SECOND FIVE-YEAR REVIEW REPORT FOR CHEMICAL LEAMAN TANK LINES, INC. SUPERFUND SITE GLOUCESTER COUNTY, NEW JERSEY

Prepared by

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Region 2
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for A. Laurent

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Table of Contents

List of Abbreviations & Acronyms	
BCEE	Bis(2-chloroethyl)ether
BHHRA	Baseline Human Health Risk Assessment
CEA	Classification Exemption Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLTL	Chemical Leaman Tank Lines
COC	Chemicals of Concern
CY	Cubic Yard
DCE	Dichloroethene
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
ERH-MPE	Electrical Resistance Heating and Multi Phase Extraction
FS	Feasibility Study
GPM	Gallons per Minute
GWETS	Groundwater Extraction and Treatment System
NAPL	Non-Aqueous Phase Liquid
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
O&M	Operations and Maintenance
OU	Operable Unit
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PRP	Potentially Responsible Party
QDI	Quality Distribution, Inc.
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager

SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
TCE	Trichloroethylene
VOC	Volatile Organic Compound
WAB	Waste Accumulation Building
WMMP	Wetlands Mitigation and Monitoring Plan

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Chemical Leaman Tank Lines Inc. (CLTL) Superfund Site (Site). The triggering action for this policy FYR is the first FYR issued for the Site in August 2012. This FYR has been prepared due to the fact that contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of three Operable Units (OUs), all of which are evaluated in this FYR. The OU1 remedy addresses contaminated groundwater and is currently in the operation and maintenance phase. The OU2 remedy addresses contaminated source areas and is currently in the remedial action phase. The OU3 remedy addressed contaminated soils, sediment and surface water in wetlands located on Site and is currently in the long-term monitoring phase.

The Site's FYR team included Stephen Cipot, the EPA Remedial Project Manager (RPM); Robert Alvey the EPA geologist; Michael Clementson the EPA ecological risk assessor; Marian Olsen the EPA human-health risk assessor; and Natalie Loney the EPA community involvement coordinator. Quality Distribution, Inc. (QDI), the site's sole potentially responsible party (PRP), was notified of the initiation of the FYR. This FYR began in November 2016.

Site Background

The Site is located in Logan Township, Gloucester County, New Jersey, approximately 1 mile east of Bridgeport, New Jersey (See Figure 1). The CLTL property encompasses approximately 31.4 acres of former farmland and wetlands with an active tank-washing terminal area occupying 14.1 acres. The Site is situated at the intersection of Cedar Swamp Road and Oak Grove Road. Portions of Cedar Swamp lie adjacent to the CLTL facility to the east, southeast, and northeast. A Conrail railroad borders the Site to the north and separates it from several private residences along Route 44. The CLTL terminal property is zoned for industrial use.

Investigative activities began at the Site in 1980 and discovered the presence of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals in groundwater, supply water, soils and wetlands in the vicinity of CLTL. The Site was subsequently placed on the National Priorities List in 1984.

For more details, related to the Site's background, physical characteristics, geology/hydrogeology, land/resource use, please refer to: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200327

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Chemical Leaman Tank Lines, Inc.		
EPA ID: NJD047321443		
Region: 2	**State:** NJ	**City/County:** Bridgeport/Gloucester County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Stephen Cipot		
Author affiliation: United States Environmental Protection Agency		
Review period: 9/12/2012 - 3/30/2017		
Date of site inspection: 2/8/2017		
Type of review: Statutory		
Review number: 2		
Triggering action date: 8/20/2012		
Due date *(five years after triggering action date)*: 8/20/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

OU1

A Baseline Human Health Risk Assessment (BHHRA) for groundwater (OU1) was performed to evaluate risks posed to current and potential future exposure to residents and on-site workers by contaminated Site groundwater. Chemicals of Concern (COCs) include tetrachloroethylene (PCE), trichloroethylene (TCE), and dichloroethene (DCE). The cancer risks from ingestion of groundwater exceeded the risk range of 10^{-4} to 10^{-6} (one in ten thousand to one in a million) defined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The BHHRA also found that residents could potentially be exposed through inhalation of volatile contaminants in residential water supplies or from trailer rinsing operations at the site. EPA concluded that actual or potential Site related risks related to groundwater contamination warranted remedial action at the Site.

OU2

A baseline risk assessment including a human health risk assessment and an ecological risk assessment, was conducted for OU2, Several Areas of Concern (AOCs) were identified in OU2 as sources of groundwater contamination.

The BHHRA evaluated risks using data from all of the AOCs and found that human health risks were above the acceptable risk range for cancer risks and noncancer hazards based on potential exposure to soils in Spill Area 2 and Areas 7B, 7C and 8 and was subsequently addressed in a removal action by potentially responsible parties (PRPs). While the remaining AOCs are not posing a direct human health risk, they contain elevated levels of contaminants of concern (COCs), including PCE, TCE, and DCE, which were serving as significant sources of groundwater contamination. As a result, remedial action was warranted.

A Screening-Level Ecological Risk Assessment (SLERA) was conducted for OU2. Although hazard quotients (HQs) exceeded 1.0 for a number of contaminants of potential concern, based on the relatively small area (1 acre) of the former secondary aeration lagoons, the low quality habitat it affords, and low number of contaminants that exceeded the HQ, the SLERA concluded that a more thorough ecological risk assessment was not warranted for OU2.

OU3

As part of the OU3 RI, both a BHHRA and an ecological risk assessment (ERA) were completed. The BHHRA concluded that there were no carcinogenic or non-carcinogenic risks exceeding EPA's recommended guidelines for protection of human health (e.g., cancer risk range of 10^{-4} to 10^{-6} and a non-cancer hazard index of 1) from the wetland surface water, sediment, or soil. However, ecological risks were identified in the ERA. The potential receptors identified in the ERA at risk from Site contaminants included the barred owl, bullfrog, green heron, snapping turtle, vole, sunfish, and earthworm. These receptors could be at risk from contaminated soil, sediment and/or surface water via dermal absorption, inhalation and ingestion. However, the most acute exposure would be through ingestion, which was analyzed in detail in the ERA.

