DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

Current Human Exposures Under Control

Facility Name: Union Carbide Caribe, LLC (subsidiary of Dow Chemical)
Facility Address: Firm Delivery, 631 Road 127, Peñuelas, PR 00624-7501
Facility EPA ID #: PRD980594618

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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

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

   _____ If no - re-evaluate existing data, or

   _____ if data are not available skip to #6 and enter"IN" (more information needed) status code.

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BACKGROUND

The Union Carbide Caribe L.L.C. (UCCLLC) facility is located on the south coast of Puerto Rico, on State Road 127 in the Municipio (town) de Peñuelas, approximately 7 miles west of the city of Ponce. The site occupies about 680 acres of generally level land that has mostly been reclaimed from wetlands by filling. The facility was formerly a large petrochemical complex, and is broadly divided into two areas, the Main Plant area and the Puntilla area. The Puntilla area occupies most of a peninsula extending to the southwest from the Main Plant area. The peninsula extends into the Caribbean Sea and separates Guayanilla Bay to the west and Tallaboa Bay to the east.

The facility ceased production operations in 1985, although it serves as a terminal for the bulk storage of chemical products and operates a wastewater treatment plant. The facility is adjacent to a number of mostly non-operating or partially operating chemical and petroleum refining facilities, the most notable of which is Commonwealth Oil and Refining Company (CORCO), immediately to the north. Otherwise, the land use in the area is generally residential and agricultural.

The major threat is the result of the unintended release of contaminants into the soil and groundwater beneath the facility. These contaminants include: benzene, ethylbenzene 2-methylnaphthalene, naphthalene, styrene, toluene, and xylene. There are a total of 35 identified SWMUs (Draft RCRA Facilities Assessment [February 1, 1988]). Some of these units, specifically surface impoundments (lagoons), were used to intentionally manage hazardous waste on-site. The sludges from these lagoons were dewatered and disposed into an on-site landfill. Although the groundwater is not currently used for drinking because of its relatively high salt content, the released contaminants represent a potential threat to the surface water of the Caribbean Sea and to its nearshore ecosystem. In addition, some groundwater in the regional area is reportedly used for agriculture and possibly other purposes from unregistered private wells, although these wells would not be expected to be impacted by the potential sources of contamination at this site.

The 35 SWMUs consist of an active industrial landfill and wastewater lagoon which operate under an permit, ten closing regulated units consisting of lagoons and landfills, and 23 SWMUs subject to corrective action. See appendix for SWMU/AOC summary table.

Contaminated groundwater, released from the active industrial landfill, is under hydraulic control. The other regulated units have either been technically closed or are undergoing closure. The administrative approval of closure is part of the renewal permit scheduled to be issued in September 2003. Most of the SWMUs subject to corrective action require no further action. Of the remaining SWMUs, four require the implementation of institutional controls and two require additional investigation under a Supplemental RCRA Facility Investigation. All closure and corrective action, as well as the operation of the two active units for the purpose of remediation of the site, is included in an active permit, scheduled to be renewed in September 2003.

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)? See Attachment for map of referenced SWMUs and RUs.

	Yes	No	?	Rationale / Key Contaminants
Air (indoors)[2]	___	___	___	Individuals on the site that are potentially exposed to contaminated indoor air are those workers in the Administration Building (# 151) and the Wastewater Treatment Plant (WWTP) Laboratory Building (#

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				941). For the Administration Building, the indoor air is potentially impacted by subsurface contamination from Underground Organic Contamination (Area of Contamination [AOC] No. 1). For the WWTP Laboratory Building, the indoor air is potentially impacted by subsurface contamination from the Wastewater Treatment Plant Influent Sewer Leakage (Solid Waste Management Unit [SWMU] No. 27). This SWMU is adjacent to the Puntilla Waste Management Area. The groundwater contaminant identified as potentially transferrable to the indoor air is benzene.
Groundwater	___	___	___	Four SWMUs, consisting of the North Cooling Water Return Lateral (stabilized and filled portion) and Cooling Water Canal (SWMU No. 5); the Dripolene Pond (SWMU No. 15); the Industrial Landfill (SWMU No. 20); and the Stormwater Control Pond (SWMU No. 30), are adjacent to each other, comprise the Industrial Landfill Waste Management Area, and have released contaminants to the underlying groundwater. These units are also Regulated Units (RUs).

