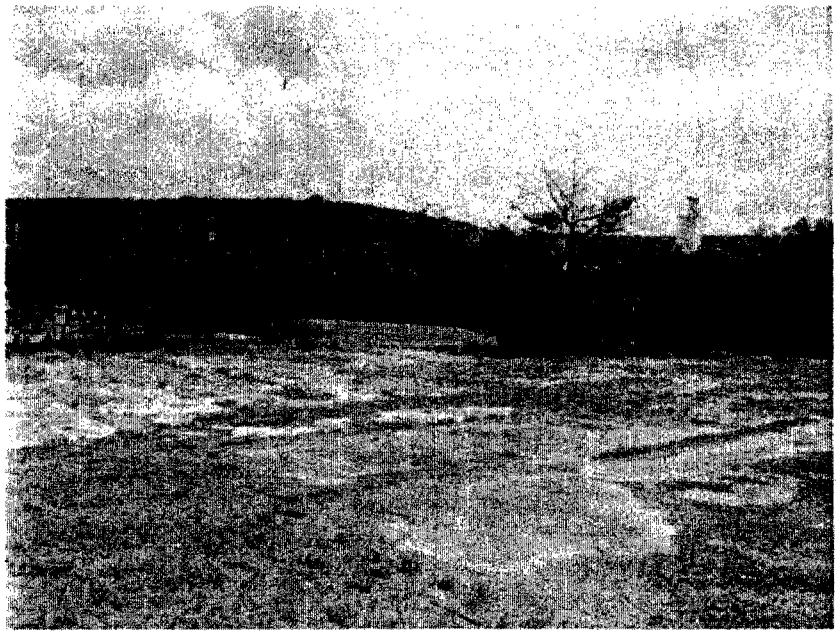
Five-Year Review Report
Island Chemical Corp./Virgin Islands Chemical Corp.
Superfund Site
EPA ID: VID980651095
St. Croix, US Virgin Islands



Prepared by:

United States Environmental Protection Agency
Region 2
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March 2009

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EXECUTIVE SUMMARY

This is the first five-year review for the Island Chemical Corp./Virgin Islands Chemical Corp. Superfund site. Six areas of potential concern were investigated during the initial assessment and the subsequent Remedial Investigation (RI), along with the nature and extent of soil and groundwater contamination, and potential off-Site sediment contamination. Based on the data collected, only the Above Ground Storage Tank Area (AST) and Former Process Pit (FPP) areas were determined to require remediation. Contaminants of concern (COC) at the Site included ethylbenzene and xylene in soils and groundwater at the AST Area and chloroform in groundwater at the FPP area. Currently, this site has no hazardous substances, associated with the National Priorities List (NPL) release, remaining above levels that would prevent unlimited use and unrestricted exposure. The remedy is considered to be complete and is protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name *(from WasteLAN)*: Island Chemical Corp./Virgin Island Chemical Corp.		
EPA ID *(from WasteLAN)*: VID980651095		
Region: 2	**State:** USVI	**City/County:** Estate Bethlehem, St. Croix

SITE STATUS	
NPL Status: ■ Final I ☐ Deleted ☐ Other (specify)	
Remediation Status (choose all that apply): ☐ Under Construction ☐ Operating ■ Complete	
Multiple OUs? ☐ YES ■ NO	**Construction completion date:** 3/2004
Has site been put into reuse? ☐ YES ☐ NO ■ N/A (site reuse has not been determined)	

REVIEW STATUS	
Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Caroline Kwan	
Author title: Remedial Project Manager	**Author affiliation:** EPA
Review period: 3/2004 to 3/2009	
Date(s) of site inspection:	
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion ■ Policy	
Review number: ■ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction ☐ Actual RA Start ■ Construction Completion ☐ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: March 24, 2004	
Due date *(five years after triggering action date)*: March 24,2009	
Does the report include recommendation(s) and follow-up action(s)? ☐ yes ■ no	
Acres in use or suitable for use: **restricted:** **unrestricted: 3.5**	

Five-Year Review Summary Form (continued)

Recommendations and Follow-Up Actions

There are no recommendations or follow-up actions.

Post Remediation Monitoring has been completed at the site. The PRPs have demonstrated in their certification of completion and their final post remediation monitoring report that the site performance standards have been achieved. Cleanup goals have been reached at both areas of the site which were subject to remediation. Further EPA has determined that the cleanup goals achieved are protective of all reasonably anticipated site uses and exposures.