The contaminants of potential ecological concern identified in the risk assessment included various metals (aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, and zinc); polychlorinated biphenyls (PCBs) identified as Aroclor-1254; 1,1,1-Trichloro-2,2-bis(p-chlorophenyl) ethane (DDT) and its derivatives; and endosulfan sulfate.

Response Actions

With respect to immediate actions taken, activated carbon treatment units were placed in four homes which used private wells as a water supply to address contaminated drinking water. In 1987, these four homes which are located in close proximity to the Site, were connected to a to a public water supply. In 1993 and 1995, three more homes threatened by contaminated groundwater emanating from the Site were connected to the public water supply.

In addition, based on the OU1 BHHRA, the PRPs conducted a removal to address contaminated soils in AOC Spill Area 2 and Areas 7B, 7C and 8. Contaminated shallow soils from these areas were excavated and appropriately disposed of offsite by the PRPs in September 2010. Cleanup goals were achieved for this action; therefore, further action for these areas was not required. The cleanup goals for this action can be found in the Excavation Workplan and include the NJDEP 2008 Non-Residential Direct Contact Soil Remediation Standards. Comparison of these values to EPA regional industrial preliminary remediation goals indicates that the concentrations are within the risk range for cancer risk and non-cancer hazards, although above background levels.

The OU1 Record of Decision (ROD) was issued in September 1990. The ROD identified the following Remedial Action Objective (RAO) for OU1:

- Restore the contaminated groundwater plume to meet drinking water standards, including Maximum Contaminant Levels (MCLs) and New Jersey Groundwater Quality Standards (NJGWQS).

Major components of the OU1 remedy include:

- Extraction and treatment of the contaminated ground water and discharge of the treated ground water via pipeline to the Delaware River; and
- Environmental monitoring to ensure the effectiveness of the remedy.

In June 2005, the discharge option for treated groundwater was modified in an Explanation of Significant Difference (ESD). The ESD indicated that treated water would be discharged into a local tributary located approximately 1/3 of a mile from the Site.

The OU2 ROD was issued in September 2009 and established the following RAOs:

- Reduce contaminant levels present in source areas of groundwater contamination to the maximum extent practicable; and
- Improve the efficiency and effectiveness of the OU1 groundwater pump and treat remedy.

Major components of the OU2 remedy include:

- In-situ thermal treatment with soil vapor extraction (SVE) to treat areas that are sources to groundwater contamination that are primarily contaminated with VOCs and SVOCs including Areas 1, 4, 6 and the Waste Accumulation Building (WAB);
- Installation of a NAPL recovery system to remove contaminated free-phase product in Areas 1, 4, 6 and the WAB;
- Extraction and treatment of highly contaminated groundwater in the vicinity of areas that are sources to groundwater contamination including Areas 2 and 3; and
- Establishment of a Classification Exception Area (CEA) and deed notice, which are institutional controls (ICs). A CEA will minimize the potential for exposure to contaminated groundwater until the aquifer meets the cleanup goals established in OU1, and a deed notice will ensure that the Site remains protective of human health and the environment for potential future land use designations.

The OU3 ROD was issued in October 1993 and established the following RAOs:

- Reduce potential for exposure of contaminated soils, sediments and surface water by ecological receptors;
- Restore the most severely degraded areas of the wetlands to a viable plant community;
- Reduce off-site transport of contaminants in the sediments, soils and surface water;
- Prevent potential migration of contaminants into the wetlands via overland runoff from the CLTL facility; and
- Prevent further degradation of the wetlands.

The major components of the OU3 selected remedy include:

- Excavation of the Swale Area, the Ponded Area and the Adjacent Impacted Area;
- Off-site disposal of contaminated soils and sediments at an appropriate facility;
- Backfilling with clean soil and revegetation/wetlands restoration;
- Construction of a berm/drainage system along the wetlands adjacent to the CLTL facility;
- Wetlands access restriction through fence maintenance and sign posting; and
- Long-term monitoring to ensure the effectiveness of the remedy.

Status of Implementation

OU1: Groundwater

In September 1991, EPA entered into a Consent Decree with Chemical Leaman Tank Lines (now QDI) to design and implement the OU1 remedy. QDI completed the Remedial Design (RD) for the remedy in 1997 and a subsequent significant modification of the RD was completed and approved in 2004. The modified design consisted of 20 extraction wells pumping a combined 230 gpm from the shallow and intermediate aquifer zones and treatment of the extracted groundwater at a treatment facility to be constructed on-Site.

The construction of the groundwater extraction and treatment system began in May 2005. Numerous difficulties were experienced with the equipment, which required lengthy re-fabrication and replacement. The treatment system was started again in 2010 and operated for five weeks. However,

the plant had to be shut down due air emissions in excess of the state permit equivalency. Exceedances were due to changes in the influent contaminant concentrations; therefore, the treatment system had to be further modified to accommodate the higher contaminant levels. Modifications to the treatment system were completed in November 2011, including installation of new chemical oxidation tanks and aeration tanks for pH adjustment. The OU1 Remedial Action (RA) Report was signed on November 21, 2011. The groundwater extraction and treatment system began operating on September 8, 2011 and O&M is ongoing. The general extent of the OU1 groundwater plume is depicted on attached Figure 6-1 (*Shallow Subzone Total VOC Isoconcentration Map),* Figure 3 (*Intermediate Subzone Total VOC Isoconcentration Map),* and Figure 4 (*Deep Subzone Total VOC Isoconcentration Map).*

OU2: Source Areas of Groundwater Contamination

QDI entered into a Consent Decree with EPA in October 2010 to conduct the RD and RA work for OU2. The RD was completed on February 19, 2015, and construction of the Electrical Resistance Heating and Multi Phase Extraction (ERH-MPE) system commenced on April 17, 2015. The ERH-MPE system startup was on July 13, 2015, within Treatment Areas (TA) 1, 4 and 6. The ERH-MPE system operated through December 2015, then power was reduced in an attempt to evaluate the unanticipated introduction of polychlorinated biphenyl compounds (PCBs) from the heated vapor phase as part of the NAPL waste stream. PCBs are not one of the identified OU2 COCs and the ERH-MPE treatment train was not designed to remove PCBs. In February 2016, the OU2 ERH-MPE system was completely shut down when it was determined that this treatment system had to undergo a redesign in order to appropriately manage the PCBs and other issues encountered during operation.

