Our Contribution to the Environment®

Environmental International Corporation
161 Kimball Bridge Road, Suite 100, Alpharetta, GA 30009
Phone: 770-772-7100, Fax: 770-772-0555
Website: www.eicusa.com

October 11, 2018

Mr. Robert Marbury
Georgia Department of Natural Resources
Response and Remediation Program
2 Martin Luther King, Jr. Drive, S.E.
Suite 1054 East Tower
Atlanta, Georgia 30334-9000

Subject: **Compliance Status Report Addendum**
Vopak Terminal Savannah, Inc.
HSI Site No. 10464
Turner and Hart Street, Savannah, Georgia

Dear Mr. Marbury:

On behalf of Vopak Terminal Savannah, Inc. (VTSI), Environmental International Corporation (EIC) is pleased to submit the attached Compliance Status Report (CSR) Addendum for the above referenced site.

Enclosed are the following:

1. One signed CSR Certification of Compliance
2. One signed CSR Qualified Groundwater Scientist Certification
3. One Executive Summary
4. One CSR Addendum

If you have any questions regarding this submittal, please contact Mr. Clifton Ferrell of VTSI at 912-964-1811 or me at the above location.

Sincerely,

ENVIRONMENTAL INTERNATIONAL CORPORATION

Raj Mahadevaiah, P.E., C.G.W.P.
President & CEO

Cc: Mr. Clifton Ferrel, Vopak Terminal Savannah, Inc.

HSI SITE NO. 10464, PCE REMEDIATION, VOPAK TERMINAL SAVANNAH

COMPLIANCE STATUS REPORT
Addendum

October 3, 2018

Submitted to:

GEORGIA DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Response and Remediation Program, Land Protection Branch

2 Martin Luther King Jr. Drive, SE
Suite 1054 East Tower
Atlanta, Georgia 30334

Prepared for:

VOPAK TERMINAL SAVANNAH INC.

P.O. Box 7390
Savannah, Georgia 31418-7390

Prepared by:

ENVIRONMENTAL INTERNATIONAL CORPORATION

161 Kimball Bridge Road, Suite 100, Alpharetta, GA 30009, USA

Phone 770.772.7100 • Fax 770.772.0555

http://www.eicusa.com

COMPLIANCE STATUS REPORT

CERTIFICATION OF COMPLIANCE 391-3-19-.06(4)(a)

"I certify under penalty of law that this report and all attachments were prepared under my direction in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Based on my review of the findings of this report with respect to the risk reduction standards of the Rules for Hazardous Site Response, Rule 391- 3-19-.07, I have determined that this site is in compliance with: Type 4 risk reduction standards (RRS) for soil; Type 5 RRS for groundwater and meets the established groundwater cleanup criteria at the point of exposure, in accordance with the VRP Act, through the use of a Uniform Environmental Covenant (UEC) and the associated monitoring and maintenance plan."

CLIFTON FERRELL

Printed Name

ENVIRONMENTAL MANAGER

Title

Vopak Terminal Savannah Inc.
280 Brampton Road
Garden City, Georgia 31418
912-964-1811

Signature

10/10/2018

Date

COMPLIANCE STATUS REPORT

QUALIFIED GROUNDWATER SCIENTIST CERTIFICATION

"I certify that I am a qualified groundwater scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in groundwater hydrology and related fields as demonstrated by state registration and completion of accredited university courses that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report was prepared by myself or by a subordinate working under my direction."

10/11/18

Date

Basavaraj Mahadevaiah, GA PE No. 23198
Environmental International Corporation
770-772-7100, extn. 223

Signature and Stamp

EXECUTIVE SUMMARY

In 2000, Vopak Terminal Savannah, Inc. (VTSI) acquired Paktank Corporation (Paktank) that maintained a bulk liquid storage terminal on a land parcel in Savannah, Georgia leased from the Georgia Ports Authority (GPA). In 1996, Paktank notified the Georgia Environmental Protection Division (EPD) about a solvent release discovered in one of its tank farms. The release was composed of PCE and its typical degradation products. Paktank attributed the source of the release to tetracholoroethylene also known as percholoroethylene (PCE) that was stored at the terminal in the mid 1970's.

In 2003, VTSI endorsed a consent order with EPD that required assessment and remediation of contaminated soils and groundwater associated with the PCE release. Based on subsequent remedial activities by VTSI, EPD notified VTSI in 2006 that the source soil remediation tasks were complete. The groundwater remediation program that involved an enhanced attenuation program was, however, found to be ineffective in reducing the overall extent of the groundwater plume. In 2010, VTSI retained Environmental International Corporation (EIC) to develop a more cost-effective remedial strategy to address the groundwater contamination. EIC proposed an alternative approach under the new Georgia Voluntary Remediation Program (VRP). In a letter dated August 31, 2011, EPD approved a voluntary investigation and remediation plan (VIRP) that presented the alternative approach. The approved VIRP superseded the requirements specified in the original consent order.

