DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: **GE Fanuc Automation**
Facility Address: **2500 Austin Drive, Charlottesville, VA 22906**
Facility EPA ID #: **VAD980551782**

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?

   X If yes - check here and continue with #2 below.

   ☐ If no - re-evaluate existing data, or

   ☐ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. 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 RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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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			Volatile Organic Compounds and Metals
Air (indoors)[2]		X		No Record of Contamination
Surface Soil (e.g., <2 ft)	X			Volatile and Semi-Volatile Organic Compounds, Metals and Cyanide
Surface Water		X		No Record of Contamination
Sediment		X		No Record of Contamination
Subsurf. Soil (e.g., >2 ft)	X			Volatile and Semi-Volatile Organic Compounds, Metals and Cyanide
Air (outdoors)		X		No Record of Contamination

☐ 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):

General Facility Information:

The GE Fanuc Automation Facility (hereinafter referred to as Facility) is located at 2500 Austin Drive in Charlottesville, Albermarle County, Virginia. The Facility is on 74 acres in the Piedmont region of Virginia approximately one mile from Pine Mountain (in the Blue Ridge Mountains). The Facility began operations on December 4, 1978 as the General Electric Company and manufactured printed circuit boards which included electroplating operations. On December 29, 1986, the Facility was renamed GE Fanuc Automation as part of a joint venture between General Electric Company and Fanuc Ltd., a Japanese company. The joint venture was dissolved on December 11, 2009 and the Facility in now operating independently under GE Intelligent Platforms. GE Intelligent Platforms manufactures various industrial products including programmable controllers, numerical controls, industrial computers, manufacturing software, factory automation systems, printed circuit boards, and data communications networks. The Facility also conducts research and development.

Soil and/or Groundwater Investigations:

Etchant Tank Area

In April 1995, the Facility modified its Etchant Tank Area (ETA) by: (1) removing and replacing its virgin and waste etchant tanks, (2) removal and replacement of the concrete secondary containment structure surrounding the etchant tanks, and (3) coating/sealing the new concrete floor and secondary containment structure. After the etchant tanks were removed, stains were observed on the floor underlying the former waste etchant tank. Since several cracks were also detected in the concrete floor of the ETA secondary containment area, the Facility initiated as assessment of the underlying soils and closure of the ETA. VADEQ was notified of the planned closure in April 1995.

In accordance with GE Fanuc's Closure Plan and the Virginia Hazardous Waste Management Regulations (VAHWMR), the soils beneath the ETA were assessed to determine whether soil impact had occurred. The assessment included a statistical evaluation of soil quality data for the ETA and background soil samples collected from the background area (BA) designated in the Facility's Closure Plan. Soil samples were collected from the ETA and BA on three separate occasions

and analyzed for arsenic, barium, cadmium, chromium, lead, selenium, silver, ammonia and pH. Results of the soil assessment identified constituents that may be characteristic of virgin and waste etchant material. These constituents were identified to a depth of 13.5 feet below land surface in the ETA. The results of the statistical evaluation indicated that concentrations of metals detected in soil samples collected from the ETA were statistically higher than concentrations of the metals in the background soil samples collected from the BA. However, analytical results for virgin etchant and waste etchant samples collected at the site indicate concentrations of the metals of concern are generally significantly lower than metal concentrations detected in the ETA soils. Therefore, it was concluded that the statistically higher metals levels in the ETA soils are naturally occurring, and thus, not the result of a release of etchant material from the ETA.

Tanks #1 and #2

In 2005, the Facility closed two underground storage tanks, referred to as Tank #1 and Tank #2. Tank #1 and Tank #2 were identified as Solid Waste Management Units (SWMUs) by the United States Environmental Protection Agency (USEPA) in a 1991 RCRA Facility Assessment. Specifically, Tank #1 was identified as SWMU #1 and #7 and Tank #2 was identified as SWMU #11. During closure of Tanks #1 and #2, a sampling program was conducted the week of July 19, 2004 to evaluate the soil and ground water quality surrounding the tanks and piping.

