

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action  
Environmental Indicator (EI) RCRAInfo code (CA750)

Migration of Contaminated Groundwater 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 "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids (DNAPLS). Achieving this E.I. does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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? All SWMUs and RUs referenced are shown in the attached map (Attachment 1).

- 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

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.

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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 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.

**Duration / Applicability of Determinations**

E.I. Determinations status codes should remain in the RCRAInfo 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).

2. Is **groundwater** known or reasonably suspected to be “**contaminated**”<sup>1</sup> above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

\_\_\_\_\_ If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

\_\_\_\_\_ If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

\_\_\_\_\_ If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

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The Groundwater Protection Standards (GPSs), in parentheses, are the applicable Maximum Contaminant Levels (MCLs) and Practical Quantification Limits (PQLs).

For the Industrial Landfill Waste Management Area, these 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) (Industrial Landfill Waste Management Area Groundwater Sampling and Analysis Plan).

The contaminants for the Puntilla Waste Management Area are the same as for the Industrial Waste Management Area, except without benzo(a)anthracene, chrysene, styrene, and toluene (Puntilla Waste Management Area Groundwater Sampling and Analysis Plan).

The contaminant from the WWTP Influent Sewer Leakage (SWMU No. 27), adjacent to the Puntilla Waste Management Area, is benzene (Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs [July 2001]).

The contaminants in the Area of Contamination (AOC No. 1) are: benzene, ethylbenzene, toluene, xylene, and naphthalene (RCRA Facility Assessment [February 1, 1988]).

Footnotes:

<sup>1</sup>“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 appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?

\_\_\_\_\_ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the “existing area of groundwater contamination”<sup>2</sup>).

\_\_\_\_\_ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”<sup>2</sup>) - skip to #8 and enter “NO” status code, after providing an explanation.

\_\_\_\_\_ If unknown - skip to #8 and enter “IN” status code.

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Rationale and Reference(s):

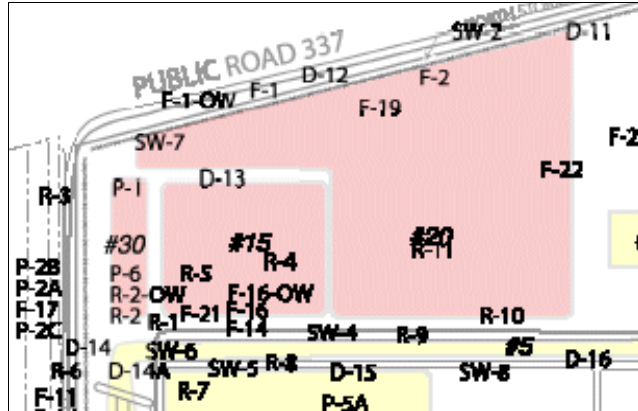


Figure 1: Groundwater contamination contained within the area of the three SWMUs which are shaded.

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 and comprise the Industrial Landfill Waste Management Area (Figure 1). These units are also RUs. The Industrial Landfill Waste Management Area has been under hydraulic control and remediation since 1989. The requirements for hydraulic control and remediation are included in the operating permit issued in 1988. The site has been monitored quarterly since 1989; then semi-annually since 2000, under requirements of the 1988 operating permit (Quarterly/Semi-Annual Groundwater Monitoring reports [1989-2003]). These reports indicate the establishment of a hydraulic gradient towards the two recovery wells within the Industrial Waste Management Area (R-6, R-7) continuously since 1989.



Figure 2: Map of SWMUs within the Puntilla Waste Management Area

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Four other SWMUs, containing a total of six formerly operating units and one currently operating unit (the East Aeration Basin), 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), are adjacent to each other and comprise the Puntilla Waste Management Area (Figure 2). The Primary Solids Ponds (SWMU No. 22) and the East and West Aeration Basins (SWMU No. 25) are also RUs. The Puntilla Waste Management Area has been monitored quarterly since 1989, then semi-annually since 2000, under requirements of the 1988 operating permit (Quarterly/Semi-Annual Groundwater Monitoring reports [1989-2003]). The reports indicate that the concentration of contaminants slowly decreasing through time and are not migrating.