Immediately after the VIRP was approved, VTSI implemented the proposed assessment and remedial tasks. In implementing the tasks, EIC successfully completed a proper evaluation of the groundwater plume, demonstrated plume stability, reestablished monitored natural attenuation (MNA) with multiple lines of evidence, and substantially reduced the environmental risks. EIC also utilized a fate and transport model to demonstrate that any potential migration of the residual groundwater contamination will not impact the water quality of the Savannah River. To address the prevailing groundwater contamination, EIC proposed Type 5 risk reduction standards (RRS) as a contingency measure. In a stakeholder meeting, EPD and GPA concurred with VTSI that Type 5 RRS would be acceptable. VTSI has also demonstrated that the groundwater impacts have been delineated to default risk reduction standards to the extent technically practicable in accordance with the VRP Act. For residual on site contamination within the VTSI land parcel, institutional controls will be implemented to manage any potential risks from incidental exposure of groundwater during any site excavation activities within the groundwater plume.

To address residual groundwater impacts associated with the site property, VTSI will utilize institutional controls, including the implementation of a monitoring and maintenance plan (MMP), to control potentially complete exposure pathways and document the continued natural attenuation and declining concentration trends. This monitoring will entail collection of groundwater samples from monitoring wells MW-1R, MW-16, MW-26R, MW-28, and MW-37 for COC analysis on an annual basis for a period of five years.

HSI SITE NO. 10464, PCE REMEDIATION, VOPAK TERMINAL SAVANNAH

COMPLIANCE STATUS REPORT
Addendum

October 11, 2018

Submitted to:

GEORGIA DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Response and Remediation Program, Land Protection Branch

2 Martin Luther King Jr. Drive, SE
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Prepared for:

VOPAK TERMINAL SAVANNAH INC.

P.O. Box 7390
Savannah, Georgia 31418-7390

Prepared by:

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On behalf of Vopak Terminal Savannah Inc (VTSI), EIC is submitting the following material as an addendum to the original CSR dated July 29, 2016

2.4.2 Groundwater Delineation

During the implementation of the VIRP program, VTSI has delineated the extent of groundwater contamination. This effort required several improvements to the monitoring well network and collection of full round of groundwater samples during several sampling events. Explicit details of these activities were discussed in the corresponding semi-annual progress report and are summarized in Section 4 of this CSR. Table 3-4 in Exhibit G tabulates the historical groundwater analytical data for each well.

Based on the historical site monitoring data, it is apparent that the groundwater impacts have been delineated to default risk reduction standards to the extent technically practicable in accordance with the VRP Act. Based on groundwater flow direction and the site conditions further delineation is technically impracticable.

Although the current offsite groundwater data indicates that the hydraulically upgradient property boundary does not meet a Type 1-4 RRS, VTSI will implement a monitoring and maintenance plan (MMP) to document the continued natural attenuation and declining concentration trends. This monitoring will include the collection of groundwater samples from monitoring wells MW-1R, MW-16, MW-26R, MW-28, and MW-37 for COC analysis on an annual basis for a period of five years. VTSI will evaluate the analytical results to confirm the continued attenuation of the COCs within that portion of the plume and perform annual inspections as a component of the MMP to confirm that groundwater onsite and on any affected property is not being used and that no conditions exist that would result in an unacceptable groundwater exposure risk.

2.4.2.1 Horizontal Delineation

Chlorinated Volatile Organic Compounds

The horizontal extent of the dissolved CVOC plumes, during the baseline VIRP sampling event in October 2011, are illustrated in Figures 4 through 7 in Exhibit B. Following this event, VTSI installed 3 additional wells to provide additional data points for completing the delineation of COC plumes and to replace an un-located well. The CVOC plumes were further defined during the January 2014 sampling event, the first sampling event after the installation of 3 additional wells, as illustrated in Figures 4-7, 4-9, 4-11, and 4-13 in Exhibit C. Two of these wells served as downgradient sentinel wells enabling downgradient delineation of the CVOC plume. Following this event, one former

injection well and one previously un-located well were both added to the sampled monitoring well network. As illustrated in Figures 3-3 through 3-6 in Exhibit G, from final VIRP sampling event in April 2016, samples collected from the improved monitoring well network, further defined the horizontal extent of the dissolved CVOCs. In reviewing the above CVOC plume maps, it is apparent that the CVOC plume has decreased in both concentration and extent during the VIRP program.