A Geoprobe® was used to perform soil sampling and temporary well installation. A total of twenty-four borings were completed to evaluate whether historical releases had occurred from the tanks and/or associated pipe lines. Four soil borings were installed to evaluate Tank #1, four soil borings were installed to evaluate Tank #2, and sixteen soil borings were installed to evaluate the integrity of the pipelines. Groundwater was encountered in the vicinity of Tank #1 and Tank #2 at approximately 20 feet below surface (fbs) and temporary monitoring wells were installed.
Soil and groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), RCRA metals plus mercury, and cyanide. Analytical results were compared to the USEPA Region III Risk Based Concentrations (USEPA Region III, April 14, 2004). These Risk Based Concentrations (RBCs) are calculated and published by the Region III EPA for use in screening of potential human health risk at contaminated sites. Soil analytical results were compared to the RBCs for industrial sites as well as the soil to groundwater screening levels. Groundwater sample results were compared directly to the RBCs for tap water.

A variety of VOCs, SVOCs, metals, and cyanide were detected in the soil samples; however, all of the VOC, SVOC and cyanide concentrations were below the RBC for industrial soil as well as the soil to groundwater screening level. Arsenic and chromium were the only constituents detected at consistent concentrations above RBCs. Arsenic was detected at concentrations above the industrial RBC or soil to groundwater screening level in all samples analyzed. Soil observed at the site can be described as silty and has arsenic concentrations ranging from 1.1 milligram per kilogram (mg/kg) to 12 mg/kg. Natural arsenic levels vary in silty soils from 0.7 parts per million (ppm) to 15 ppm. Therefore it is very likely that the elevated arsenic concentrations are indicative of natural soil conditions and not associated with a release from Tank #1 or Tank #2.

Samples were analyzed for total chromium, which consists of a mixture of trivalent (Chromium III) and hexavalent (Chromium VI) chromium. Chromium was detected above the soil to groundwater screening level, but below the RBC for Chromium VI in two of the soil samples (BH-4 and BH-5); however, much, if not all, of the chromium detected is likely to be Chromium III. Detected concentrations are all several orders of magnitude below the soil to groundwater screening level for Chromium III (which is 2,000,000,000 mg/kg). Groundwater samples were also collected from BH-4 and BH-5, and chromium was detected below the tap water RBC for Chromium VI in both samples. Based on these results, these two isolated occurrences of elevated chromium in soil were not indicative of a release and more than likely reflect natural variations.

A variety of organic compounds were detected in the groundwater samples. Ten VOCs were detected, three – chloroform, tetrachloroethene (PCE), and trichloroethene (TCE) – at concentrations above the tap water RBCs. PCE and TCE were detected in only one groundwater sample from BH-5, and these detections were "J" flagged indicating that the constituents were detected at a concentration above the instrument detection limit, but below the quantitation limit, therefore the exact concentration could not be quantified, only estimated. Chloroform was detected above the RBC in the groundwater samples collected from BH-4 and BH-5 (J-value). Two SVOCs were detected in the groundwater sample from BH-4, with only bis(2-ethylhexyl)phthalate detected at a "J" flagged value exceeding the tap water RBC.

While none of these organic compounds are naturally occurring, they are ubiquitous in industrial settings and the extremely low (most "J" flagged) concentrations detected are not necessarily indicative of a release from Tank #1 or Tank #2. PCE and TCE, in particular, were not detected in either the tank fluids, or the soil surrounding the tanks or pipe lines. Bis(2-

ethylhexyl)phthalate was detected in the soil surrounding the tanks and pipe lines at concentrations below the RBC and soil to groundwater screening levels. This constituent is highly insoluble, and its detection in groundwater was suspect. The detection of this constituent is more likely representative of its presence in soil.

