Beak Consultants, Ltd. (Beak), as documented in an April 1995 report. In summary, Beak conducted a study on the biodegradation of trichloroethylene (TCE) and other VOCs in the groundwater in the three hydrostratigraphic units identified at the site. The objectives of the study were to determine if biodegradation is occurring and proceeding to convert VOCs to innocuous end products, to evaluate the nature of the biological processes, and to assess what role biodegradation could play in the overall remedial program. The information presented in the Biodegradation Study Report indicates that several biological processes are working symbiotically to degrade TCE in the overburden and shallow bedrock units.

Contaminants in Surface Water

During the RI, surface water samples were collected from various locations to confirm prior analytical results for VOCs, acquire information for analytes other than VOCs, and collect information to enable comparison of surface water quality at the site with background conditions. VOCs were detected in surface water samples collected at and downstream from the site. The analytical data indicate that surface water at locations SW-G, SW-CP and SW-Q exhibit concentrations of TCE in excess of New York State's guidance values for Class C waters. VOCs were not detected in the two background surface water samples.

Bis (2-ethylhexyl) phthalate was detected at very low concentrations in all of the samples analyzed, including the two background samples, and its detection is attributed to laboratory and/or sampling artifacts. No other semi-volatile organic compounds (SVOCs) were detected in the surface water samples.

No pesticides, polychlorinated biphenyls (PCBs) or cyanide were detected in any of the samples.

Several naturally-occurring metals were detected in the surface water samples. However, they were present at higher concentrations at the background locations than at the site. The occurrence of these metals is, therefore, not related to the site.

With respect to surface water conditions at the site prior to implementation of the Surface Water Interim Action in 1995 (described in detail below), it appeared that overburden groundwater had discharged to storm sewer drains and the on-site drainage ditch flowing northwest from the plant building during wet portions of the year. Because overburden groundwater in portions of the site contains VOCs, contaminants had previously been detected in surface water in and downstream of those areas. TCE, cis-l,2-dichloroethylene (cis-I,2-DCE), vinyl chloride, and chloroform had been detected in surface water in the storm sewer drains located in the northeastern corner of the West Parking Area and the field west of the plant building. Additionally, flow from the storm sewer drain which ran along the back of the 1962 Building Addition adjacent to the Waste Solvent Tank area appeared to contain tetrachloroethylene (PCE), 1,1,I-trichloroethane (TCA), and xylenes in addition to TCE and cis-I,2-DCE. TCE, cis-l ,2- DCE, and PCE had also been detected in the drainage ditch running behind the plant building.

GE retained O'Brien & Gere Engineers, Inc. (O'Brien & Gere) to perform the FS, and the development of remedial alternatives has been initiated. However, the remainder of the FS cannot be performed until the RI has been completed.

Contaminants in Overburden Groundwater

VOCs were identified as the dominant, if not the only, contaminants of potential concern in overburden soils and groundwater at the site. VOCs were detected in these media in the vicinity of the North Evaporation Pit, purported West Evaporation Pit, Waste Solvent Tank area and at the Laboratory Waste Solvent Tanks. However, the lateral extent of VOCs in the overburden soils and groundwater in these areas is relatively limited, and off-site migration of dissolved contamination in concentrations exceeding groundwater standards does not appear to have occurred in the overburden hydrogeologic unit.

In the primary source areas (i.e., North Evaporation Pit, purported West Evaporation Pit and Waste Solvent Tank area), New York State's groundwater standards were exceeded for TCE, 1,2- DCE, 1, l-dichloroethene (1,1-DCE), 1, l-dichloroethene (1,1-DCA), vinyl chloride, acetone, toluene, ethylbenzene and xylenes in one or more of the overburden monitoring wells sampled. The groundwater standards for tetrachloroethene (PCE), l,l,l-trichloroethane (TCA) and methylene chloride were also exceeded in the overburden groundwater at the Waste Solvent Tank area. Groundwater samples from some wells exhibited VOC concentrations exceeding the groundwater standards by several orders of magnitude. The concentration of TCE was sufficiently high to suggest the possible presence of NAPL, although no NAPL was actually observed in any of the wells sampled during the RI. At the two Laboratory Waste Solvent Tanks, overburden groundwater samples exceeded New York State's groundwater standards for TCE, 1,2-DCE, 1,1-DCE and vinyl chloride, but the concentrations were much lower than in the primary source areas.