Protectiveness Statement

Remedial action objectives have been achieved so that human health and the environment are protected under all reasonably anticipated site uses and exposures. No further five-year reviews are required by Section 121(c) of CERCLA, EPA regulations or EPA policies.

I. Introduction

This first five-year review for the Island Chemical Corp./Virgin Islands Chemical Corp. (VICHEM) Superfund site, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Caroline Kwan. The five-year review was conducted in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and function as intended by the decision documents. This document will become part of the site file.

In the Remedial Design/Remedial Action (RD/RA) Consent Decree, the PRPs agreed to perform the RD/RA specified in the ROD. On a voluntary basis, the PRPs had been operating the soil vapor extraction/air sparging (SVE/AS) system in the AST Area (which was consistent with the requirements of the ROD) since 2001, and an extensive network of monitoring wells was already in place. A formal remedial design phase was, therefore, not required by the Consent Decree, except in the event EPA determined that supplemental activities were required to achieve performance standards. The following are all elements of the required remedial action:

- Remedial Element I: Soil Vapor Extraction/Air Sparging (SVE/AS) for the AST Area;
- Remedial Element II: Monitored Natural Attenuation (MNA) for the FPP Area; and,
- Remedial Element III: Institutional Controls.

EPA conducted the Pre-Final Inspection of remedial construction activities in March 2004. Remedial construction activities were considered complete during this inspection. Because the completion of the remedy will not leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure, a policy five-year review (rather than a statutory five-year review) is required. In accordance with the Section 1.3.2 of the five-year review guidance, a policy five-year review is triggered by the construction complete This five-year review provides background information, covers the site history, discusses past data-collection efforts along with information collected in the past five years, and reevaluates risk and remedy protectiveness based on updated assumptions.

This five-year review evaluated the remedial action and found that the implemented remedies protect human health and the environment.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery to post remediation monitoring.

III. Background

Physical Characteristics

The VICHEM Site is located on Plot 13Q of Estate Bethlehem Middle Works in the south-central portion of St. Croix in the U.S. Virgin Islands. Plot 13Q is bordered to the north and east by an intermittent stream. The River Gut, which originates north of the Site, drains to the Caribbean Sea.

Site Geology/Hydrogeology

The site lithology consists of fill material from ground surface to approximately 10 feet below ground surface (fbgs), underlain by 80 feet of brown and gray clay-rich alluvial sediments. Local lenses of permeable gravel and sand are located at approximately 30 to 40 fbgs. Underlying the alluvium is the white to light brown and gray, lime-rich, stiff clay of the Kingshill Formation.

The site contains two water bearing zones; the shallow alluvium from 0 to 50 fbgs and the deep alluvium from 50 to 100 fbgs. Depth to water varies from 10 to 30 fbgs depending on annual precipitation cycles (the wet season typically extends from August through November). Groundwater flow is south – southeasterly with a horizontal gradient of approximately 0.002 – 0.014 ft/ft in the shallow alluvium and 0.003 – 0.014 ft/ft in the deep alluvium. A downward vertical gradient of approximately 0.005 – 0.11 ft/ft exists between the two zones.

Monitoring wells screened in the shallow zone typically do not show a response to off-site pumping, while wells screened in the deep zone show significant response. Based on this difference, it is believed an aquitard exists between the shallow and deep alluvium that prevents contaminant migration.

Land and Resource Use

Land use surrounding the VICHEM Site includes a mix of commercial and industrial purposes and the Site is zoned as I-2 (Light Industry).

History of Contamination

Charles H. Steffey, Inc. (CHS, Inc.) purchased the VICHEM Site in 1968. At some point prior to 1969, CHS, Inc. changed its name to CHS Holding Corporation (CHS). From 1968 to 1982, the Site was used for the manufacture and blending of a variety of pharmaceutical products. By the end of 1982, the facility was permanently closed. CHS retains ownership of the Site. Between 1984 and 1991, several investigations were conducted at the Site by EPA and a former tenant, Island Chemical Company, which was later acquired by Berlex. This investigative work identified six areas of potential environmental concern:

- Laboratory and Warehouse Building;
- Above ground storage tank (AST) area;
- Former process pit (FPP) area;

- Loading dock/former laboratory pit area;
- Soil beneath concrete pad near ASTs;
- Concrete storage pad.