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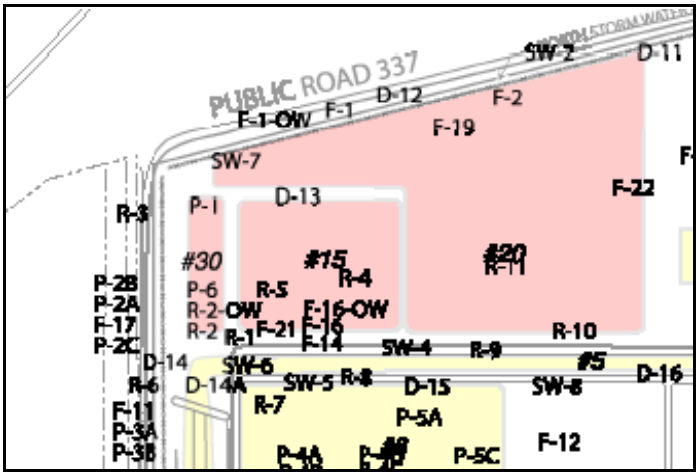

Figure 1: Groundwater contamination contained within the area of the three SWMUs which are shaded.

Four other SWMUs, containing a total of seven (formerly) operating units, consist of the Dewatered Sludge Landfill (SWMU No. 21), the Primary Solids Ponds (SWMU No. 22), the Equalization Basins (SWMU No. 23), and the East and West Aeration Basins (SWMU No. 25). These SWMUs, which are also RUs, are adjacent to each other, comprise the Puntilla Waste Management Area, and have released contaminants to the underlying groundwater.

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Surface Soil (e.g., <2 ft)	_	___	___	The Dredge Material North of Peerless - Area C (SWMU No. 11).

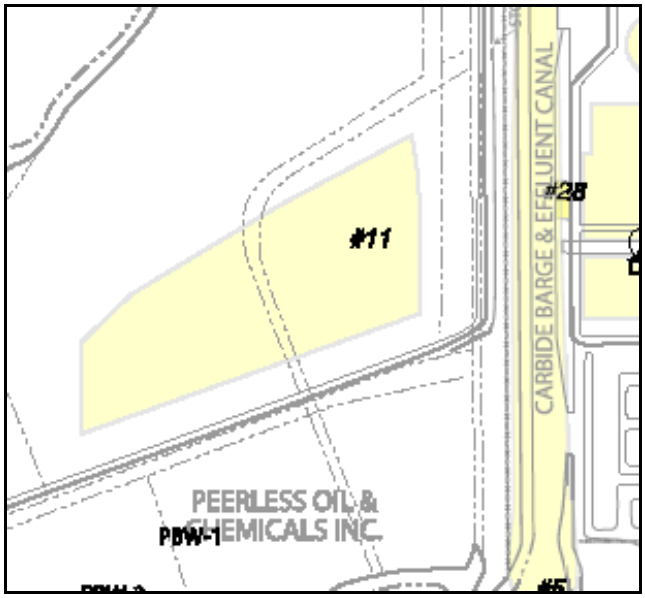

Figure 2: Delineated area of SWMU No. 11 showing the location and area of surface soil contamination.