Only a few SVOCs were detected in samples collected from overburden monitoring wells. New York State's groundwater standards for phenol, 1,2-dichlorobenzene and 2-methlyphenol were exceeded in one or two wells only. These data indicate that SVOCs, although they do occur at low concentrations in overburden groundwater in the immediate vicinity of the primary source areas, are not a significant concern at the site.

No pesticides, PCBs or cyanide were detected during the RI in groundwater samples collected from the overburden monitoring wells.

The only inorganic parameters that were detected in unfiltered groundwater samples from one or more of the overburden monitoring wells at concentrations that exceeded New York State's groundwater standards and/or guidance values were chromium, copper, iron, lead, magnesium, manganese, and zinc. However, except for copper, each of these metals was also detected in the background well. Moreover, results from the background well also exceeded New York State's groundwater standards and/or guidance values for iron, manganese and magnesium.

Filtered groundwater samples were also obtained during the RI to evaluate the impact of suspended sediment in the samples on the total metals concentrations. For wells at the site, the only dissolved metals that exceeded the standards and/or guidance values were for iron, magnesium and manganese. The concentration of dissolved magnesium also exceeded the guidance value in the background well. It was concluded that metals are not a significant concern in the overburden groundwater and that the chromium, copper, lead and zinc detected in the unfiltered samples are primarily associated with sample turbidity.

Contaminants in Shallow Bedrock Groundwater

Elevated concentrations of certain VOCs were found in the shallow bedrock hydrogeologic unit, notably TCE, 1,2-DCE, vinyl chloride, acetone, toluene, xylenes, PCE, TCA and methylene chloride. The concentration of these VOCs exceed New York State's groundwater standards and/or guidance values in one or more shallow bedrock wells. However, the concentration of VOCs did not exceed the standards or guidance values in 14 of the 27 shallow bedrock wells sampled and analyzed during the RI.

The highest concentrations of TCE were in shallow bedrock monitoring wells located near the primary source areas (i.e., North Evaporation Pit, purported West Evaporation Pit and Waste Solvent Tank Area). Acetone and methanol were generally found to occur in these same areas. The concentrations of TCE in two wells are sufficiently high to be indicative of the potential presence of NAPL. However, the TCE concentrations attenuate rapidly with increasing distance downgradient from the source areas; in general, TCE was not detected in shallow bedrock wells located only 300 to 500 feet from the primary source areas. TCE was also detected in the shallow bedrock groundwater of the two Laboratory Waste Solvent Tanks.

1,2-DCE and vinyl chloride, by-products of the biodegradation of TCE, were the two most frequently detected VOCs in the shallow bedrock groundwater. The distributions of these two compounds are more extensive and continuous than the distribution of TCE. 1,2-DCE and vinyl chloride appear to migrate away from the primary source areas in the shallow bedrock unit. These VOCs are detected in off-site areas to the northwest and to the northeast of the primary source areas. 1,2-DCE and vinyl chloride are also present in the shallow bedrock unit at the two Laboratory Waste Solvent Tanks.

The analytical data indicate that the areal extent and concentrations of toluene and xylenes in the shallow bedrock unit are considerably less than those of either 1,2-DCE, or vinyl chloride The occurrence of these VOCs in the shallow bedrock unit is restricted primarily to the immediate vicinity of the North Evaporation Pit and Waste Solvent Tank. The extent of methylene chloride, PCE and TCA in the shallow bedrock unit appears to be limited to the Waste Solvent Tank area.

None of these VOCs occur beyond the site boundary at concentrations exceeding New York State's groundwater standards.

SVOCs were detected in concentrations exceeding New York State's groundwater standards in only two of the shallow bedrock wells sampled and analyzed during the RI (i.e., wells DGC-8B and DGC-9B). These wells are located in the immediate vicinity of the North Evaporation Pit and Waste Solvent Tank area, respectively. SVOCs were not detected in the other shallow bedrock wells sampled and analyzed during the RI. Thus, it was concluded that the groundwater quality in this unit has not been significantly impacted by SVOCs, and the extent of any site- related SVOCs appears to be very limited.