Eleven metals were detected in groundwater, three – arsenic, lead, and zinc – at concentrations exceeding the tap water RBC. These constituents are naturally occurring and were found at concentrations several orders of magnitude higher in the surrounding soil. As such, the detection of these constituents in groundwater was determined to be naturally occurring and not the result of a release from Tank #1 or Tank #2.

SWMUs #7 and #18

On November 4, 2004, GE Fanuc Automation agreed to participate in EPA Region 3's Facility Lead Agreement (FLA). The FLA was developed by EPA to address RCRA corrective action facilities and encourage such facilities to take the lead in addressing corrective action using a generic, non-enforceable, agreement which includes the same requirements, and relies on the same scope of work and policy as a permit or an order. Corrective action facilities invited into the program generally meet a number of the following factors: good enforcement record, state approval, financial and technical capability, a proactive approach to clean up, and a willingness to work with the Agency.

Under the FLA, GE Fanuc Automation collected and analyzed groundwater samples to assess the groundwater quality in the vicinity of (1) the former Wastewater Treatment (IWT) Tank #1, which is identified as SWMU No. 7; and (2) the former wastewater drain field at SWMU No. 18. On January 11, 2010, one groundwater monitoring well was installed downgradient of and adjacent to SWMU No. 7 and SWMU No. 18. Soil samples were collected during construction of each of the monitoring wells and screened for total volatile organic compound (VOC) vapors using a photoionization detector (PID). Readings of 5 parts per million (ppm) or less were detected by the PID, and the soil samples showed no visual or olfactory evidence of anthropogenic impact. Therefore, no soil samples were retained for laboratory analysis.

Groundwater sampling of the monitoring wells, identified as MW-1 for SWMU No. 18 and MW-2 for SWMU No. 7, was conducted on January 25, 2010. The groundwater samples were analyzed for Target Compound List (TCL) VOCs, TCL Semi-volatile Organic Compounds (SVOCs), and dissolved (i.e., field filtered) Priority Pollutant List (PPL) metals. Other than a trace amount of chloroform at an estimated concentration of 2 micrograms per liter (µg/L), TCL VOCs were not detected in any of the groundwater samples. Chloroform, which is a common laboratory cross contaminant, is currently not used at the Facility, nor has it been used by the Facility in the past. Furthermore, the chloroform value is listed as a J value, indicating it is an estimated value. Therefore, it was determined that the chloroform detection is not representative of the groundwater quality at the site. TCL SVOCs were not detected in any of the groundwater samples. Trace concentrations of copper, nickel and zinc were detected; however, all of the reported concentrations were well below EPA and VADEQ's screening levels.

Based on the findings of the sampling, EPA has concluded that the soil and groundwater quality within the vicinity of SWMU's No. 7 and 18 does not pose any potential for harm to human health or the environment.

References:

(1) RCRA Facility Assessment of GE Fanuc Automation, May 1991
(2) Assessment Report for Etchant Tank Area, May 1995
(3) GE Fanuc Closure Work Plan, September 2004
(4) GE Fanuc Work Plan Implementation Report, April 2010

Footnotes:

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

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

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

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	No	No	No	No
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft)	No	No	No	No	No	No	No
~~Surface Water~~							
~~Sediment~~							
Soil (subsurface e.g., >2 ft)	No	No	No	No	No	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):

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

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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

☐ 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):

[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.

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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 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):

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI (event code CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (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 Fanuc Automation facility, EPA ID # VAD980551782 located at 2500 Austin Drive, Charlottesville, Virginia under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

☐ NO - "Current Human Exposures" are NOT "Under Control."

☐ IN - More information is needed to make a determination.

Completed by (signature) signed 6/21/2010 Date ____
(print) Jeanna R. Henry
(title) Remedial Project Manager

Supervisor (signature) signed 6/21/2010 Date ____
(print) Luis Pizarro
(title) Associate Director
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Locations where References may be found:

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