Surface Water	___	_	___	Sampling data from the Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal (November 28, 2000) indicated that no contaminants of concern were detected in surface water.
Sediment	_	___	___	The open water portion of the North Cooling Water Canal, aka, the Effluent Canal (SWMU No. 5).
Subsurf. Soil (e.g., >2 ft)	_	___	___	Units with contamination above appropriately protective risk-based "levels" are: the Dewatered Sludge Landfill (SWMU No. 21), the Primary Solids Ponds (SWMU No. 22), the West and East Aeration Basin, the Dredge Material Playa Tank/Olefin Flare - Area D (SWMU No. 12). These units contain benzo(a)anthracene and benzo(a)pyrene. The Dredge Material North of Peerless - Area C (SWMU No. 11) contains anthracene and benzo(a)pyrene as contaminants. For the Hydrotreater Area (SWMU No. 35), the contaminant is benzo(a)pyrene.

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Air (outdoors) ___ _ ___

___ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

_ 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):

For indoor air, the contaminants identified as potentially transferable from groundwater to indoor air are benzene, toluene and xylene (Indoor Air Sampling Plan for the Administration [# 151] and WWTP Laboratory Buildings [# 941] [January 9, 2003]). Because the only people exposed are workers (part-time) in an industrial settling, the exposure levels and testing protocol are the responsibility of the Occupational Health and Safety Administration (OSHA).

For groundwater, the contaminants are acenaphthene (65 ppb), acenaphthylene (1200 ppb), anthracene (28 ppb), benzo(a)anthracene (PQL), benzene (10,000 ppb), chrysene (PQL), ethylbenzene (4700 ppb), fluoranthene (60 ppb), fluorene (120 ppb), 2-methylnaphthalene (546 ppb), naphthalene (5000 ppb), phenanthrene (140 ppb), pyrene (22 ppb), styrene (PQL), toluene (10,000 ppb), and xylenes (1380 ppb). The values are the applicable groundwater protection standards (GPS) that are based on Maximum Contaminant Levels (MCLs) and Practical Quantitative Limits (PQLs) (RCRA Part B Permit Renewal Application Amendment, Volume III, Part 1- Groundwater Monitoring [March 3, 2000]).

For surface soils in the Dredge Material North of Peerless - Area C (SWMU No. 11), the contaminants are benzo(a)anthracene and benzo(a)pyrene. The "levels" are the EPA Region 3 Soil Screening Levels (Phase I RFI Report - Group III SWMUs [January 28, 2000]).

For sediments in the North Cooling Water Canal (SWMU No. 5), the contaminants are PAHs. The PAHs consist of 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene. The "levels"are risk-based for ingestion from fish consumption (Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal [November 28, 2000]).

For subsurface soil, the contaminants in the Dewatered Sludge Landfill (SWMU No. 21), the Primary Solids Ponds (SWMU No. 22), the East and West Aeration Basins, the Dredge Material Playa Tank/Olefin Flare - Area D (SWMU No. 12), are benzo(a)anthracene and benzo(a)pyrene. For the Dredge Material North of Peerless - Area C (SWMU No. 11) the contaminants are anthracene and benzo(a)pyrene. For the Hydrotreater Area (SWMU No. 35), the contaminant is benzo(a)pyrene. The "levels" are from EPA Region 3 Soil Screening Levels (Phase 1 RFI Report for Group III SWMUs [January 28, 2000]; Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs [July 2001]).

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Footnotes:

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

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

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)	no	yes	no	no	no	no	no
Soil (surface, e.g., <2 ft)	no	no	no	no	no	no	no
~~Surface Water~~							
Sediment	no	no	no	no	no	no	yes
Soil (subsurface e.g., >2 ft)	no	no	no	no	no	no	no
Air (outdoors)	no	no	no	no	no	no	no

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.

_____ 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.

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_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

For indoor air, workers on the site are potentially exposed to contaminated indoor air in the Administration Building (# 151) and the WWTP Laboratory Building (# 941). The air of the Administration Building is potentially impacted by volatilization of subsurface contamination from Underground Organic Contamination (AOC No. 1).