On May 31, 1990, EPA filed a Notice of Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) lien on the Site property pursuant to Section 107(l) of CERCLA, 42 U.S.C. § 9607(l), to secure payment for the costs incurred in the performance of the removal action at the Site.

On September 29, 1994, EPA entered into an Administrative Order on Consent (AOC), Index No. II CERCLA-94-0401, with Berlex and Island Chemical Company; Pierrel S.p.A, a subsidiary of Pharmacia &Upjohn (P&U) and also a former tenant at the Site, was added as a respondent to the AOC in April 1999. The AOC, pursuant to Section 106(a) of the CERCLA, as amended, 42 U.S.C. '9606(a), required the performance of a Remedial Investigation/Feasibility Study (RI/FS) at the Site.

The primary objectives of the RI were to: 1) collect the data needed to characterize the nature and extent of contamination and adequately support human health and ecological baseline risk assessments and 2) provide a basis on which a subsequent remedial action plan would be recommended. All six areas of potential concern were investigated during the initial assessment and the subsequent RI, along with the nature and extent of soil and groundwater contamination, and potential off-Site sediment contamination. Based on the data collected, only the AST and FPP areas were determined to require remediation.

EPA added the VICHEM Site to the National Priorities List (NPL) on June 17, 1996.

Initial Response

During initial stages of site assessment, both EPA and Berlex conducted response activities including soil excavation with on-Site treatment or off-Site disposal, drum removals, and off-Site disposal of AST contents. Between September 1989 and October 1991, EPA conducted a removal action at the Site. At that time, the laboratory/warehouse building was found to contain approximately 400 drums (some extremely deteriorated), leaking cylinders of chlorine and hydrogen chloride, and over 800 containers of laboratory reagents that included sodium metal, potassium cyanide, and ethyl ether. EPA removed 354 drums containing 14,720 gallons of various chemicals and 8,061 pounds of lab pack chemicals from the laboratory/warehouse building and disposed of these materials off-Site.

Basis for Taking Action

Contaminants of concern at the Site as determined in the RI included ethylbenzene and xylene, in soils and groundwater at the AST Area and chloroform in groundwater at the FPP area. The risk assessment determined that the Site posed potential threats to human health and the environment through ingestion associated with contaminated soil and groundwater.

IV. Remedial Actions

Remedy Selection

As part of the RI/FS, the PRPs implemented a field Pilot Test of SVE/AS in February 2000. Following successful completion of the Pilot Test, and with the approval of EPA and the Virgin Islands Department of Planning and Natural Resources (VIDPNR), a SVE/AS system for the AST Area was placed in continuous operation in June 2001 by the PRPs.

A chain link fence was installed in spring 2000 along the property line to secure the area from unauthorized access, and in the spring of 2002, the PRPs demolished the site buildings and removed and disposed/recycled all of the tanks and related equipment.

On August 14, 2002, the Regional Administrator signed a Record of Decision (ROD) selecting the following remedy:

- SVE/AS to treat contaminated groundwater, saturated soil, and unsaturated soil at the AST source area;
- MNA to address low-level residual contamination in groundwater at the FPP area and downgradient areas; and
- Institutional controls (in the form of existing VIDPNR well permitting laws and regulations) to limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until EPA's Maximum Contaminant Levels (MCLs) are achieved.

The ROD also selected groundwater pump and treat as a contingency remedy in the event that groundwater cleanup goals were not achieved in a reasonable time period.

The cleanup goals for soils in the AST Area were 6,500 ug/kg for ethylbenzene and 90,000 ug/kg for xylene; these values were selected with consideration of commercial land use and impact to groundwater. The unrestricted residential soil cleanup goals are 5,700 ug/kg for ethylbenzene and 600,000 ug/kg for xylene. The post-excavation sampling conducted by Golder Associates indicates that the maximum detected concentration of ethylbenzene in soils is 1,600 ug/kg at a depth of 8 feet and that the maximum detected concentration of xylene in soils is 1,300 ug/kg at a depth of 11 feet. Therefore, the concentrations of site-related contaminants remaining in soils are below the level that allows unrestricted residential land use.