No PCBs were detected in samples collected from the shallow bedrock monitoring wells. Very low concentrations of three pesticides (i.e., heptachlor epoxide, alpha-chlordane and 4,4'-DDT) were detected in well DGC-8B and/or DGC-9B. These detections, however, were all qualified during data validation. No other pesticides were detected in these two wells, nor were any pesticides detected in the other shallow bedrock wells sampled and analyzed during the RI.

Cyanide was detected in two of the shallow bedrock wells sampled and analyzed during the RI, including the background well. The reported concentrations were well below New York State's groundwater standard.

Unfiltered shallow groundwater samples were collected during the RI and analyzed for metals. The results for arsenic, barium, beryllium, chromium, copper, iron, lead, magnesium, manganese, sodium and zinc exceeded New York State's groundwater standards and/or guidance values in one or more of the samples analyzed. However, except for lead, all of these metals were detected in the background well, and the results for the background well also exceeded New York State's groundwater standards and/or guidance values for iron, magnesium and sodium.

Filtered groundwater samples were also collected and analyzed during the RI to evaluate the impact of suspended sediment in the samples on the total metals concentrations. The results for barium, manganese and sodium exceeded New York State's groundwater standards and/or guidance values in one non-background well each. The standards and/or guidance values were exceeded for iron and magnesium in more than one non-background well. The concentration of dissolved magnesium and sodium in the background well also exceeded New York State's groundwater standards and/or guidance values. Arsenic, beryllium, chromium, copper, lead and zinc detected in the unfiltered samples are likely attributable to suspended matter in the samples. The inorganic analytical data indicate that metals are not a significant concern in the shallow bedrock groundwater system.

Contaminants in Deep Bedrock Groundwater

Analytical results obtained from deep bedrock wells during the RI are generally consistent with data obtained during the Phase IV investigation. 1,2-DCE and vinyl chloride were detected in the deep bedrock groundwater system. These VOCs were detected above New York State's groundwater standards in five of the 17 deep bedrock wells sampled during the RI (i.e., wells B-8D, B-9D, B-20D, B-24D and B-26D). Additionally, an anomalous detection of carbon disulfide was found at 25 micrograms per liter (µg/L) in well B-8D.

1,2-DCE and vinyl chloride may ~~potentially~~ be migrating into the deep bedrock groundwater from the overlying shallow bedrock groundwater, resulting in significant concentration of these compounds in the deep bedrock. Although the vertical permeability of the shallow bedrock unit may be 250 to 500 times lower than its horizontal permeability, water-level data collected during both the Phase IV investigation and the RI indicate that large hydraulic head differences exist between the shallow and deep bedrock units. These gradients suggest a potential for downward flow of groundwater, which in turn might explain why the distribution of VOCs in the deep bedrock unit mimics that observed in the shallow bedrock unit.

Other potential sources of the VOCs in the deep bedrock unit include temporary interconnection of the shallow and deep bedrock units during drilling, and less significant connection of the shallow and deep bedrock units resulting from aspects of well construction. In this regard, numerous monitoring wells were permanently abandoned during the RI to help ensure that such connections are not present.

The five deep bedrock monitoring wells which showed VOC concentrations above New York State's groundwater standards were resampled several months after the well abandonment activities were performed to assess the impact, if any, of that work. The concentration of 1,2- DCE and vinyl chloride declined somewhat, perhaps as a result of the well abandonment activities. The maximum concentrations of these VOCs were 4.9 and II µg/1, respectively. Moreover, the detections of 1,2-DCE were all below New York State's groundwater standard. Additional well installation and sampling was performed during the years 2003(?) to 2004(?),as part of the ongoing RI to further assess concentration trends and develop a better understanding of the deep bedrock groundwater system. The data from this additional sampling indicated high levels of VOCs in the deep groundwater with concentrations of Dense Non-Aqueous Phase Liquid (DNAPL) at concentrations of [Isabel or Eric - Please fill in the concentrations.]

With respect to the other analytes, groundwater samples collected from the deep bedrock monitoring wells demonstrated no detectable concentrations of SVOCs, with one exception. Di- n-butylphthalate was detected at a very low concentration in a background well. This detection was attributed to Laboratory and/or sampling artifacts, but was, nevertheless, well below the New York State's groundwater standard. In addition, no pesticides, PCBs or cyanide were detected from groundwater samples collected from the deep bedrock wells.