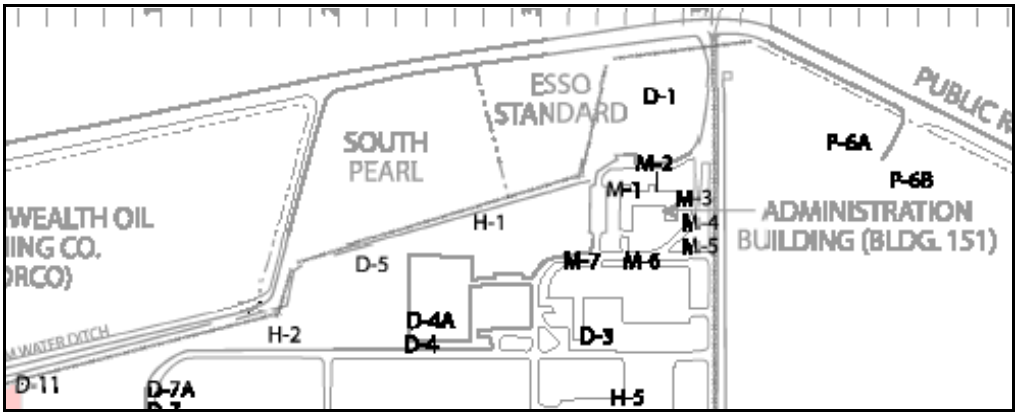

Figure 3: Site map of area of contamination (AOC No. 1)

The Area of Contamination (AOC No. 1) is an area free-phase petroleum hydrocarbons and associated contaminated groundwater. AOC No. 1 is located at the most upgradient edge of the facility boundary, with regional groundwater flow having the potential to move contaminated groundwater further onto the facility property rather than off-site.

The WWTP Laboratory Buildings are potentially impacted by a release from the Wastewater Treatment Plant Influent Sewer Leakage (SWMU No. 27). There are no other workers on the site, with the exception of security personnel (email from Timothy King, UCCLLC Chairman and President, to Richard Krauser, EPA RCRA Project Manager [March 24, 2003]; Indoor Air Sampling Plan for the Administration [# 151] and WWTP Laboratory Buildings [# 941] [January 9, 2003]). There are no on-site or nearby non-workers.

For sediment, the PAHs can potentially serve as a source of contamination to resident or transient fish, either through direct adsorption or through ingestion from food (Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal [November 28, 2000]; Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs [July 2001]). Contaminated fish have the potential to be ingested by local subsistence fishermen.

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

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):

For indoor air, part-time workers in the two building are potentially impacted by significant (i.e., unacceptable) levels of VOCs in indoor air derived from groundwater (Indoor Air Sampling Plan for the Administration [# 151] and WWTP Laboratory Buildings [# 941] [January 9, 2003]). These workers are the only people known to be potentially impacted by this indoor air. EPA has the authority under RCRA to determine the appropriate health-based levels for indoor air for all non-workers and all individuals outside of the facility boundaries impacted by these releases. However, for workers within the facility itself, appropriate exposure levels are determined by the Occupational Health and Safety Administration (OSHA). As a result, EPA is deferring to OSHA, the determination of the appropriate health-based exposure levels for these workers and the determination of the appropriate testing protocol for determining these exposures. OSHA was notified of EPA's intention to defer this determination forthis site by telephone communication (EPA internal memorandum noting a telephone conversation between Richard Krauser, EPA RCRA Project Manager, and José I. Droz, Deputy Director for Occupational Health and Safety, Puerto Rico Department of Labor and Human Resources, Hato Rey, Puerto Rico [September 4, 2003]) and email (Email from Richard Krauser, EPA RCRA Project Manager, to José I. Droz, Deputy Director for Occupational Health and Safety, Puerto Rico Department of Labor and Human Resources, Hato Rey, Puerto Rico [September 15, 2003]). A follow-up letter is being finalized.

For sediment, some benthic organisms in the Canal, as well as demersal fish, have been identified as potential candidates for the accumulation of PAHs (Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal [November 28, 2000]). These fish, in turn, may become a food source for local subsistence fishermen.