The WWTP Influent Sewer Leakage (SWMU No. 27), adjacent to the Puntilla Waste Management Area, has shown a localized concentration of benzene (Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs [July 2001]). The requirements of the renewal permit scheduled to be issued in September 2003, will require that the groundwater of the SWMU be subject to recovery and treatment until the benzene level falls below the ACL for three consecutive years. Benzene will be monitored quarterly for the first year and semi-annually thereafter. When benzene concentrations fall below the ACL for three consecutive years, the Permittee may make a request to EPA that monitoring be stopped for this unit.

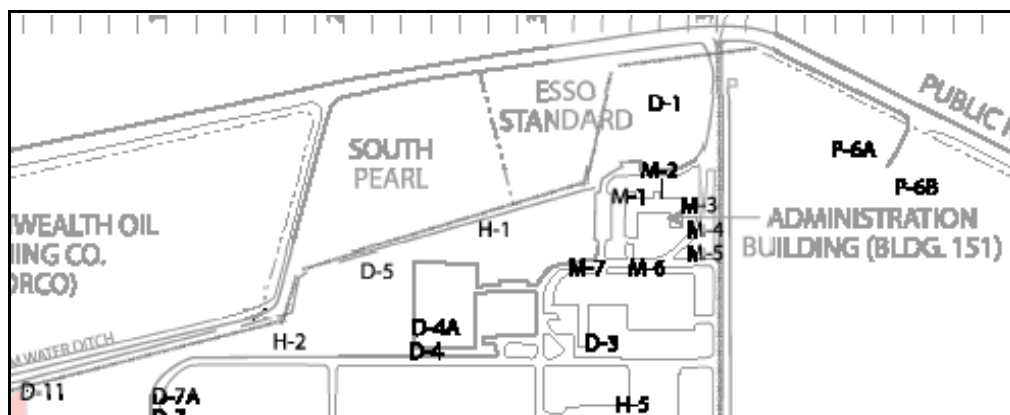


Figure 3: Site Map of Area of Contamination (AOC No. 1)

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. Monitoring results indicate that the concentration of the contaminants are decreasing with time and that the extent of the plume is stable (RCRA Facility Assessment [February 1, 1988]; a letter report prepared by Union Carbide Caribe on the origin, history and status of the underground organic contamination [June 25, 1998]; and a letter report prepared by Union Carbide Caribe on the results of an investigation of the underground organic contamination [June 17, 1999]).

<sup>2</sup> “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable

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allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does “contaminated” groundwater **discharge** into **surface water** bodies?

\_\_\_\_\_ If yes - continue after identifying potentially affected surface water bodies.

\_\_\_\_\_ If no - skip to #7 (and enter a “YE” status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater “contamination” does not enter surface water bodies.

\_\_\_\_\_ If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

The Industrial Landfill Waste Management Area has been monitored quarterly since 1989; then semi-annually since 2000 (Quarterly/Semi-Annual Groundwater Monitoring reports [1989-2003]. These reports indicate the establishment of a hydraulic gradient towards the two recovery wells within the Industrial Waste Management Area (R-6, R-7) continuously since 1989. The contours of the hydraulic gradient extend to the area of the nearest surface water (the north terminus of the North Cooling Water Canal) and indicate that the surface water is being drawn, along with the groundwater, towards the recovery wells. The hydraulic control is requirement a of the 1988 operating permit and is also a requirement of the renewal permit, scheduled to be issued in September 2003.

The SWMUs of the Puntilla Waste Management Area have been monitored since 1989 as part of source removal and/or capping associated with unit closure and corrective action. Since then, the low level contaminant concentrations have decreased, without active remediation, indicating natural attenuation is apparently taking place. There is no evidence that contaminants in the groundwater have ever reached surface waters (Quarterly/Semi-Annual Groundwater Monitoring reports [1989-2003].

Groundwater monitoring associated with WWTP Influent Sewer Leakage (SWMU No. 27), adjacent to the Puntilla Waste Management Area, shows a localized area of groundwater with a low concentration of benzene. This area will be subject to active hydraulic containment and remediation as a requirement of a renewal permit, scheduled to be issued in September 2003 (Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs [July 2001]).

5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

\_\_\_\_\_ If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

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\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

\_\_\_\_\_ If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented<sup>4</sup>)?