Several inorganic parameters were detected in deep groundwater samples collected during the RI. The results for iron, magnesium, manganese and sodium exceeded New York State's groundwater standards and/or guidance values in the background wells. Results from deep bedrock well B-8D, located on-site within the area of the shallow bedrock contaminant plume, exceeded standards and/or guidance values only for iron and magnesium. In fact, the metals concentrations in this well were generally lower than the maximum concentrations detected in the two background wells. Based on these data, the metals detected in the deep bedrock wells are not related to the site.

Similar constituents have been found in the deep groundwater at the Cayuga County Groundwater Contamination Site, which is in close proximity to the GE Auburn facility.

Contaminants in Soil

During removal of two waste solvent tanks (see discussion of February 1994 IRM below), soil samples were obtained from the floor and walls of the excavations and from the stockpiled soils. Analytical results indicated that VOCs, notably trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE) and vinyl chloride, were present in the subsurface soils in the immediate vicinity of the tanks. Stockpiled soils were returned to the excavations and investigative work was then performed, including the following:

- Installation of 22 soil borings around the two waste solvent tanks;
- Field screening of over 200 subsurface soil samples from the borings using a headspace method with two portable gas chromatographs (GCs);
- Laboratory analyses of 44 subsurface soil samples for confirmational purposes;
- Installation of an overburden and shallow bedrock monitoring well in the immediate vicinity of each of the two waste solvent tanks; and
- Collection of two rounds of groundwater samples from the newly-installed monitoring wells for laboratory analysis.

The resulting data are to be incorporated into the RI, and these source areas are to be addressed in the FS for the site.

Indoor Air - Indoor air contamination from vapor intrusion is not an issue at this facility. This is because the off-site shallow groundwater, which flows in a northerly direction is not contaminated. The deep groundwater, which recently was found to be contaminated, is overlain by clean shallow groundwater. Thus, even if there is a connection between the GE site and the Cayuga County Groundwater Contamination Site, vapor intrusion from the deep groundwater would not be seeping into dwellings due to the clean layer of shallow groundwater.

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~~	____	____			____	____	____
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 and Reference(s):

Summary of Human Exposure Pathways

Sampling has confirmed groundwater on-site to be contaminated above groundwater standards. Although off-site migration of VOCs (in the

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

single digit parts per billion range) is occurring, there are no buildings above the contaminated groundwater that might complete the vapor intrusion pathway. Additional investigation of the deep bedrock aquifer off-site is underway. Infiltration of contaminated groundwater into the storm sewer and then to surface water in drainage ditches has been stopped by sliplining the sewers.

Contaminants have been found in the soil at high levels. Groundwater has also been impacted by volatile organic compounds (VOCs). Dense non aqueous phase liquid (DNAPL) has been identified at this site. The contaminants may migrate from this site via surface water, or deep bedrock groundwater.

Previous Interim Remedial Measures (IRMs)

Prior to construction of the Shallow Bedrock Groundwater Interim Action, three IRMs had been completed at the site. Under the observation of Dunn Engineering Company, OBG Technical Services, Inc. (OBG Tech) excavated and removed the two Laboratory Waste Solvent Tanks and their contents in February 1994. This IRM was performed under the Order on Consent pursuant to the NYSDEC-approved Laboratory Waste Solvent Tanks IRM Work Plan dated September 1993. Soil from the base and walls of the excavations was sampled in accordance with the work plan, and VOCs were detected. The excavations were subsequently backfilled and the contingent investigative activities identified in the work plan were performed to determine the extent of VOCs in the vicinity of the two tanks. These investigative activities included soil borings radiating outward from the two tanks and the installation of overburden and shallow bedrock monitoring wells. The resulting data are to be incorporated into the RI, and these source areas are to be addressed in the FS for the site.

The second IRM involved the installation of additional fencing and gates at the site. This Access Restriction IRM was performed by Atlas Fence, Inc. and was completed in December 1994. Construction observation was conducted by O'Brien & Gere. This IRM was also performed under the Order on Consent, in accordance with the NYSDEC-approved Access Restriction IRM Work Plan dated July 1994.

The third IRM focused on surface water. This measure is discussed in detail in the following section.

Interim Actions

To support development and implementation of an Interim Action addressing the surface water and shallow bedrock groundwater, Dunn Engineering Company prepared an Interim Remedial Investigation (IRI) Report to document the investigative activities which had been performed to date pursuant to the NYSDEC-approved RI/FS Work Plan. The investigative activities conducted pursuant to implementation of the Laboratory Waste Solvent Tanks IRM Work Plan are also described in the

IRI Report, which was submitted to the NYSDEC in January 1995.