For groundwater, the cleanup goals were 700 μg/L for ethylbenzene, 10,000 μg/L for xylene, and 100 μg/L for chloroform, respectively. All groundwater monitoring locations have been below the cleanup goals.

The following RAOs based on the human health risk assessment were required for the site:

- Mitigate the toxicity, mobility, and/or volume of volatile organic compounds (VOCs) (ethylbenzene and xylene) in soils in the AST Area so as to minimize continued leaching to groundwater;
- Mitigate the toxicity, mobility, and/or volume of VOCs (ethylbenzene and xylene) in groundwater in the AST Area and downgradient so as to achieve MCLs and protect potential future groundwater users;
- Mitigate the toxicity, mobility, and/or volume of chloroform in groundwater in the FPP area and downgradient so as to achieve MCLs and protect future potential groundwater users; and
- Restrict on-Site groundwater use to non-potable purposes until the water quality is restored to MCLs.

In the RD/RA Consent Decree, the PRPs agreed to perform the RD/RA specified in the ROD. On a voluntary basis, the PRPs had been operating the SVE/AS system in the AST Area (which was consistent with the requirements of the ROD) since 2001, and an extensive network of monitoring wells was already in place. A formal remedial design phase was, therefore, not required by the Consent Decree, except in the event EPA determined that supplemental activities were required to achieve performance standards. The PRPs submitted a Remedial Action Work Plan (RAWP) in September 2004 that details all elements of the required remedial action:

- Remedial Element I: Soil Vapor Extraction/Air Sparging (SVE/AS) for the AST Area;
- Remedial Element II: Monitored Natural Attenuation (MNA) for the FPP Area; and,
- Remedial Element III: Institutional Controls.

Remedy Implementation

SVE/AS System in AST Area

The SVE/AS system included six SVE wells, one AS well, and eleven vapor monitoring probes, together with a surface vapor barrier that prevented short-circuiting of air flow and direct contact with surface soil. A groundwater monitoring network comprising a total of eight wells (shallow and deep) was also installed in the AST Area. Continuous operation of the SVE/AS system by the PRPs from June 2001 through November 2003 removed approximately 2,030 pounds of AST Area contaminants and reached asymptotically low limits of mass removal. Rebound testing indicated that negligible residual mass was left in the unsaturated zone. The mass removed correlates well with source mass estimates presented in the Feasibility Study (FS) of 1,900 pounds.

AST Area Groundwater Sampling Results up to June 2004

AST Area groundwater has been monitored quarterly commencing in June 2001, when the SVE/AS system was placed in continuous operation, including three events subsequent to shut down of the AS/SVE system on November 3, 2003. Groundwater concentrations were reduced from a high of 176,000 ug/L of total toluene, ethylbenzene and xylene (TEX) in June 2001

(baseline levels) in the most contaminated well (MW 6), to 13 ug/L in September 2003, the last sampling event prior to the November 2003 shutdown of the SVE/AS system. Four other AST Area groundwater monitoring locations remained below the ROD cleanup goals for the entire period, and were generally at or near non-detect levels from November 2001 onward.

Rebound and post shut down evaluations performed in August 2002, December 2003, March 2004 and June 2004 indicated modest increases in groundwater concentrations, to levels generally below cleanup goals. Post shutdown levels in MW 1 and MW 6 in June 2004 were reduced 99.99% from baseline concentrations in June 2001, confirming the permanence of the remediation. Concentrations in MW 6 decreased from 6,900 ug/L of TEX in December 2003 to 14 ug/L of TEX in June 2004. The concentrations in MW 1, which increased from December 2003 to March 2004, had decreased since March 2004, as natural attenuation degraded the residual contaminant concentrations following source removal/treatment of the vadose zone (2,035 pounds removed via SVE).

Prior to source mass removal in the AST Area, the extent of groundwater impacts were relatively limited (approximately 30 to 40 feet downgradient) due to natural attenuation processes.

Wells located to the north of the AST Area, MW 8 and MW 10, were installed during the Remedial Investigation (RI) to monitor the possible off property migration of contaminants although the predominant groundwater flow direction is to the south/southeast. These wells were sampled during the baseline event and in the three events since December 2003. In each event, concentrations of TEX were 0.6 ug/L in MW 8 and MW 10, indicating that there is no migration of Site COCs to the north.