[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.

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):

For indoor air, exposure levels and the testing protocol are the responsibility of the Occupational Health and Safety Administration (OSHA). The exposure standards for OSHA, because of the conditions of the work environment and the personnel employed are set at a higher level than standard EPA risk-based standards for other populations. The workers in the two buildings are reportedly in the buildings a maximum of 20-hours per week, rather than the standard 40-hours (email from Timothy King, UCCLLC Chairman and President, to Richard Krauser, EPA RCRA Project Manager [March 24, 2003]). By telephone call of August 18, 2003, EPA notified OSHA of the potential indoor air exposure to on-site workers at this site. This information will be included in a follow-up letter to OSHA in October 2003.

For sediment, the primary contaminants of concern are polycyclic aromatic hydrocarbons (PAHs). PAHs are known not to be readily bioaccumulated in fish. Local coordination has indicated that fishing is not reported in the area of the Canal. The reasons for this are that local fishermen are aware of the industrial nature of the Canal, that the site is contaminated, that the mangrove and reef habitat is degraded and that therefore the fish population is not that high. The people in the local community of Playa de Guayanilla fish in Guayanilla Bay rather than in Tallaboa Bay, the location of the Canal. The area of the Canal is patrolled by Union Carbide Caribe security personnel and the waters around a nearly facility, the EcoElectrica Cogeneration Plant, are patrolled to keep unauthorized personnel away from the area (EPA internal memorandum noting a conversation between Richard Krauser of the EPA and Lisa-Marie Carruba, Director of the National Marine Fisheries Service [NMFS] Field Office, Puerto Rico [March 21, 2003)]).

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

___ YE - 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 Union Carbide Caribe (subsidiary of Dow Chemical) facility, EPA ID # PRD980594618, located at Firm Delivery, 631 Road 127, Peñuelas, Puerto Rico 00624-7501 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.

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Completed by Original signed by Date _____
Richard F. Krauser
Project Manager/ Geologist
Caribbean Section (RPB/DEPP)

Supervisor Original signed by Date _____
Dale Carpenter
Chief, Caribbean Section (RPB/DEPP)
EPA Region 2

Supervisor Original signed by Date : 9/30/2003
Adolph Everett, P. E.
Chief, RCRA Program Branch (DEPP)
EPA Region 2

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Cited References:

1. Draft RCRA Facilities Assessment (February 1, 1988);
2. RCRA Part B Permit Renewal Application Amendment, Volume III, Part 1- Groundwater Monitoring (March 3, 2000);
3. Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal (November 28, 2000);
4. Phase 1 RFI Report for Group III SWMUs (January 28, 2000);
5. Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs (July 2001);
6. Indoor Air Sampling Plan for the Administration (# 151) and WWTP Laboratory Buildings (# 941) (January 9, 2003);
7. EPA internal memorandum noting a conversation between Richard Krauser of the EPA and Lisa-Marie Carruba, Director of the National Marine Fisheries Service [NMFS] Field Office, Puerto Rico (March 21, 2003);
8. Email from Timothy King, UCCLLC Chairman and President, to Richard Krauser, EPA RCRA Project Manager (March 24, 2003);
9. EPA internal memorandum noting a telephone conversation between Richard Krauser, EPA RCRA Project Manager, and José I. Droz, Deputy Director for Occupational Health and Safety, Puerto Rico Department of Labor and Human Resources, Hato Rey, Puerto Rico (September 4, 2003); and
10. Email from Richard Krauser, EPA RCRA Project Manager, to José I. Droz, Deputy Director for Occupational Health and Safety, Puerto Rico Department of Labor and Human Resources, Hato Rey, Puerto Rico (September 15, 2003).