On May 31, 2016, QDI provided a report on the effectiveness of the ERH-MPE system. This report documented the status of soil remediation within three targeted treatment areas (TAs) referred to as: TA1, TA4 and TA6. The report detailed that the ERH-MPE treatment system achieved significant reductions in the mass and concentrations of contamination within OU2 during its operation in 2015. However, it was clear that additional remediation was necessary to meet RAOs. On January 30, 2017, QDI submitted a plan outlining modifications to the treatment system to address PCBs and to continue to reduce levels of soils contamination. After comment and modification, EPA approved QDI's redesign. Modifications to the system were completed and the ERH-MPE system was restarted in March 2017 and is currently in operation and is estimated to be complete in late 2017. Shortly after completion of the ERH-MPE portion of the remedy, additional extraction well(s) will be installed and operated in the OU2 source areas to augment ongoing groundwater extraction and treatment.

OU3: Wetland Areas

The remedy selected in the October 1993 ROD included excavation of contaminated sediments and soils in the wetlands, wetlands restoration, construction of a berm/drainage system and wetlands access restrictions. In September 1998, EPA issued a Unilateral Administrative Oder to QDI which required QDI to design and implement the selected remedy.

Construction of the OU3 remedy was initiated in June 2004. Removal of sediment and surface soils in Areas 1, 2, 3, 3A; the Main Swale Area; Adjacent Swale Area; and the Upland Swale area occurred between June 2005 and February 2006. Approximately 7,500 cubic yards (CY) of material were excavated. Post-excavation samples were collected for each remediation area and the analytical results

indicated that the established cleanup goals were achieved for each remediation area with the exception of the Main Swale Area.

Further delineation of the Main Swale Area indicated that removal to greater depths would not achieve compliance with the cleanup goals. In March 2006, EPA approved the Main Swale Area's closure plan with the following requirements:

- QDI must provide OU1 groundwater influent monitoring for the OU3 COCs;
- QDI must provide 12 inches of topsoil during backfill in all excavation areas greater than 6 inches; and
- QDI must develop a monitoring and maintenance plan for the Main Swale Area.

In June 2006 an update to the Wetland Mitigation and Monitoring Plan (WMMP) addressed those aforementioned requirements.

It should also be noted that post-excavation sampling indicated exceedances of the background value for arsenic (24.0 milligrams/kilogram (mg/kg)) in Areas 1, 2, 3, and 3A sediments at varying depths. An additional arsenic background study was conducted and results of the study indicated that the arsenic background level in sediment should be 46 mg/kg. This new background level for arsenic was approved by EPA in November 2005.

Twelve OU3 Access Restriction Signs and seven Main Swale Area Access Restriction signs were installed between June and July 2006.

In spring 2006, the excavated areas were backfilled with approximately 8,100 CY of imported sand fill and 3,700 CY of topsoil and the wetlands restoration work was initiated. Wetlands restoration included planting and seeding, installation of debris piles and vertical snags to promote reintroduction of wildlife species, and initial invasive species control. Planting and seeding activities were completed in July 2006.

Cutting of phragmites to grade was performed in April 2006. An initial application of HABITAT (invasive species control spray) was performed in May 2006. A second application was performed in June 2006 to address areas of new growth. *Galerucella* beetles were introduced to the Site in the Spring of 2007 and 2008 to help control the spread of purple loosestrife, an invasive species prevalent in the wetland areas. In addition, thirteen new piezometers were installed in July 2006, in preparation for O&M activities. Vegetative monitoring plots were established having piezometers as the center point of the plot. The effectiveness of the remedy is regularly monitored in accordance with the schedule established in the WMMP for OU3.

Institutional Control Summary Table

Table **1**: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	2	Restrict installation of groundwater wells and groundwater use	Classification Exception Area anticipated 2018
Soils Source Areas Of Groundwater Contamination	Yes	Yes	OU2	Restrict future use of any affected properties to ensure non-residential use	Deed Notice anticipated 2018

The OU2 ROD also requires that a CEA be established to minimize the potential for exposure to contaminated groundwater until cleanup goals are met. A draft CEA application was submitted to NJDEP by QDI on May 14, 2015. NJDEP did not accept the CEA as submitted and has required additional groundwater delineation near the southeastern limits of the plume. In December 2016, QDI installed an additional monitoring well (MW-27I) in this southern Site area to determine if Site COCs are present. The results of sampling of this new well will be utilized by QDI to revise their CEA application and resubmit it to NJDEP for review. It is anticipated that the CEA will be established in 2018 by NJDEP. QDI must also file a deed notice on the Site property pursuant to NJDEP regulations. It is anticipated that the deed notice filing will be complete in 2018.

Systems Operations/Operation & Maintenance

OU1

The current O&M schedule for OU1 called for water level and hydrology monitoring to be conducted quarterly. The last round of groundwater quality sampling and hydrology monitoring available was conducted in November 2016. Currently, the groundwater monitoring program includes semi-annual sampling of shallow, intermediate and deep wells for VOCs and annual sampling for SVOCs and metals.