\_\_\_\_\_ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

\_\_\_\_\_ If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

<sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for

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many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater?”

\_\_\_\_\_ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the “existing area of groundwater contamination.”

\_\_\_\_\_ If no - enter “NO” status code in #8.

\_\_\_\_\_ If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

The Industrial Landfill Waste Management Area will be sampled at wells: F-16OW, F-17, P-1, D-14A, F-22 (background/upgradient), D-7A, D-11, D-12, D-13, D-14A, D-16, F-1, F-16-OW, F-17, H-4, P-1, P-2B, P-3A, P-4A, R-2, R-3, R-8, and R-9. Wells D-7A, D-11, D-12, D-13, D-16, F-1, F-17, H-4, P-2B, P-3A and P-4A., as part of the requirements for the renewal permit scheduled to be issued in September 2003.

The Puntilla Waste Management Area will be sampled at wells B-1; P-23; PBW-6 (for the Primary Solids Ponds [SWMU No. 22] and B-13; PBW-5 (for the West Aeration Basin [ SWMU No. 25]). The other units of the Puntilla Waste Management Area, although determined to no longer be RUs, have been functionally clean closed.

The WWTP Influent Sewer Leakage (SWMU No. 27), adjacent to the Puntilla Waste Management Area, will be monitored by well B-15, which is also being used as a recovery well, as part of the requirements of the renewal permit scheduled to be issued in September 2003.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), 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).

\_\_\_\_\_ YE - Yes, “Migration of Contaminated Groundwater Under Control” has been verified. Based on a review of the information contained in this EI determination, it has been determined that the “Migration of Contaminated Groundwater” is “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. Specifically, this determination indicates that the migration of “contaminated” groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the



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“existing area of contaminated groundwater” This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

\_\_\_\_\_ NO - Unacceptable migration of contaminated groundwater is observed or expected.

\_\_\_\_\_ IN - More information is needed to make a determination.

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

Cited References:

1. Draft RCRA Facilities Assessment (February 1, 1988);
2. Quarterly/Semi-Annual Groundwater Monitoring reports (1989-2003);
3. a letter report prepared by Union Carbide Caribe on the origin, history and status of the underground organic contamination (June 25, 1998);
4. a letter report prepared by Union Carbide Caribe on the results of an investigation of the underground organic contamination (June 17, 1999);
5. Phase II RFI Report - Group III SWMUs; RFI Report - Group IV SWMUs (July 2001).

Locations where References may be found:

EPA Region 2, RCRA Records Room, 15<sup>th</sup> floor, 290 Broadway, New York, NY 10007  
EPA Region 2, RCRA Programs Branch Records Room, 22<sup>nd</sup> floor, 290 Broadway, New York, NY 10007-1866  
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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**APPENDIX**

**Union Carbide Caribe SWMU/AOC Summary Table**

**Group I:** SWMUs = 3.

Name	SWMU No.	Closure/Corrective Action Status
Dripolene Pond	15	<ul style="list-style-type: none"> <li>• closed;</li> <li>• groundwater is under hydraulic control and is being remediated by pump and treat.</li> </ul>
Industrial Landfill (HWMU)	20	<ul style="list-style-type: none"> <li>• active, regulated, and permitted unit;</li> <li>• closure plan technically approved;</li> <li>• groundwater is under hydraulic control and is being remediated by pump and treat.</li> </ul>
Stormwater Control Pond	30	<ul style="list-style-type: none"> <li>• closed;</li> <li>• groundwater is under hydraulic control and is being remediated by pump and treat.</li> </ul>