Locations where References may be found:

EPA Region 2, RCRA Records Room, 15th floor, 290 Broadway, New York, NY 10007
EPA Region 2, RCRA Programs Branch Records Room, 22nd floor, 290 Broadway, New York, NY 10007
EPA Region 2, Caribbean Environmental Protection Division, Centro Europa Building, Suite 417, 1492 Ponce de Leon Avenue, San Juan, Puerto Rico 00907-4127

Contact telephone and e-mail numbers

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

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APPENDIX

Union Carbide Caribe SWMU/AOC Summary Table

Group I: SWMUs = 3.

Name	SWMU No.	Closure/Corrective Action Status
Dripolene Pond	15	• closed; • groundwater is under hydraulic control and is being remediated by pump and treat.
Industrial Landfill (HWMU)	20	• active, regulated, and permitted unit; • closure plan technically approved; • groundwater is under hydraulic control and is being remediated by pump and treat.
Stormwater Control Pond	30	• closed; • groundwater is under hydraulic control and is being remediated by pump and treat.

Group II: SWMUs = 10.

Container Storage/Warehouse Area (HWMU)	16	• unit has been closed. • verification sampling report submitted.
Environmental Protection Department Residues Storage Tanks Nos.18-1001, 18D-1002, and 18D-1010 (HWMU - 3 separate units)	17	• unit has been closed. • verification sampling report submitted.
Phenol/Acetone Unit Residues Storage Tanks (HWMU - 2 separate units)	18	• unit has been closed. • verification sampling report submitted.
Energy Systems Unit Tanks (HWMU - 3 separate units)	19	• unit has been closed. • verification sampling report submitted.
Dewatered Sludge Landfill (no longer a HWMU)	21	• one of contiguous SWMUs within the Puntilla Waste Management Area; • closed in 1988 with waste in-place and capped with a landfill cover; • being cleaned up under Closure Certification Report and Post Closure Plan (December 1998). • monitored by wells B-10 and B-17.

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Primary Solids Pond 1 & 2 (HWMU - 2 separate units)	22	• one of contiguous SWMUs within the Puntilla Waste Management Area; • closed as a landfill. • monitored by wells B-1 and P-23.

Equalization Basins
(no longer a HWMU)
	23	• one of contiguous SWMUs within the Puntilla Waste Management Area;
		• partially closed as a landfill;
		• hazardous waste removed and disposed in the Industrial Landfill;
		• closure and cleanup in 1988 included:
		  • solidification and removal of the sludge/soils;
		  • disposal of solidified sludge/soil in the Industrial Landfill.
		• testing and analysis of the soils immediately surrounding the units confirmed clean closure to risk-based standards.
		• monitored by well PBW-6.

Filter Presses (no longer a SWMU)	24	• unit not subject to corrective action requirements.
East Aeration Basin and the West Aeration Basin (HWMU - 2 separate units)	25	• one of contiguous SWMUs within the Puntilla Waste Management Area; • East Aeration Basin is an active, regulated, and permitted unit; • has a closure/post-closure plan; • West Aeration Basin is being closed. • closure plan requirements (clean closure) include removal of the residual sludge to risk-based standards; • monitored by wells B-13 and PBW-5.
Ground Burners (HWMU)	26	• contaminated soil beneath the pit removed. • no significant releases to the remaining soil identified. • verification sampling required.

Group III: SWMUs = 14.

Incinerator	1	• releases to soil, but not groundwater; • soil below R3 Risk-Based Concentrations; • no further corrective action is required.

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Contaminated sediments from the uncovered portion of the partially filled North Cooling Water Return Lateral Effluent Canal	5	• contaminated sediments investigated as in partial CMS by a report entitled: Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal. • the Ecological Assessment Work Plan Outline has been submitted and commented upon by EPA. Comments have been addressed by UCCLLC. The Work Plan has been submitted as an outline because the preferred alternative may be to fill in all or a portion of the Canal. • sediment stabilization and filling of a portion of the Canal is UCCLLC's probable preferred corrective action alternative. • contaminants of concern in the surface water of the Canal are below detection.
Polyethylene Area	6	• no evidence of a release; • no further corrective action is required.
Tallaboa River Landfill	7	• releases in soil (only) and are below R3 RBCs; • no further corrective action is required.
Carbon Ponds	8	• no evidence of a release; • no further corrective action is required.
Dredge Material Small Boat Landing - Area A	9	• no evidence of a release; • no further corrective action is required.
Dredge Material Energy Systems - Area B	10	• no evidence of a release; • no further corrective action is required.