Prior to 2011, the Groundwater Extraction and Treatment System (GWETS) was pumping from extraction wells at an average combined flow rate of 170 to 180 gallons per minute (gpm), which was less than the design flow rate of 230 gpm. The low flow rate was the result of iron fouling of the force

mains, riser pipes and submersible pumps. To resolve the iron fouling issue, a revised maintenance program was implemented.

The number of extraction wells online and the target flow rates have been revised continuously over time as a result of the hydraulic monitoring and plume capture evaluations conducted by QDI. The result of these changes are that the total design flow rate of the GWETS is lower than originally planned, however, the adjustments made have ensured that the extraction system is optimized and the plume capture is maintained. Part of these reduced extraction rates were necessary to prevent drawing in contaminants from the Bridgeport Rental and Oil Services (BROS) site, and ensuring that wells in the center of the plume are pumped at greater rates than those on the periphery, to draw the plume back to the center of the Site. The average flow rate of the GWETS for 2016 was approximately 190 gpm. Since the start of OU2 treatment operations in March 2017, groundwater extraction rates have been further reduced, as a number of extraction wells in the source area have been temporarily turned off to enhance the OU2 treatment. Currently pumping rates are approximately 130 gpm.

The OU1 GWETS has removed 11,751 pounds of VOCs from the aquifer from start-up in September 2011 through September 2016. The VOC mass recovery by the GWETS has been steadily decreasing over time. The total VOC recovered by the system in 2012 was 2,876 lbs. This has declined to 1,540 pounds in 2015, and 1,411 pounds in 2016. The GWETS removes most of the mass in the chemical oxidation phase at the head of the plant. The chemical oxidation portion of the groundwater treatment is averaging an efficiency of approximately 97%, the remainder of the treatment plant is needed for final polishing of the water prior to discharge to the Unnamed Tributary to the Delaware River. The GWETS has operated in accordance with its New Jersey Pollution Discharge Elimination System (NJPDES) permit since start-up.

OU2

The OU2 ERH-MPE/SVE system is currently in operation. Data are collected on a regular basis including: subsurface temperatures and chemical analysis of soil vapor and treatment water. The mass of contaminants removed is also calculated on a regular basis. Data will be collected and analyzed until remediation goals are met.

OU3

Monitoring of the OU3 remedy began in July 2006 upon completion of the RA activities in June 2006. The WMMP required annual monitoring for a period of at least five years. This monitoring was extended in 2012 to continue through the end of the second five-year period (August 2017). The WMMP initially required monitoring of 13 wetland plots and added an additional 4 monitoring plots in a July 2008 revision to the WMMP. Five of the 17 plots represent high quality wetlands that were not disturbed by the OU3 remediation therefore serve as reference plots. Reference plots allow monitoring of water level depths in a non-disturbed environment and notation of any qualitative trends in vegetation.

Wetland monitoring tasks include the following:

- Monthly surface water monitoring and subsidence monitoring
- Baseline and biannual Main Swale Area cap inspection
- Biannual shallow groundwater sampling – Main Swale Area
- Biannual surface water sampling – Main Swale Area

- Biannual sediment sampling – Main Swale Area
- Semiannual sampling of the OU1 GWETS influent for OU3 COCs
- Annual vegetative plot inspections
- Monthly inspection of erosion and sedimentation controls
- Invasive species control tasks
    - Spring inspection and application of herbicides to control invasive species
    - Application of purple loosestrife beetles
    - Fall inspection and application of herbicides to control invasive species

QDI is preparing the monitoring plan for the third five-year monitoring period for OU3. This monitoring plan will include a revised schedule for sampling OU1 GWETS influent, OU3 groundwater, OU3 sediment and OU3 surface water.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** five-year review as well as the recommendations from the **last** five-year review and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy for OU1 is protective of human health and the environment in the short-term because exposure pathways that could result in unacceptable risks are being controlled. Residences impacted by contaminated groundwater have been connected to a public water supply and the groundwater pump and treat system has been constructed and is currently operating. However, in order to be protective in the long-term, the New Jersey Classification Exemption Area needs to be put in place.
3	Protective	The implemented action for OU3 remedy at the CLTL site is protective of human health and the environment. The remedy has addressed exposure to ecological receptors through the excavation and off-site disposal of contaminated sediment in Cedar Swamp and the Main Swale Area. The constructed berm assists in the control of surface water runoff and any potential contaminant migration from the Site into the wetlands. The wetland vegetation has been restored and invasive species are under control. The sediment, surface water, and vegetative monitoring indicate recovery of the wetlands.

Table 3: Status of Recommendations from the 2012 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
OU1	Groundwater Institutional Controls are not in place	Implement CEA	Ongoing	In progress. PRP completing delineation of southern limits of OU1 groundwater plume to resubmit CEA to NJDEP	6/30/2018

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 14, 2016, EPA posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Chemical Leaman Superfund site. The announcement was posted on EPA's website and also can be found at the website for Logan Township, NJ here:
http://www.logan-twp.org/pdf/2nd%20FYR%20PUB%20NOTICE%20Chem%20Leaman.pdf

The outreach effort included a phone contact to the Logan Township Administrator, who attended the FYR Site visit, and provided a written notice of the FYR to the Logan Township Municipal Office to place on the township's website. The NJDEP case manager was also notified of the five-year review.

Data Review

OU1 Groundwater Data Review

Shallow subzone (ground surface to approximately 30 feet below ground surface (bgs):

The attached Figure 6-1, *Shallow Subzone Total VOC Isoconcentration Map*, shows the extent of the VOC groundwater plume in the shallow subzone in February 2016. This plume extends laterally to the north and south of the former settling and aeration lagoon source areas. As illustrated by the 10 micrograms per liter (µg/l) total VOC contour line[1], the plume extends from south of the former aeration lagoons source area to the north as far as Monitoring Well MW-10S (approximately 500 feet wide and 1,500 feet long).