**Group II:** SWMUs = 10.

Container Storage/Warehouse Area (HWMU)	16	<ul style="list-style-type: none"> <li>• unit has been closed.</li> <li>• verification sampling report submitted.</li> </ul>
Environmental Protection Department Residues Storage Tanks Nos.18-1001, 18D-1002, and 18D-1010 (HWMU - 3 separate units)	17	<ul style="list-style-type: none"> <li>• unit has been closed.</li> <li>• verification sampling report submitted.</li> </ul>
Phenol/Acetone Unit Residues Storage Tanks (HWMU - 2 separate units)	18	<ul style="list-style-type: none"> <li>• unit has been closed.</li> <li>• verification sampling report submitted.</li> </ul>
Energy Systems Unit Tanks (HWMU - 3 separate units)	19	<ul style="list-style-type: none"> <li>• unit has been closed.</li> <li>• verification sampling report submitted.</li> </ul>
Dewatered Sludge Landfill (no longer a HWMU)	21	<ul style="list-style-type: none"> <li>• one of contiguous SWMUs within the Puntilla Waste Management Area;</li> <li>• closed in 1988 with waste in-place and capped with a landfill cover;</li> <li>• being cleaned up under Closure Certification Report and Post Closure Plan (December 1998).</li> <li>• monitored by wells B-10 and B-17.</li> </ul>

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Primary Solids Pond 1 & 2 (HWMU - 2 separate units)	22	<ul style="list-style-type: none"> <li>• one of contiguous SWMUs within the Puntilla Waste Management Area;</li> <li>• closed as a landfill.</li> <li>• monitored by wells B-1 and P-23.</li> </ul>
Equalization Basins (no longer a HWMU)	23	<ul style="list-style-type: none"> <li>• one of contiguous SWMUs within the Puntilla Waste Management Area;</li> <li>• partially closed as a landfill;</li> <li>• hazardous waste removed and disposed in the Industrial Landfill;</li> <li>• closure and cleanup in 1988 included:               <ul style="list-style-type: none"> <li>• solidification and removal of the sludge/soils;</li> <li>• disposal of solidified sludge/soil in the Industrial Landfill.</li> </ul> </li> <li>• testing and analysis of the soils immediately surrounding the units confirmed clean closure to risk-based standards.</li> <li>• monitored by well PBW-6.</li> </ul>
Filter Presses (no longer a SWMU)	24	<ul style="list-style-type: none"> <li>• unit not subject to corrective action requirements.</li> </ul>
East Aeration Basin and the West Aeration Basin (HWMU - 2 separate units)	25	<ul style="list-style-type: none"> <li>• one of contiguous SWMUs within the Puntilla Waste Management Area;</li> <li>• East Aeration Basin is an active, regulated, and permitted unit;</li> <li>• has a closure/post-closure plan;</li> <li>• West Aeration Basin is being closed.</li> <li>• closure plan requirements (clean closure) include removal of the residual sludge to risk-based standards;</li> <li>• monitored by wells B-13 and PBW-5.</li> </ul>
Ground Burners (HWMU)	26	<ul style="list-style-type: none"> <li>• contaminated soil beneath the pit removed.</li> <li>• no significant releases to the remaining soil identified.</li> <li>• verification sampling required.</li> </ul>

**Group III:** SWMUs = 14.

Incinerator	1	<ul style="list-style-type: none"> <li>• releases to soil, but not groundwater;</li> <li>• soil below R3 Risk-Based Concentrations;</li> <li>• no further corrective action is required.</li> </ul>
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Contaminated sediments from the uncovered portion of the partially filled North Cooling Water Return Lateral Effluent Canal	5	<ul style="list-style-type: none"> <li>• contaminated sediments investigated as in partial CMS by a report entitled: <u>Management-Level Ecological Risk Assessment for SWMU No. 5, North Cooling Water Outlet Canal</u>.</li> <li>• 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.</li> <li>• sediment stabilization and filling of a portion of the Canal is UCCLLC's probable preferred corrective action alternative.</li> <li>• contaminants of concern in the surface water of the Canal are below detection.</li> </ul>
Polyethylene Area	6	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>
Tallaboa River Landfill	7	<ul style="list-style-type: none"> <li>• releases in soil (only) and are below R3 RBCs;</li> <li>• no further corrective action is required.</li> </ul>
Carbon Ponds	8	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>
Dredge Material Small Boat Landing - Area A	9	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>
Dredge Material Energy Systems - Area B	10	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>
SWMU No. 11 consists of the Dredge Material North of Peerless - Area C	11	<ul style="list-style-type: none"> <li>• releases of contaminants to the soil only;</li> <li>• below Tier 2 Risk-Based Corrective Action (RBCA) risk (industrial) at <math>1 \times 10^{-5}</math>;</li> <li>• no Phase II investigation is required provided there is implementation of institutional and physical controls, consisting of: <ul style="list-style-type: none"> <li>• restricted site access (currently existing);</li> <li>• limited site maintenance; and</li> <li>• limit of future site use.</li> </ul> </li> </ul>
Dredge Material Playa Tank/Olefin Flare - Area D	12	<ul style="list-style-type: none"> <li>• for soil, benzo(a) anthracene and benzo(a)pyrene exceeds R3 RBC;</li> <li>• excavate benzo(a)anthracene and benzo(a)pyrene in soil above the R3 RBCs and dispose in the Industrial Landfill.</li> <li>• there is no physical access to the site</li> </ul>
Dredge Material Near Tallaboa River LF - Area E	13	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>
Dredge Material West of Wastewater Treatment Plant (WWTP)	14	<ul style="list-style-type: none"> <li>• no evidence of a release;</li> <li>• no further corrective action is required.</li> </ul>