To expedite implementation of the Interim Action and to further support the associated decision making, GE proposed to conduct certain pre-design investigation activities and also pilot test the use of dual-phase extraction technology at the site. These activities were incorporated into the RI/FS via an addendum to the work plan. The pre-design investigation activities included: sampling of sediments in the drainage ditch at the site; a geotechnical assessment of three existing building foundations for possible reuse during the remedial program; and a constant- head pumping test of the large-diameter well previously installed next to the North Evaporation Pit. The pilot testing consisted of three dual-phase extraction tests; one test was performed on the large-diameter well previously installed next to the North Evaporation Pit (designated PW-1), and the two other tests were performed on large- diameter wells installed next to the Waste Solvent Tank and purported West Evaporation Pit (designated as PW-2 and PW-3, respectively).

After completing the pre-design investigation and pilot testing activities, O'Brien & Gere performed a Focused Feasibility Study (FFS) to evaluate various interim remedial alternatives for surface water and shallow bedrock groundwater. A FFS Report was submitted to the NYSDEC in February 1995. An addendum to the FFS Report that evaluates two additional interim remedial alternatives for the shallow bedrock groundwater, both of which involve hybridized discharge options, was submitted to the NYSDEC in September 1995. The FFS Report Addendum did not impact the recommended interim remedial alternative for surface water.

In the FFS Report, a number of remedial alternatives to address the surface water at the site were developed and analyzed. Alternative SW2 was the recommended remedial alternative and included the following major activities:

- Removal and off-site disposal of impacted sediments in the on-site drainage ditch upstream of the Trap Dam;
- Slip-Lining or grouting portions of the storm sewer piping to mitigate the infiltration of impacted overburden groundwater;
- Installing piping in the on-site drainage ditch to mitigate the infiltration of impacted overburden groundwater; .Removal and off-site disposal of the abandoned agriculture drainage pipe at the northwestern corner of the site; and
- Conducting a comprehensive monitoring program to document effectiveness.

In the FFS Report and its addendum, a number of remedial alternatives were developed to address the shallow bedrock groundwater at the site. Alternative SBGW4D was the recommended remedial alternative and included the following activities:

- Extracting groundwater from the shallow bedrock hydrostratigraphic unit;

- Constructing, starting up, and operating an on-site groundwater treatment system;
- Discharging treated groundwater by the combination of several methods including (a) recharge back to the shallow bedrock unit via injection wells, (b) discharge to the on-site surface water, (c) discharge to the City of Auburn's wastewater treatment plant, and, possibly, (d) recharge to the ground surface via sprinkle irrigation during the growing season; and
- Conducting a comprehensive monitoring program to document effectiveness.

The NYSDEC prepared a Proposed Interim Action Plan (PIAP) in February 1996 which presented the Interim Action. Following the PIAP, the NYSDEC, in consultation with the New York State Department of Health (NYSDOH), issued an Interim Action Record of Decision (ROD) in March 1996. The Order on Consent was subsequently amended on May 12, 1997 to allow implementation of the Surface Water and Shallow Bedrock Groundwater Interim Actions. The Surface Water and Shallow Bedrock Groundwater Interim Actions, with subsequent enhancements, are described in the following sections.

Surface Water Interim Action

A Basis of design Report, dated September 7, 1995, was prepared by Blasland, Bouck & Lee, Inc. (BBL) to present the fundamental design concepts for the Surface Water Interim Action. GE submitted this report to the NYSDEC, and, to expedite implementation, proposed to complete the construction activities for the Surface Water Interim Action as a third IRM under the existing Order on Consent. In October 1995, NYSDEC approved commencement of the work described in the Surface Water Interim Action Basis of Design Report as a third IRM. BBL Environmental Services, Inc. (BBLES) was selected by GE as general contractor to implement the Surface Water Interim Action, which consisted of the following major activities:

- Removal and off -site disposal of impacted sediments from the on-site drainage ditch upstream of the Trap Dam; .Removal and off -site disposal of abandoned agricultural drainage pipe from the field west of the plant building; .Decommissioning nine storm sewer catch basins in the West Parking Area;
- Slip-Lining the existing reinforced concrete pipe (RCP) from manhole MH-l to the on-site drainage ditch with high density polyethylene (HDPE) pipe;
- Decommissioning or removing some of the existing storm sewer system north and west of the plant building ! and replacing with a water-tight HDPE storm sewer system;
- Removing and replacing with HDPE piping the storm sewer section near the former Laboratory Waste Solvent Tanks;
- Demolishing and off-site disposal of the former Oil Storage Building and adjacent concrete trays; and
- Removal to grade and off -site disposal of four concrete tank

saddles and the northern section of concrete diking in the Waste Solvent Tank area.