As of monitoring data collected in 2016, no VOCs were detected at concentrations above the NJDEP groundwater criteria in any of the monitoring wells located around the perimeter of the Site. The data also indicate that the overall size of the plume in the shallow sub-zone has decreased when compared to the 2010 data. While COC concentrations remain high in the center of the plume, some significant decreases in concentrations of some COCs have occurred since 2010. Some examples of this trend are:

[1] Note that the 10 µg/l contour line is only used here as a tool in understanding the general plume makeup and behavior, and is not indicative of the area to be remediated.

- TCE levels went from 77 ug/l in 2015 to non-detect in 2016 in Extraction Well-7S
- Total VOC levels went from 23,127 ug/l in 2015 to 4,949 in 2016 in Extraction Well – 11S
- Vinyl chloride levels went from 370 ug/l in 2010 to 1.4 ug/l in 2016 in Well 10C
- Cis-1,2-DCE levels went from 780 ug/l in 2010 to 1.1 ug.l in 2016 in Well 10C
- TCE levels went from 8,300 ug/l in 2010 to 304 ug/l in 2016 in Well MW16-S

Note that in Extraction Well 12S, levels of total VOCs remained relative stable between 2015 (667 ug/l) and 2016 (611 ug/l).

The primary source areas of the OU1 groundwater plume are three areas currently being treated by the OU2 ERH-MPE/SVE system. Concentrations of VOC in these source zones remain elevated (i.e. greater than 10,000 μg/l). After completion of the OU2 remedy to address these source areas, EPA expects to see further decreases in shallow groundwater contaminant levels.

Intermediate Subzone: (approximately 30 to 100 feet bgs):

The VOC plume in the intermediate subzone is shown on Figure 3. The plume is similar in shape compared to the shallow subzone plume except it is more extensive, with the 10 μg/l VOC contour line covering a larger area with dimensions of approximately 1,500 feet wide by 3,300 feet long. Based on review of historical data compared to the VOC analytical data from November 2016, the contamination in the intermediate subzone is not currently expanding its footprint over time.

The intermediate subzone remains heavily contaminated, however, positive effects of the ongoing groundwater extraction and treatment can be seen. The center of the intermediate sub-zone is characterized by an elongated area of total VOC levels above 1,000 μg/l. This area does not appear to have appreciably changed in size or orientation during the last five years, however the contaminant concentrations in the center of the plume are generally declining as a result of intermediate zone pumping. Overall, 10 out of 43 wells screened in the intermediate zone of the Site's groundwater plume have shown an order of magnitude or greater decrease in total VOC levels between 2012 and 2016. Most of these wells are located in the core of the intermediate zone plume. Levels of total VOC in other wells are generally stable or have decreased to a lesser extent. Perimeter wells in the intermediate zone are not contaminated and indicate that the extent of this zone is not increasing.

Deep Subzone: (Approximately 100 to 150 feet bgs):

Deep subzone wells 1C (west Site perimeter), OBS-4D (former aeration lagoon area) and GM95-MW4D (southwest Site perimeter) and MW-15D had no detections of COCs above standards through the last few years of sampling (Figure 4).

Monitoring well 15-620 is the only deep subzone well to exhibit exceedances of NJGWQS in recent monitoring events. The well is located on the eastern periphery of the Site's groundwater contamination and has historically had elevated levels of Site contaminants. Concentrations of VOCs have increased over time in this well. QDI believes that some of the contamination in the well may be from the adjacent BROS Superfund Site and are currently performing additional groundwater sampling to further evaluate groundwater condition within and in the vicinity of this well.

In 2016 the NJDEP released an interim groundwater quality standard of 0.4 ug/l for 1,4-dioxane. In 2016, Site groundwater, in all subzones, was sampled and analyzed for 1,4-dioxane. 1,4-dioxane was not found at levels above the interim groundwater quality standard.

OU1 Summary

In the shallow groundwater subzone, the data indicate that the overall size of the plume has decreased when compared to the 2010 data. While COC concentrations remain high in the center of the plume, some significant decreases in concentrations of some COCs have occurred since 2010, when extraction and treatment began.

The intermediate subzone generally contains the highest levels of contaminants and covers the largest area compared to the shallow and deep subzones. The area of contamination in the intermediate zone has been relatively stable over time. While this zone contains highly elevated levels of contaminants, the levels in most wells have generally decreased over time due to ongoing extraction of groundwater in this subzone.

The deep subzone is not widely contaminated. In 2016, only one out of 9 wells regularly sampled in the deep subzone contains elevated levels of VOC contamination.

OU3 Data Review

Ongoing OU3 O&M sampling includes sampling of shallow groundwater in monitoring well MWOU3-1, sampling of groundwater treatment plant influent for OU3 COCs, hydrology monitoring, and vegetative plot monitoring of restored areas. In addition, sediment sampling is performed one time every two years. COCs identified for OU3 include various metals (aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel and zinc), PCBs/Aroclor-1254. 1,1,1-tricholoro-2,2-bis(p-chlorophenyl)ethane (DDT) and its derivatives and endosulfan sulfate. A summary of data collected over the last five year period is presented below for each media:

OU3 Groundwater:

Analysis of groundwater at monitoring well MWOU3-1, located in the OU3 Main Swale Area, was conducted semi-annually during the second five year monitoring period to evaluate the effectiveness of the Main Swale Area remediation and ensure groundwater is no longer impacted by this AOC. Samples collected from this well were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals. VOCs are being monitoring in this well to evaluate the OU1 remedy and will continue until the OU1 remedy is complete. VOCs were generally not detected above standards, except in a couple of instances where the reporting limits for two compounds were greater than the groundwater quality criteria.