AST Confirmatory Soil Sampling

Soil samples were collected in the AST Area on a 25 foot by 25 foot grid pattern with vertical samples collected every 2 feet to the water table, in February 2004 and analyzed for site contaminant VOCs. The results demonstrated that contaminant levels were below cleanup goals in all samples analyzed. The highest depth averaged concentrations of soil samples in one location were 369 ug/kg of ethylbenzene and 296 ug/kg of xylene, compared with the ROD cleanup goals of 6,500 ug/kg and 90,000 ug/kg, respectively.

Groundwater monitoring was performed semi annually from 2004 to 2006. Three wells, MW-1, MW-6, and AST-VMP-3D, were monitored in the AST Area for TEX parameters and a list of key intrinsic biodegradation parameters. All TEX results were below cleanup goals except for one detection of ethylbenzene at 1700 ug/L in December 2004. EPA approved annual post remediation monitoring in the AST Area in April 2006. TEX concentrations have remained below cleanup goals during three rounds of post remediation monitoring from 2006 to 2008. The data is reported in the Final Post Remediation Report. Since post remediation monitoring showed compliance with cleanup goals, no further sampling of the monitoring wells is expected in the AST Area.

MNA in FPP Area

EPA selected monitored natural attenuation (MNA) as the remedy for FPP Area groundwater, and chloroform concentrations in groundwater have decreased sharply since 1998 such that the cleanup goal has now been reached. From 1998 to June 2004, chloroform in MW-2, the source area of historically highest concentrations, decreased from 2,400 ug/L to 13 ug/L. Chloroform concentrations in the FPP Area have been consistently below the cleanup goal since 2000. MW-11, a downgradient well which had an increase in chloroform from 3J ug/L in 1998 to 40.4 ug/L in 2000, was below cleanup goals in 2004, indicating that chloroform has attenuated downgradient. Chloroform was not been detected in any of the AST Area wells, and methylene chloride (a potential degradation product of chloroform) was not detected above 1 ug/L in any FPP or AST wells up to June 2004.

In the FPP area, annual post remediation groundwater monitoring began in the 2nd quarter 2005. Three wells, MW-2, MW-7, and MW-11, were monitored for chloroform. Chloroform concentrations have remained below cleanup goals during three rounds of post remediation monitoring from 2005 to 2007. The data is reported in the Final Post Remediation Report. Since post remediation monitoring showed compliance with cleanup goals, no further sampling of the monitoring wells is expected in the FPP Area.

ROD Cleanup Goals Achieved

Based upon the soil and groundwater data, which indicated compliance with all cleanup goals, EPA determined that supplemental remedial construction activities were not necessary, and use of the contingency remedy of groundwater pump and treat would not be required in either the AST Area or FPP Area. EPA conducted the Pre-Final Inspection of remedial construction activities in March 2004. Remedial construction activities were considered complete during this inspection. Subsequent Post Remediation groundwater monitoring at both AST and FPP Areas showed that compliance with all cleanup goals have been met. The Final Post Remediation Monitoring Report was submitted to EPA on April 28, 2008.

Institutional Controls

The ROD indicated that the VIDPNR, in consultation with EPA, would utilize institutional controls (in the form of existing well permitting laws and regulations) to limit the pumping of groundwater at the Site, to prevent interference with the selected remedy, and to also prevent human exposure to contaminated groundwater until ROD cleanup goals are achieved. Pursuant to the CD, on request from EPA, the PRPs were to execute and record an easement to provide access to the Site and ensure that groundwater was not used for potable purposes and activities at the Site would not interfere with the remedy. The PRPs maintained fencing around the site and maintained oversight of groundwater conditions during remediation. The PRPs worked with VIDPNR to ensure that no wells were installed or used for the duration of the remediation. Based upon the confirmatory groundwater sampling data, which indicate meeting or

exceeding all cleanup goals for both soils and groundwater, EPA did not require the filing of an easement. The site is considered suitable for unlimited use and unrestricted exposure (UU/UE) and the use of institutional controls in the future is not warranted.

No reuse is known to be currently planned for the Site. The property is currently up for sale.

System Operations/Operation and Maintenance

There are no further operation and maintenance activities associated with this site. The PRPs will properly seal all remaining monitoring wells and discontinue remedy components, as appropriate. There were no institutional controls implemented for this site and no follow-up activities associated with the institutional controls. Following issuance of this report, EPA will seek the Virgin Islands concurrence on the deletion of this site from the NPL.