BTEX

The horizontal extent of the dissolved BTEX -from the baseline VIRP sampling event in October 2011 - is illustrated in Figures 8 through 11 in Exhibit B. Downgradient delineation of the BTEX plume has been complete since the initiation of the VIRP. Similar to the CVOC plume, the understanding of the BTEX plumes concentrations and extent were more accurately delineated with the expansion of the monitoring well network. Figures 4-15, 4-17, 4-19, and 4-21 in Exhibit C illustrate the extents of the BTEX plumes during January 2014, the first sampling event after the installation of 3 additional monitoring wells. Figures 3-7 through 3-10 in Exhibit G illustrate the horizontal extent of the BTEX plumes during the final VIRP sampling event in April 2016. In reviewing these figures, it is apparent that the BTEX plume has decreased in both concentration and extent during the VIRP program.

2.4.2.2 Vertical Delineation

The historical groundwater sampling results from the deep well MW-14 located within the original COCs footprint are tabulated in Table 3-4 in Exhibit G. Referring to the analytical data in the table, it is apparent that all monitored COCs concentrations in the well have remained below delineation standards since October 2013. Also, the concentrations of all but one parameter were below method detection limits - MDLs. In the EPD's comment letter to VTSI, dated April 3, 2014, the EPD concurred with VTSI that vertical delineation is complete (EPD, 2014).

2.4.2.3 Point of Exposure

VTSI understands that Section 12-8-108 (4) of the VRP Act specifies concentrations of site specific COC in groundwater shall be measured and evaluated at a point of demonstration (POD) well to demonstrate that groundwater concentrations are protective of any established downgradient point of exposure (POE). Based on historical groundwater contours, MW-16 appears to be the most hydraulically downgradient well at the site and is located adjacent to the Savannah River.

Currently, there are no drinking water wells located between MW-16 and the Savannah River. The Savannah River at the point of groundwater discharge and downstream is not being used as a drinking

water intake, and a UEC will be executed for the site property restricting groundwater use. Therefore, it has been determined that the drinking water exposure pathway is not complete at this site property at the time of this evaluation. However, the groundwater to surface water exposure pathway is complete and the groundwater POE for the site property will be designated as the Savannah River. Since COCs are persistent in groundwater in the interior of the site property at concentrations above the cleanup goals, the VRP Act specifies that a POD for this groundwater POE is required, which will include monitoring location MW-16. Considering that MW-16 is adjacent to Savannah River, additional monitoring points between MW-16 and the Savannah River is technically impracticable.

Referring to Section 4.6.2 of the CSR, while concentrations of COCs may be present at the site above the cleanup goals, the results of the groundwater mixing modeling program indicate that the potential COC migration to the River - even at the highest historical concentrations from this site -would not result in downstream River concentrations in excess of either federal or state surface water quality standards. The collection of surface water samples as an element of a monitoring program to validate the model assumptions was considered. However, because the Savannah River changes flow directions depending on the diurnal tidal influence, locating a sampling point for evaluating potential impacts from relatively low concentrations of COC that could migrate to the river is unattainable. In addition, stormwater flow to the drainage culvert from other areas of the facility would likely affect the ability to collect a representative surface water sample where groundwater discharges to surface water; stormwater discharges are regulated under the facility's stormwater permit; and based on these site-specific conditions, it is not practicable to collect surface water samples from the drainage outfall proximal to MW-16 or from a nearby location that may be representative of the groundwater-surface water interface.

To address residual groundwater impacts associated with the site property, VTSI will utilize institutional controls, including the implementation of a monitoring and maintenance plan (MMP), to control potentially complete exposure pathways and document the continued natural attenuation and declining concentration trends. This monitoring program will entail collection of groundwater samples from monitoring wells MW-1R, MW-16, MW-26R, MW-28, and MW-37 for COC analysis on an annual basis for a period of five years. Upon completion of five years of groundwater monitoring and evaluation of the data, EPD will make a determination regarding the need for additional monitoring.

4.7 VAPOR INTRUSION POTENTIAL

As noted in Section 3.1, CVOC-contaminated soil in the vadose zone was previously delineated and remediated and EPD has concluded that soil at the site has met the established RRS (EPD, 2006). In reviewing the extent of the COC plume, it is also apparent that no enclosed structures are present within the groundwater foot-print impacted by COCs. Also, the prevailing concentrations in groundwater do not result in an exposure risk above PELs to workers onsite. Consequently, the

primary vapor risk would be incidental contact of contaminated groundwater to construction workers during subsurface intrusive tasks.

VTSI understands that the concentrations of VOCs in the groundwater exceed the VISL screening values for both residential and non-residential use scenarios. Considering that the site is actively used as a chemical bulk storage facility, however, VTSI will utilize OSHA PELs as the vapor intrusion exposure criteria for any intrusive work within the COC footprint. Any potential future exposures resulting from changes to property use will be addressed through institutional controls as described in Section 5.3.1.