During the past five years of monitoring, the analytical results of several SVOCs were found to have reporting limits that exceeded the groundwater quality criteria, but the data was qualified as undetected. For example, for bis(2-ethylhexyl)phthalate, the reported result of 5.0 U µg/L in May 2016 and 11.5 U ug/L in September 2016, indicates that this compound's presence can't be ruled out because the reporting limits are above the groundwater quality criteria of 0.3 µg/L. The presence of these SVOCs has been consistent over the last five years of monitoring events. Routine SVOC monitoring will be continued to evaluate concentrations over time. In order to obtain detection limits more supportive of assessing compliance with the groundwater quality criteria, the analytical method for VOCs and SVOCs

has been changed from the CLP method to EPA method SW846. This change in analytical method will be applied to data collected over the next five-year period to ensure that SVOCs are not present at concentrations above the groundwater quality criteria.

Several metals were detected above the groundwater quality criteria during the past five years of monitoring, including aluminum, (ranging from 870 to 14,400 µg/L vs. the groundwater quality criterion of 200 µg/L), arsenic (ranging from 3.6 to 16 µg/L vs. the groundwater quality criterion of 3.0 µg/L), iron (ranging from 12,100 to 21,600 µg/L vs. the groundwater quality criterion of 300 µg/L), manganese (ranging from 150 µg/L vs. the groundwater quality criterion of 50 µg/L), and lead (8.0 µg/L vs. the groundwater quality criterion of 5.0 µg/L). The occurrence of these metals in samples obtained from groundwater samples collected within OU3 has been consistent during the five-year period and will continue to be monitored to evaluate concentrations over time. Iron and arsenic are present in the shallow and intermediate subzones at the Site at concentrations above groundwater quality criteria at locations both inside and outside of the OU1 and OU3 areas of concern (i.e., background conditions). For this reason, iron and arsenic concentrations do not warrant action at this time, but will continue to be monitored.

OU3 Surface water:

Surface water sampling was performed on a semi-annual basis during the past five years of monitoring. When surface water has been present in the Main Swale Area, surface water samples were collected in March/April and again in November/December of each monitoring year, in accordance with the *Second 5-Year Period Monitoring Plan for OU-3 (Rev. 6).* The samples were collected in the immediate vicinity of PZOU3-8, which falls within sediment sampling Grid No. 14 (see the attached wetland Figure titled, *Main Swale Area Sampling Grid Locations*), located at the center of the Main Swale Area.

All reported VOCs in surface water samples were “non-detect” during the past five years of monitoring. There were many SVOC compounds reported as “non-detect”, but with a reporting limit above the surface water criteria (NJDEP Surface Water Quality Standards NJAC 7:9C) during the 5 years of monitoring. To remedy this, the analytical method has been changed from the CLP method to EPA method SW846 for the next five years of monitoring. This change will allow for lower detection limits, as needed to ensure that VOCs are not present at concentrations above the surface water quality criteria.

During the last five years of monitoring, only benzo(a)anthracene with an estimated result of 0.058 µg/L in the March 2016 sampling event was found to be in exceedance of its surface water quality criterion of 0.025 µg/L. Surface water SVOCs will continued to be monitored in the next 5 years.

Metals were generally not detected above the surface water quality criteria during the past five years of monitoring; however, the reporting limit of cadmium was found to be higher than the surface water quality criterion during two of the monitoring events (1.0 ug/L versus the surface water quality criterion of 0.17 ug/L in both the April 2014 and March 2016 sampling events). To remedy this, the analytical method has been modified for future sampling events. Surface water metals will continue to be monitored during the next five years to determine if cadmium or other metals detected in surface water in the Main Swale Area present any unacceptable risk.

OU3 Sediment

Sediment sampling events for OU3 were conducted concurrently with surface water sampling in March 2014 and March 2016.

None of the reported VOCs were detected above the standards (freshwater sediment lowest effect levels, NJDEP Ecological Screening Criteria or OU3 target cleanup goals); however, bromomethane, reported as non-detect for all sediment samples, had a quantitation limit that exceeded the NJDEP ecological screening criterion of 1.37 µg/kg. Quantitation limits ranged from 6.9 to 9.7 µg/kg during the five years of monitoring.

EPA evaluated SVOC results in the Main Swale Area. Many of the reported results were listed as "non-detect", but at a quantitation limit greater than the NJDEP ecological screening criteria. In order to obtain data that are more supportive of compliance with the NJDEP ecological screening criteria, for future sampling events, the analytical method has been changed from the CLP methods to EPA method SW846, which will provide lower detection limits for these compounds. The only SVOC that exceeded an established standard that was not reported "non-detect" was bis(2-ethylhexyl)phthalate which was found to be in exceedance of NJDEP ecological screening criterion of 182 µg/kg during the April 2014 event with results ranging from 420 J µg/kg to 2,600 µg/kg.

EPA also evaluated metals results in Main Swale Area sediment. Antimony, cadmium, silver and mercury were detected above the NJDEP ecological screening criteria during the five years of monitoring. Antimony levels ranged for 6.7 to 7.8 mg/kg, which exceed the NJDEP Ecological Screening Criteria of 3.0 mg/kg. Cadmium ranged from 3.3 to 3.9 mg/kg, exceeding the NJDEP Ecological Screening Criteria of 0.6 mg/kg, but below the OU3 target cleanup goal of 24 mg/kg. Silver detections ranged from 0.3J to 0.68J mg/kg (NJDEP criterion is 0.5 mg/kg). Mercury was detected in all seven grid samples, as well as the duplicate sample, during both sampling events, with estimated (J-qualified) results ranging from 0.058 to 0.1 mg/kg. The OU3 target goal for mercury is 0.0014 mg/kg. To better evaluate mercury levels in sediments, the analytical method has been changed from the CLP methods to EPA method SW846 for all future sampling events in order to provide lower detection limits and assure that accurate values are determined.