Remedy Costs

The ROD estimate of costs for the Selected Remedy was as follows:

Capital costs:	$	850,760.
Estimated present worth O&M costs:	$	553,500.
Total estimated present-worth cost:	$	1,404,260.

The PRPs incurred capital costs for remedy implementation of approximately $600,000. Operation and maintenance costs $573,000 to date and have included:

- SVE/AS system operation
- Maintenance and monitoring for 30 months
- Quarterly and post-remediation groundwater sampling and reporting for 48 months, and
- Confirmatory soil sampling.

V. Progress Since the Last Five-Year Review

This is the first five-year review for the site.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of:

Michael Sivak: EPA Risk Assessor
Amanda Gallgaher: EPA geologist
Caroline Kwan: EPA RPM
Syed Sadaydeli: VIDPNR RPM

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the Virgin Islands Chemical site is, Cecilia Echols. A public notice in The St. Croix Avis was published on February 6, 2009, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the remedy for the Site to ensure that the implemented remedy remains protective of public health and is functioning as designed. It was also indicated that once the five-year review is completed, the results will be made available in the local site repositories. In addition, the notice included the RPM's and the CIC's addresses and telephone numbers for questions related to the five-year review process for the Virgin Islands Chemical site. There were no comments received from the public or from stakeholders during this review. The Region's community involvement staff conducted an active campaign to ensure that the residents were well informed about the activities at the site. Community involvement activities included routine publication of progress fact sheets.

Document Review

The documents, data, and information which were reviewed in completing the five-year review are summarized in Table 3 (attached).

Data Review

Groundwater Monitoring

Twelve groundwater monitoring events have been conducted at the site during the review period (2003 – 2008). Groundwater monitoring has been conducted according to the 2002 Record of Decision and Consent Decree, and the associated 2004 Statement of Work. Groundwater elevation measurements and natural attenuation parameters (temperature, pH, specific conductance, turbidity, dissolved oxygen, and redox potential) were collected during each event. Groundwater samples were submitted for analysis of toluene, TEX in the AST Area, and chloroform and methylene chloride in the FPP Area. Post Remediation Monitoring groundwater sampling was discontinued May 2007 in the FPP Area and February 2008 in the AST Area.

Aboveground Storage Tank Area

The selected remedy for groundwater contaminants in the AST Area is treatment via SVE/AS. The SVE/AS system was shut down on November 3, 2003. Prior to system shut-down, COC, TEX, were below MCLs The MCLs for ethylbenzene and xylene are 700 parts per billion (ppb) and 10,000 ppb, respectively. Following shut-down, COC concentrations rebounded in AST Area wells MW-1, MW-6, and AST-VMP-3D, but are currently showing decreasing trends.

MW-1

Ethylbenzene concentrations in groundwater increased to above the MCL in Spring 2004, but then declined during subsequent sampling seasons. Currently concentrations are below the MCL. Xylene concentrations increased to levels above the MCL from December 2003 through June

2004 then declined to below the MCL in November 2005 and subsequent sampling events showed contaminant levels continued to remain below MCLs.

MW-6

Concentrations of ethylbenzene rebounded to levels above the MCL in December 2003, but have since shown a declining trend. Concentrations have been below the MCL since the March 2004 sampling event. Concentrations of xylene also rebounded post remedial shut-down, but have remained below the MCL since 2001.

AST-VMP-3D

Although concentrations of TEX rebounded slightly post system shut-down, ethylbenzene has remained below the MCL during the review period. Concentrations of xylene increased to levels above the MCL in December 2004, but have subsequently decreased. Currently xylene concentrations are below the MCL. Subsequent sampling events showed contaminant levels continued to remain below MCLs.

Former Process Pit Area

EPA selected monitored natural attenuation (MNA) as the remedy for FPP Area groundwater, and chloroform concentrations in groundwater have decreased sharply since 1998 such that the cleanup goal has now been reached. From 1998 to June 2004, chloroform in MW-2, the source area of historically highest concentrations, decreased from 2,400 ug/L to 13 ug/L. Chloroform concentrations in the FPP Area have been consistently below the cleanup goal since 2000. MW-11, a downgradient well which had an increase in chloroform from 3J ug/L in 1998 to 40.4 ug/L in 2000, was below cleanup goals in 2004, indicating that chloroform has attenuated downgradient. Chloroform has not been detected in any of the AST Area wells, and methylene chloride (a potential degradation product of chloroform) was not detected above 1 ug/L in any FPP or AST wells up to June 2004.