Construction of the Surface Water Interim Action began in early November 1995 and was substantially completed by the end of December 1995. Surface restoration was completed in June 1996. GE submitted an Engineering Certification Report, prepared by BBL, to the NYSDEC in February 1996.

Surface Water Interim Action Enhancement

Sampling conducted following construction of the Surface Water Interim Action indicated the continued presence of VOCs (primarily TCE, cis-1,2-DCE, and PCE) in the storm sewer system at the site. To address the continued presence of VOCs in the site storm sewer system, GE proposed implementation of a Surface Water Interim Action Enhancement. A Basis of Design Report, dated October 30, 1996, was prepared by BBL to present a detailed design for the Surface Water Interim Action Enhancement. GE submitted this report to the NYSDEC in November 1996. Information regarding the potential air emissions associated with the Surface Water Interim Action Enhancement was also submitted to NYSDEC in November 1996 for the purpose of determining substantive requirements, if any. The NYSDEC provided approval to proceed with the proposed enhancement activities in December 1996.

BBLES was selected by GE as general contractor to implement the Surface Water Interim Action Enhancement. Implementation of the Surface Water Interim Action Enhancement consisted of the following major activities:

- Installing an incoming electrical service to provide power for the Surface Water Interim Action Enhancement and for the future Shallow Bedrock Groundwater Interim Action;
- Installing an air sparging system in catch basin CB-16 to aerate the water in the site storm sewer system;
- Installing an equipment enclosure adjacent to catch basin CB-16 to house the air sparging system equipment and controls; and
- Installing security fencing around catch basin CB-16 and the equipment enclosure.

Construction of the Surface Water Interim Action Enhancement began in December 1996 and was substantially completed in January 1997. GE submitted an Engineering Certification Report, prepared by BBL, to the NYSDEC in February 1997. Operation of the Surface Water Interim Action Enhancement began in January 1997 and continues today.

Shallow Bedrock Groundwater Interim Action

As stated previously, the FFS Report recommended alternative SBGW4D to address shallow bedrock groundwater at the site. GE retained Radian Engineering, Inc. (Radian) to perform the design activities associated with the Shallow Bedrock Groundwater Interim Action. A Basis of Design Report, dated October 7, 1996, was prepared to present the fundamental design concepts for the Shallow Bedrock Groundwater Interim Action. The 2-PHASE Extraction TM technology patented by Xerox Corporation was selected to perform the groundwater extraction component of the Shallow Bedrock Groundwater Interim Action. The 2-PHASE Extraction process was chosen because it is the most aggressive method for accomplishing hydraulic control of groundwater at this site. To accelerate implementation of the Shallow Bedrock Groundwater Interim Action, the construction activities were conducted in two phases.

The first phase consisted of the Site Preparation Activities that needed to be completed prior to installing the on-site groundwater extraction and treatment system. This phase consisted of the following activities:

- Demolishing and removing the Waste Solvent Tank and the Temporary Plating Solution Storage Tank;
- Renovating a portion of the 1975 Building Addition interior for use as the Primary Treatment Room; and
- Installing a water service to the southwestern corner of the renovated 1975 Building Addition that utilized existing sections of water main piping, capped unused sections of water main piping, and installed new sections of water main piping.

Clean Harbors Environmental Services, Inc. was selected by GE as general contractor to perform the Site Preparation Activities. Construction began in July 1997 and was substantially completed in February 1998. GE submitted an Engineering Certification Report, prepared by Radian, to the NYSDEC in July 1998.

The second phase of the construction for the Shallow Bedrock Groundwater Interim Action consisted of installing an on-site groundwater extraction and treatment system and was performed in accordance with the following design documents:

- Shallow Bedrock Groundwater Interim Action Treatment System Materials and Performance Specifications (Radian, December 17, 1997); and
- Shallow Bedrock Groundwater Interim Action Treatment System Contract Drawings (Radian, December 17, 1997).