OU3 Hydrology Monitoring:

Hydrology monitoring of the wetlands was conducted in accordance with the *Second 5-Year Period Monitoring Plan for OU-3 (Rev. 6)*. The wetland piezometer locations maintained *less than two feet* of difference between water elevation and groundwater surface elevation during the past five years of monitoring as required by the work plan. This requirement was established to assure that OU1 groundwater extraction was not having a negative impact on the OU3 wetlands. The wetlands will continue to be monitored over the next five years.

Vegetative Plot Monitoring:

Vegetation plot monitoring events took place in September 2014 and September 2016. A review of the data, concluded that overall, the wetlands throughout the monitoring area are meeting the performance standards specified in the *Wetland Monitoring Plan for the Second 5-Year Monitoring Period*, save for

minor exceedances of standards which may be due to surface water run-off. The OU3 restored wetlands are in excellent condition with minimal invasive species. Purple loosestrife is present in some plots within the wetlands, though evidence of purple loosestrife beetles is found in these plots. Vegetative plot monitoring will continue into the next five years of monitoring, and invasive species control (re-application of the purple loosestrife beetle) will be conducted in accordance with the work plan as necessary.

OU3 Summary

This review of groundwater, surface water, and sediment data indicate that the OU3 remedy is performing well and that materials left in place in Main Swale Area are likely not adversely impacting the quality of groundwater and surface water, or sediments at the Site.

Specific to surface water and sediment exceedances, since the Main Swale Area receives surface water run-off from the upland swale, it is more likely that detections of SVOCs and metals in the samples are related to run-off of storm water and associated silt deposits from the Site. The upland swale must continue to be maintained for this reason to prevent SVOCs, metals and sediment from impacting the surface water quality in the wetlands.

Site Inspection

The inspection of the Site was conducted on February 8, 2017. In attendance were Stephen Cipot (EPA Site RPM), Robert Alvey (EPA Geologist), Michael Clementson (EPA Biologist), U.S. Army Corps of Engineers staff Stephen Creighton and John Agamie, and Carlo Di Tullio of Arcadis (U.S. Army Corps of Engineers contractor). QDI staff, subcontractors, and the Logan Township Administrator also attended various parts of the Site Inspection.

The three OU2 areas were undergoing field modifications for the resumption of thermal operations in April 2017. The OU3 wetland areas appeared to be of high quality having minimal invasive species and a variety of wetland vegetative species. Furthermore, observed vegetation did not appear to show any signs of stress from potential drawdown associated with the OU1 pump and treat system. The Run-On Berm was adequately maintained and ample signage was posted stating restricted accesses to the wetland areas.

Physical access to the three OU2 thermal treatment areas and the wetland areas remains limited, however QDI removed portions of the fencing to allow access for the OU2 thermal system modification. QDI's informed EPA that the missing sections of fencing would be replaced as work is completed, and would be in place prior to OU2 remedy operation. Otherwise, the OU2 treatment areas are each fenced with posted warning signs indicating restricted access.

For OU3, a portion of the protective berm and sediment trap around TA-1 was destroyed due to the OU2 related construction activities. QDI advised EPA that the damaged and destroyed portions of the berm would be repaired, and the sediment swale would be cleaned out after the completion of OU2 operations.

V. TECHNICAL ASSESSMENT

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

The OU1 remedy is currently operating as intended. To date, the OU1 GWETS has removed over 11,751 pounds of VOCs from the aquifer from start-up in September 2011. The VOC mass recovery by the GWETS has been steadily decreasing over time. The GWETS has operated in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) permit requirements for discharge to surface water permit since start-up. The total mass of VOCs recovered by the system in 2012 was 2,876 pounds. This has declined to 1,540 pounds in 2015, 1,411 in 2016, and is expected to continue to decline as the OU2 source remedy continues to reduce source concentrations on site.

The overall size of the groundwater plume is generally stable, although contaminant levels in the most contaminated areas of the plume are generally decreasing or stable. As the OU2 remedy continues to operate, concentrations in both the shallow and intermediate zone are expected to decrease further.

Based upon the review of the Annual Wetland Monitoring Reports, contaminant monitoring data, and the FYR Site inspection, it appears that the OU3 remedy is functioning as intended. The materials left in place in Main Swale Area are likely not adversely impacting the quality of groundwater and surface water, or sediments at the Site. The OU3 remedy has eliminated exposure to ecological receptors through the excavation and offsite disposal of the contaminated sediment in Cedar Swamp and the Main Swale Area. A monitoring program involving periodic groundwater, surface water, and sediment sampling indicates that the remedy continues to function as intended. Sampling data over the last five years, in some cases for SVOCs and metals, had sampling detection limits above groundwater and surface water quality criteria. To address this issue, the analytical method has been modified for future sampling events to assure lower detection limits. Sediment sampling indicated some exceedances of the sediment screening values for antimony, cadmium, silver and mercury. EPA will continue to evaluate sediment through modified analytical methods.

Specific to surface water and sediment exceedances, since the Main Swale Area receives surface water run-off from the upland swale, it is more likely that detections of SVOCs and metals in the samples are related to run-off of storm water and associated silt deposits from the Site. The upland swale must continue to be maintained for this reason to prevent SVOCs, metals and sediment from impacting the surface water quality in the wetlands.

For this site, institutional controls are required. The CEA has not yet been established by NJDEP, however, NJDEP and QDI are working on this and it is expected to be complete in 2018. A deed notice will be filed upon completion of the OU2 remedy by QDI. QDI has maintained signs posted around the borders of the restored wetlands and capped areas; which are in good condition. The run-on berm, as well as the Site swales will require routine maintenance to ensure wetlands do not receive direct runoff from parking areas.