In the FPP area, annual post remediation groundwater monitoring began in the 2nd quarter 2005. Three wells, MW-2, MW-7, and MW-11, were monitored for chloroform. Chloroform concentrations have remained below cleanup goals during three rounds of post remediation monitoring from 2005 to 2007 and have not migrated downgradient. The data are reported in the Final Post Remediation Report. Since post remediation monitoring showed compliance with cleanup goals, no further sampling of the monitoring wells is planned in the FPP Area.

Site Inspection

Site inspections were performed on March 4, 2009.

Inspection participants included:

Caroline Kwan- EPA-RPM
Dr. Nadine Noorhasan Director of DEP, VIDPNR
Syed Syedali- VIDPNR
Emanual Liburd- VIDPNR
William Gierke- RPM, Pfizer, Inc.
Steve Kemp- Pfizer, Inc.
Allen Kane- Golder Associates
Wes Jamison- Caribbean Hydro-Tech Inc.

Institutional Controls Verification and Effectiveness

There were no institutional controls implemented for this site and no follow-up activities associated with the institutional controls.

VI. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The Remedial Action Objectives include: 1.) mitigating the toxicity, mobility, and/or volume of ethylbenzene and xylene in the soils of the AST Area in order to minimize leaching potential and in the groundwater at and downgradient of the AST Area so as to reach MCLs; 2.) mitigating the toxicity, mobility, and/or volume of chloroform in groundwater at and downgradient of the FPP area so as to reach MCLs; and 3.) to restrict potable use of groundwater until MCLs are achieved. All recent groundwater data indicate that MCLs have been achieved at the site. The remedy has functioned as intended and these remedial action objectives have been achieved.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

There are no changes in the physical conditions of the site or site uses that would affect the protectiveness of the selected remedy. The exposure assumptions and the toxicity values that were used to estimate the potential risks and hazards to human health followed the general risk assessment practice at the time that the risk assessment was performed.

Although the risk assessment process has been updated in recent years and specific parameters and toxicity values have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

Cleanup goals for soil remain valid. It should be noted that the cleanup goals for soils in the AST Area are 6,500 ug/kg for ethylbenzene and 90,000 ug/kg for xylene; these values were selected with consideration of commercial land use and impact to groundwater. The unrestricted residential soil cleanup goals are 5,700 ug/kg for ethylbenzene and 600,000 ug/kg for xylene. The post-excavation sampling conducted by Golder Associates indicates that the maximum detected concentration of ethylbenzene in soils is 1,600 ug/kg at a depth of 8 feet and the maximum

detected concentration of xylene in soil is 1,300 ug/kg at a depth of 11 feet. Therefore, the concentrations of site-related contaminants remaining in soils are below the level that allows unrestricted land use.

Cleanup goals for groundwater are MCLs. The evaluation of groundwater in this five-year review focused on the possibility of vapor intrusion if buildings were to be constructed at the site. Soil vapor intrusion was not evaluated in the original risk assessment. This pathway was evaluated for this Five-Year Review to determine if vapor intrusion concerns are present. Since groundwater concentrations at all monitoring wells meet MCLs, the potential for vapor intrusion is not anticipated.

Exceeding soil cleanup levels and meeting MCLs in groundwater COCs have achieved an unrestricted use and unlimited exposure determination for the site. As a result, no long-term Institutional Controls (IC) or operation and maintenance activities are necessary.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

Technical Assessment Summary

Based upon the results of the five-year review, it is concluded that the remedial action objectives have been achieved at the site. The concentrations of site-related contaminants remaining in soils are below the levels that allow unrestricted land use. The data review showed that all monitoring wells at both the AST and FPP Areas meet MCLs. There are no further operation and maintenance activities associated with this site. The PRPs will properly seal all remaining monitoring wells and discontinue remedy components, as appropriate. There were no institutional controls implemented for this site and no follow-up activities associated with the institutional controls.