SWMU No. 11 consists of the Dredge Material North of Peerless - Area C	11	• releases of contaminants to the soil only;
		• below Tier 2 Risk-Based Corrective Action (RBCA) risk (industrial) at $1X10^{-5}$;
		• no Phase II investigation is required provided there is implementation of institutional and physical controls, consisting of:
		  • restricted site access (currently existing);
		  • limited site maintenance; and
		  • limit of future site use.

Dredge Material Playa Tank/Olefin Flare - Area D	12	• for soil, benzo(a) anthracene and benzo(a)pyrene exceeds R3 RBC; • excavate benzo(a)anthracene and benzo(a)pyrene in soil above the R3 RBCs and dispose in the Industrial Landfill. • there is no physical access to the site
Dredge Material Near Tallaboa River LF - Area E	13	• no evidence of a release; • no further corrective action is required.
Dredge Material West of Wastewater Treatment Plant (WWTP)	14	• no evidence of a release; • no further corrective action is required.

Chemical Addition Station Sump Leakage	28	• no evidence of a release; • no further corrective action is required.
Old Anaerobic Basin	31	• no evidence of a release; • no further corrective action is required.
Old Ground Burners	32	• no evidence of a release; • no further corrective action is required.
Puntilla Disposal Area	33	• no evidence of a release; • no further corrective action is required.
Puntilla Tank 1501	34	• no evidence of a release; • no further corrective action is required.
Hydrotreater Area	35	• releases in soil and sediments of benzo(a)pyrene above R3 RBCs ; • risk for direct contact in surface soils and groundwater is acceptable; • risk associated with the subsurface contamination of benzo(a)pyrene shall be assessed prior to any future construction activities.
Wastewater Treatment Plant (WWTP) Underground Effluent Pipe Leak	36	• no evidence release had an impact; • no further corrective action is required.

Group IV: SWMUs = 4.

Underground Lines at Phenol/Acetone.	2	• contaminated groundwater from process sewer leak treated in WWTP. • contaminated soil excavated to the water table, treated, and disposed in the Industrial Landfill; • Contamiants of concern in soil below the R3 RBCs. • cumene and acetophenone in groundwater above R3 RBCs; • risk assessment indicates a potential inhalation risk from groundwater discharging to surface water of the South Lateral Canal to long-term industrial workers. However, the source has been removed and the contaminants of concern (cumene and acetophenone) are confirmed to be non-detect in groundwater discharging to the South Lateral Canal, the potential point of exposure. Therefore there is no completed exposure pathway. • no further corrective action is required.
Underground Line at Energy Systems Units	3	• releases to soil excavated ; • no further corrective action is required.

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

WWTP Influent Sewer Leakage	27	• release was a one-time spill; • no contaminants of concern in soil above R3 RBCs; • benzene above ACL in groundwater; • pumping of well B-15 shall be reinstated until the benzene level falls below the ACL. • if construction activity impacts the site, UCCLLC will have to implement more aggressive corrective action.
Glycols Unit Sewer Leakage	29	• release cause by a rupture of the industrial sewer line; • all CONTAMINANTS OF CONCERN in soil below R3 RBCs; • barium and chromium in groundwater below R3 RBCs for tap water; • no further corrective action is required.

Underground Organics: AOC = 1.

Underground organics	4	• release of phase separated hydrocarbon; • no immediate threat to the surface waters of Guayanilla and Tallaboa Bays; • letter reports prepared by the Permittee - June 25, 1998 and June 17, 1999; • no immediate corrective action required; • OSHA determines the risk-based exposure levels for workers.