DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: **Compaq Computer Corporation**
Facility Address: **Sabana Grande, Puerto Rico**
Facility EPA ID #: **PRD000706333**

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 ACurrent Human Exposures Under Control@ EI determination (AYE@ status code) indicates that there are no Aunacceptable@ human exposures to Acontamination@ (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 Acontamination@ 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 ACurrent 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).

Facility Information

The Compaq Computer Corporation (Compaq) site is located on the top of a mountain at an elevation of 780 feet above mean sea level (See Attachment 1). The site consists of a 0.55 acre irregular shaped impoundment facility with four earthen walled lagoons. Metal hydroxide sludges generated by Digital Equipment Corporation=s (DEC) San German facility were placed in the lagoons from 1977 to 1983. In 1984 a majority of the sludge was removed from the lagoons and shipped to a metal reclamation company. In 1988 the remaining sludge was removed except for a layer on top of the bedrock. The lagoons were filled with clean soil and graded. Compaq acquired DEC in 1998.

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 #6 and enter AIN@ (more information needed) status code.

Summary of Solid Waste Management Units (SWMUs): A SWMU map has been provided as Attachment 2.

SWMU 1, Lagoon A: Earthen walled lagoon excavated to 3 feet below ground surface (bgs). This lagoon is located in the middle of the impoundment and is approximately 40 feet by 20 feet.

SWMU 2, Lagoon B: Earthen walled lagoon excavated to 12 feet bgs.. This lagoon is located southwest of Lagoon A and is approximately 100 feet by 40 feet.

SWMU 3, Lagoon C: Earthen walled lagoon excavated to 12 feet bgs. This lagoon is located south of Lagoon A and is approximately 80 feet by 50 feet.

SWMU 4, Lagoon D: Earthen walled lagoon excavated to 12 feet bgs. This lagoon is located north of Lagoon A and is approximately 80 feet by 80 feet.

Reference:

Hydrogeologic Assessment, December 1986, GZA Associates.

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

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater		X		
Air (indoors)[2]		X		
Surface Soil (e.g. , < 2 ft.)		X		
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g. > 2 ft.)	X			chromium, lead, copper
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:

Subsurface Soil (e,g., > 2ft.):

In 1988 soil from the four lagoons in the impoundment area was removed. Sixty-six samples were taken from the impoundment area and twelve had elevations of chromium, lead, and copper above action levels for cleanup. Lagoon B had the following concentrations: chromium, 3400 mg/kg; lead, 898 mg/kg; and copper, 5250 mg/kg. Lagoon C had concentrations of: chromium, 3747 mg/kg; lead 1910 mg/kg; and copper, 5095 mg/kg. Lagoon D had concentrations of: lead, 432 mg/kg; copper, 3600 mg/kg; and chromium was not above action levels. Lagoon A did not have any concentrations above action levels. The cleanup action levels established for this facility for chromium, lead, and copper are 3000 mg/kg, 300 mg/kg, and 3000 mg/kg respectively. Action levels for cleanup were established with EPA Region II representatives by reviewing background sample analyses in the vicinity of the site. These levels are based on background levels for the surrounding area.

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[1] AContamination@ and Acontaminated@ 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 Alevels@ (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.

Groundwater:

Lysimeters were installed around and in the impoundment to measure porewater. The lysimeter in Lagoon C had levels of tetrachloroethene of 8 Fg/l and chromium of 0.101 mg/l. The MCL for groundwater for tetrachloroethene and chromium is 5 Fg/l and 0.1 mg/l respectively. The concentrations are slightly above the associated MCLs for groundwater but these cannot be compared directly. The depth to groundwater is approximately 200 feet so it is unlikely that the levels of contamination in the porewater would impact the groundwater. Even if the contaminants reached the groundwater at the same concentration as measured in the lysimeters there would be no impact to the groundwater due to dilution. The EPA approved risk assessment conducted at the facility indicates that there is no impact to groundwater at the site due to a net loss of water as a result of a high rate of evaporation. There is a groundwater seep located 200 feet down gradient of the site which was sampled in 1999. There were no concentrations of metals or VOCs above the associated MCLs. There are limitations with measuring VOCs from a seep due to volatization upon discharging to the surface. However, the concentration of VOCs detected in the lysimeters would not impact the groundwater due to dilution. Finally, there are no drinking water wells within close proximity of the site.

Air (indoors):

There are no structures on the site. Therefore, indoor air exposures are not a concern.