VII. Recommendations and Follow-Up Actions

There are no recommendations and follow-up actions associated with this five-year review.

VIII. Protectiveness Statement

Remedial action objectives have been achieved so that human health and the environment are protected under all reasonably anticipated site uses and exposures. No further five-year reviews are required by Section 121(c) of CERCLA, EPA regulations or EPA policies.

IX. Next Review

This is the only five-year review for the site. Additional five-year reviews are not necessary since the remediation allows for unlimited use and unrestricted exposure.

Approved:

March 29 2009

Walter E. Mugdan, Director
Emergency and Remedial Response Division

Date

Table 1: Chronology of Site Events	
Event	**Date(s)**
EPA and Island Chemical Corp. conduct preliminary site investigations.	1984-1991
EPA conducts removal action at the site.	1989-1991
EPA enters into an AOC with PRPs.	1994
VICHEM Site added to the NPL.	1996
PRPs conduct RI/FS.	1995-2001
SVE system installed and functional at the site.	2001-2003
EPA signs the ROD for the site.	2002
EPA enters into an "ability to pay" Consent Decree with landowner CHS	2003
EPA signs Consent Decree with the PRPs to perform RD/RA at the site.	2003
PRP performs quarterly groundwater sampling at the AST and FPP areas at the site.	2002-2004
Confirmatory soil sampling in the AST Area by PRPs demonstrates that the contaminant levels were below cleanup goals.	2004
PRP submits Remedial Action Work Plan.	2004
EPA produces Superfund Preliminary Close Out Report.	2004
PRP performs semi-annual groundwater sampling at the AST and FPP areas at the site.	2004-2006
Post Remediation groundwater sampling at the AST and FPP areas at the site demonstrates that contaminant levels are below cleanup goals.	2005-2008

Table 4: Documents, Data, and Information Reviewed in Completing the Five-year Review
McLaren Hart, 1999. Draft Final Treatability Study Workplan, Virgin Island Chemical Site, May 1999.
Golder Associates Inc. 2000. Revised Final Remedial Investigation Report, Volume 1 and Remedial Investigation Addendum, Virgin Island Chemical Site, St. Croix, USVI, submitted to the USEPA October 6, 2000.
Golder Associates Inc. 2001. Feasibility Study Report, Virgin Island Chemical Site, June 20, 2001.
ERTEC, 2001. Operations, Maintenance and Monitoring Plan, Soil Vapor Extraction and Air Sparging Systems, VICHEM Site, St. Croix, USVI. February 2001.
EPA. 2002. Record of Decision for Virgin Islands Chemical Site, St. Croix, USVI. EPA. August.
EPA. 2003a. Consent Decree for Virgin Islands Chemical Site, St. Croix, USVI. EPA. September.
EPA. 2003b. Statement of Work for Remedial Action Oversight, Virgin Islands Chemical Site, St. Croix, USVI. December.
EPA. 2004. Superfund Preliminary Close Out Report, Island Chemical Corp. Superfund Site, St. Croix, U.S. Virgin Islands, USEPA Region II, New York, New York, March 24, 2004.
Golder Associates Inc. 2004. Remedial Action Report, Virgin Island Chemical Site, September 17, 2004.
Golder Associates Inc. 2008. Final Post Remediation Monitoring Report, Virgin Island Chemical Site, April 28, 2008.
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new applicable or relevant and appropriate requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.

Table 7: Acronyms Used in this Document	
AOC	Administrative Order on Consent
AST	Above Ground Storage Task
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
CHS	CHS Holding Corporation
CHS, Inc.	Charles H. Steffey, Inc.
COC	Contamination of Concern
EPA	United States Environmental Protection Agency
FFS	Focused Feasibility Study
FPP	Former Process Pit
FS	Feasibility Study
MCL	Maximum Contaminant Level
ug/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
MNA	Monitored Natural Attenuation
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
RA	Remedial Action
RAWP	Remedial Action Work Plan
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
SVE/AS	Soil Vapor Extraction/Air Sparging
TCE	trichloroethylene

Table 7: Acronyms Used in this Document	
TEX	Total toluene, ethylbenzene & xylene
VICHEM	Island Chemical Corp./Virgin Island Chemical Corp.
VIDPNR	Virgin Islands Department of Planning and Natural Resources
VOCs	Volatile Organic Compounds