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Chemical Addition Station Sump Leakage	28	<ul style="list-style-type: none"> <li>no evidence of a release;</li> <li>no further corrective action is required.</li> </ul>
Old Anaerobic Basin	31	<ul style="list-style-type: none"> <li>no evidence of a release;</li> <li>no further corrective action is required.</li> </ul>
Old Ground Burners	32	<ul style="list-style-type: none"> <li>no evidence of a release;</li> <li>no further corrective action is required.</li> </ul>
Puntilla Disposal Area	33	<ul style="list-style-type: none"> <li>no evidence of a release;</li> <li>no further corrective action is required.</li> </ul>
Puntilla Tank 1501	34	<ul style="list-style-type: none"> <li>no evidence of a release;</li> <li>no further corrective action is required.</li> </ul>
Hydrotreater Area	35	<ul style="list-style-type: none"> <li>releases in soil and sediments of benzo(a)pyrene above R3 RBCs ;</li> <li>risk for direct contact in surface soils and groundwater is acceptable;</li> <li>risk associated with the subsurface contamination of benzo(a)pyrene shall be assessed prior to any future construction activities.</li> </ul>
Wastewater Treatment Plant (WWTP) Underground Effluent Pipe Leak	36	<ul style="list-style-type: none"> <li>no evidence release had an impact;</li> <li>no further corrective action is required.</li> </ul>

**Group IV:** SWMUs = 4.

Underground Lines at Phenol/Acetone.	2	<ul style="list-style-type: none"> <li>contaminated groundwater from process sewer leak treated in WWTP.</li> <li>contaminated soil excavated to the water table, treated, and disposed in the Industrial Landfill;</li> <li>Contaminants of concern in soil below the R3 RBCs.</li> <li>cumene and acetophenone in groundwater above R3 RBCs;</li> <li>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.</li> <li>no further corrective action is required.</li> </ul>
Underground Line at Energy Systems Units	3	<ul style="list-style-type: none"> <li>releases to soil excavated ;</li> <li>no further corrective action is required.</li> </ul>

**Migration of Contaminated Groundwater Under Control  
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WWTP Influent Sewer Leakage	27	<ul style="list-style-type: none"> <li>• release was a one-time spill;</li> <li>• no contaminants of concern in soil above R3 RBCs;</li> <li>• benzene above ACL in groundwater;</li> <li>• pumping of well B-15 shall be reinstated until the benzene level falls below the ACL.</li> <li>• if construction activity impacts the site, UCCLLC will have to implement more aggressive corrective action.</li> </ul>
Glycols Unit Sewer Leakage	29	<ul style="list-style-type: none"> <li>• release cause by a rupture of the industrial sewer line;</li> <li>• all CONTAMINANTS OF CONCERN in soil below R3 RBCs;</li> <li>• barium and chromium in groundwater below R3 RBCs for tap water;</li> <li>• no further corrective action is required.</li> </ul>

**Underground Organics: AOC = 1.**

Underground organics	4	<ul style="list-style-type: none"> <li>• release of phase separated hydrocarbon;</li> <li>• no immediate threat to the surface waters of Guayanilla and Tallaboa Bays;</li> <li>• letter reports prepared by the Permittee - June 25, 1998 and June 17, 1999;</li> <li>• no immediate corrective action required;</li> <li>• OSHA determines the risk-based exposure levels for workers.</li> </ul>
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