BBLES was selected by GE as general contractor to implement the second phase of construction. Implementation of this phase of the Shallow Bedrock Groundwater Interim Action consisted of the following major activities:

- Installing a Remote Treatment Building for treatment of groundwater from extraction wells PW-6 and PW- 7; .Installing irrigation field piping and sprinkler heads;
- Installing piping, valve boxes, buried conduit, and other buried utilities;
- Installing equipment previously purchased by GE in the Primary

Treatment Room and the Remote Treatment Building;

- Installing Primary Treatment Room system equipment, piping, wiring, and associated instrumentation;
- Installing electrical and instrumentation conduits from the Primary Treatment Room to the Remote Treatment Building;
- Installing natural gas piping from the gas main on West Genesee Street to the Primary Treatment Room;
- Installing telephone service to the Primary Treatment Room;
- Installing treated- and partially-treated water holding tanks; and
- Installing an asphalt cap over the former Waste Solvent Tank area.

Construction of the second phase of the Shallow Bedrock Groundwater Interim Action began in April 1998 and , was substantially completed in December 1998. GE submitted an Engineering Certification Report, prepared by BBL, to the NYSDEC in May 1999.

In addition to the above-described facilities, a total of seven recovery wells and four injection wells will be used in the Shallow Bedrock Groundwater Interim Action. Three of the recovery wells (i.e., PW-1, PW-2, and PW-3) were installed during previous RI activities. The other four recovery wells (i.e., PW -4, PW -5, PW -6, and PW- 7) and the four injection wells (i.e., IW-1, IW-2, IW-3, and IW-4) were installed by O'Brien & Gere in December 1997.

Shallow Bedrock Groundwater Interim Action Enhancement

Following construction of the Shallow Bedrock Groundwater Interim Action, the NYSDEC issued preliminary substantive requirements for water discharges from the groundwater treatment system, which included very low discharge limitations for certain discharge locations (e.g., the irrigation fields). To achieve these discharge requirements, GE proposed the addition of a low-profile air stripper as an enhancement to the Shallow Bedrock Groundwater Interim Action treatment system. The air stripping equipment was designed to provide additional treatment of any remaining VOCs in the groundwater before discharging to either of the irrigation fields (or surface water, if that discharge option is used in the future). GE retained BBL to perform the design activities associated with the Shallow Bedrock Groundwater Interim Action Enhancement. A Basis of Design Report, dated August 21, 2000, was prepared to present a detailed design for the Shallow Bedrock Groundwater Interim Action Enhancement. GE submitted the Basis of design Report, prepared by BBL, to the NYSDEC in August 2000.

BBLES was selected by GE as general contractor to implement the Shallow Bedrock Groundwater Interim Action Enhancement that consisted of the following major activities:

- Procurement and installation of the low-profile air stripper;
- Modification of existing piping to accommodate the new air stripper system equipment;
- Insulation of inlet air ductwork and an in-line duct heater;

- Insulation of an air discharge stack including the roof penetration; and
- Insulation of electrical and instrumentation conduit and wiring including tie-in of select air stripper alarms and operational parameters to the existing main programmable logic controller (PLC).

Construction of the Shallow Bedrock Groundwater Interim Action Enhancement began in November 2000 and the low-profile air stripper was installed in December 2000. Computer programming to integrate the air stripper with the Shallow Bedrock Groundwater Interim Action treatment system was completed in March 2001. GE will submit an Engineering Certification Report to the NYSDEC following completion by BBL.

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): ____

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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

Rationale and Reference(s): ____

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[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 Auburn (Powerex) facility located at Auburn, 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.

Completed by ____ Date _______________
Eric Hausamann
Environmental Engineer 2

Supervisor ____ Date _______________
James Harrington
Bureau of Program Management
Division of Environmental Remediation

Director Original signed by:________________________ Date: 12/31/2004
Edwin Dassatti
Bureau of Radiation and Hazardous Site Management
Division of Solid and Hazardous Materials

Locations where References may be found:

New York State Department of Environmental Conservation
Region 7
615 Erie Blvd. West
Syracuse, NY 13204-2400

Contact telephone and e-mail numbers

Kevin J. Kelly
(315) 426-7551
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