Soil (surface e.g., <2 ft.):

The lagoons have been filled in with clean soil and the sludge that could not be removed is located at the base of the lagoons, which is deeper than 2 feet.

Surface Water:

The risk assessment conducted at the facility indicates that there is no impact to surface water from the site due to a net loss of water due to a high rate of evaporation. The risk assessment stated that the site was not impacting human health and the environment including the surface water in the area.

Sediment:

The risk assessment conducted at the facility indicates that there is no impact to the sediments in the surface water from the site due to a net loss of water due to a high rate of evaporation. The risk assessment stated that the site was not impacting human health and the environment including the surface water in the area, which would include the sediments in the surface water.

Air (outdoors):

The contamination in the soil is metals, which do not volatilize. EPA has not developed a reference dose for inhalation exposures for chromium, lead, and copper. The risk assessment evaluated the inhalation exposure from the contaminants becoming airborne in the form of dust. Exposure levels estimated in the risk assessment were much lower than levels estimated for direct contact and incidental ingestion and would be expected to pose even less of a health impact.

References:

Demonstration of Clean Closure, May 1990, GZA Associates.
Workplan for Additional Lysimeter Sampling, 4/7/98, Digital Equipment Corporation.
Interim Reporting of Sampling Data, 1/20/2000, GZA Associates.

3. Are there **complete pathways** between Acontamination@ 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	Trespasser	Recreation	Food[3]
~~Groundwater~~					--	--	
~~Air (indoors)~~				--	--	--	--
Surface Soil (e.g. < 2 ft)							
~~Surface Water~~			--	--			
~~Sediment~~			--	NA			
Subsurface Soil (e.g. > 2 ft)	--	--	--	No	--	--	No
~~Air (outdoors)~~						--	--

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptor's 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 (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. These spaces instead have "–". 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 AContaminated@ Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any AContaminated@ Media - Human Receptor combination) - skip to #6 and enter AIN@ status code.

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

Rationale:

A human health risk assessment was conducted using a Aworst case scenario@ of a small child in direct contact with the contaminated soil. The assessment resulted in no exposures above EPA health-based limits.

Reference:

Demonstration of Clean Closure, May 1990, GZA Associates.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be "**significant**"[4] (i.e., potentially Aunacceptable@ 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 Alevels@ (used to identify the Acontamination@); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable Alevels@) could result in greater than acceptable risks)?

____ If no (exposures can not be reasonably expected to be significant (i.e., potentially Aunacceptable@) for any complete exposure pathway) - skip to #6 and enter AYE@ status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to Acontamination@ (identified in #3) are not expected to be Asignificant.@

____ If yes (exposures could be reasonably expected to be Asignificant@ (i.e., potentially Aunacceptable@) for any complete exposure pathway) - continue after providing a description (of each potentially Aunacceptable@ exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to Acontamination@ (identified in #3) are not expected to be Asignificant.@

____ If unknown (for any complete pathway) - skip to #6 and enter AIN@ status code.

Rationale and Reference(s): This question is not applicable, see answer to Question 3.

[4] If there is any question on whether the identified exposures are Asignificant@ (i.e., potentially Aunacceptable@) consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the Asignificant@ **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all Asignificant@ exposures have been shown to be within acceptable limits) - continue and enter AYE@ after summarizing and referencing documentation justifying why all Asignificant@ exposures to Acontamination@ 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 Aunacceptable@)- continue and enter ANO@ status code after providing a description of each potentially Aunacceptable@ exposure.

____ If unknown (for any potentially Aunacceptable@ exposure) - continue and enter AIN@ status code

Rationale and Reference(s): This question is not applicable, see answer to Question 3.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE - Yes, ACurrent Human Exposures Under Control@ has been verified. Based on a review of the information contained in this EI Determination, ACurrent Human Exposures@ are expected to be AUnder Control@ at the **Compaq Computer Corporation** facility, EPA ID # **PRD000706333**, located at **Sabana Grande, Puerto Rico** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - ACurrent Human Exposures@ are NOT AUnder Control.@

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

Completed by: original signed by Doug Sullivan for Date: 09/26/00
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Locations where References may be found:

U.S. Environmental Protection Agency
RCRA Records Center
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New York, New York 10007-1866

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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.

Attachments:

The following attachments have been provided to support this EI determination.

1. Locus Plan
2. SWMU Location
3. Summary of Media Impacts Table
4. Corrective Action Status Sheet

Attachments truncated, see facility file (MSS,03/06/02)