QUESTION B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

OU1

The BHHRA for OU1 evaluated exposures to groundwater under current/future exposures to residents and on-site workers consuming groundwater. The groundwater criteria established for remediation remain protective. The toxicity value for tetrachloroethylene, a COC, was updated in 2012, but this update does not affect the protectiveness of the remedy. In 2006, EPA evaluated soil vapor intrusion from groundwater to soil to indoor air. The soil vapor and indoor air evaluations were performed in the terminal building on Site, as well at some residences located in close proximity to the Site. EPA concluded that for off-site residents, the concentrations of VOCs in indoor air or sub-slab air were less than the concentrations requiring remedial action. Updates to the EPA's Vapor Intrusion Guidance have not changed the conclusions regarding vapor intrusion. The conclusions for on-site workers exposed to chemicals via vapor intrusion in the terminal building concluded that the concentrations of COCs in indoor air were below the Occupational Safety and Health Administration (OSHA) permissible exposure limits and were within EPA's acceptable risk range for a non-residential facility.

Changes in Standards and TBCs

The standards identified in the remedy for groundwater included MCLs and NJGWQS. There have been no changes in these standards that would impact the protectiveness of the remedy. In addition, as part of OU1, residential homes were connected to the municipal water supply based on elevated concentrations of Site COCs, and these actions have interrupted direct exposure.

Changes in Toxicity and Other Contaminant Characteristics

There have been no changes in the toxicity values for the primary COCs: TCE; PCE; and DCE that would change the results of the BHHRA and the protectiveness of the remedy.

Changes in Risk Assessment Methods

The standard default Exposure Factors used at Superfund sites were updated in 2015. These changes, however, do not change the results of the BHHRA for the need to take action, nor do they effect remediation goals.

Changes in Exposure Pathways

The assessment for OU1 evaluated current/future exposure to residents and on-site workers consuming groundwater at the site. There are no anticipated changes in land use that would change the results of the BHHRA. The routes of exposure, ingestion and inhalation of groundwater, have not changed from the original risk assessment.

The Site COCs remain PCE, TCE, and DCE. There have been no toxic byproducts or daughter products of the remedy not previously addressed. The site physical conditions have not changed the protectiveness of the remedy.

OU2

The BHHRA for the OU2 source areas found that these source areas do not pose a direct human health risk because there is no surface exposure pathway. However, OU2 source areas contain elevated levels

of subsurface contaminants that are significant sources of groundwater contamination. Currently, the remedial action for OU2 is ongoing. The protectiveness of this remedy will be discussed in the next Five Year Review. A deed notice is planned to be implemented after implementation of the OU2 remedy.

As there are no unacceptable human health risks associated with OU2, there are no chemical specific cleanup levels. Rather, OU2 will actively remove contaminants from the source areas to further support groundwater cleanup levels established for OU1.

OU3

The BHHRA for OU3 found the cancer risk and non-cancer hazards did not exceed the risk range or hazard index of 1 for exposures to wetland surface water, sediment or soil based on limited human exposure to the contaminated areas. In addition, access to the OU3 wetland area remains limited and excavation of contaminated soil and sediments as outlined in the OU3 remedy further reduced contaminant concentrations in the wetland area where limited exposures are possible under current/future conditions.

The ERA for OU3 evaluated ecological risks to the wetlands area groundwater, sediments and surface water. The RAOs, standards and screening values developed for OU3 remain protective of ecological receptors. Surface water sampling revealed no significant exceedances above established surface water quality criteria. In some instances, the reporting limit for some substances was higher than its standard. To address this, further monitoring will include a modified analytical method. Future sediment samples will also be analyzed using a modified method to assure the reporting limit is less than the relevant sediment standard for each compound. Some values for antimony, cadmium, and silver were slightly elevated above their respective standards. Mercury levels were elevated in all samples, but the laboratory reported these values as estimated (J-qualified). To better evaluate mercury levels in the sediment, the analytical method for future sampling has been modified to assure accurate values are determined and so a careful trend analysis can be done.

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

Based on the evaluation of the potential human and ecological exposures at the Site, there is no new information that would call into question the protectiveness of the Site's remedies.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU2 *OU3*

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1, 2	**Issue Category: Institutional Controls**			
	Issue: CEA filing in progress and deed restriction will be filed upon completion of remedy.			
	Recommendation: Finalize ICs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	6/30/2018

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU1	*Protectiveness Determination:* Short-term	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy for OU1 is protective of human health and the environment. in the short-term because exposure pathways that could result in unacceptable risks are being controlled. Residences impacted by contaminated groundwater have been connected to a public water supply and the groundwater pump and treat system has been constructed and is currently operating. However, in order to be protective in the long-term, the Classification Exemption Area required in the OU2 ROD needs to be put in place.		

Protectiveness Statement(s)		
Operable Unit: OU2	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
The OU2 remedy is expect to be protective of human health and the environment upon completion. In the interim, the site is fenced preventing access and residents in the vicinity of the site receive municipal water and the OU1 treatment system contains source and groundwater contamination on site.		

Protectiveness Statement(s)		
Operable Unit: OU3	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The implemented action for OU3 at the CLTL site is protective of human health and the environment.		

VIII. NEXT REVIEW

The next five-year review report for the Chemical Leaman Superfund Site is required five years from the completion date of this review.

APPENDIX A

Table 1 Chronology of Events	
Event	**Date**
Operation of the facility	1961 – Present
Wastewater generated at the facility was impounded in a series of unlined settling and/or aeration lagoons	1960 – 1975
Lagoons taken out of service	1975
Liquid and sludge in the primary settling lagoons were removed prior to backfilling with dean fill and construction debris. The aeration and final settling lagoons were drained, but no lagoon materials were removed prior to backfilling.	1977
NJDEP documented contamination in the groundwater beneath the Site	1980 -1981
Excavation of visible sludge and contaminated soil from the former primary settling lagoons, to a depth of approximately 12 feet below the surface, and backfill of excavated area with clean sand.	1982
Site placed on National Priorities List	1985
Administrative Order on consent to conduct a RI/FS to delineate the nature and extent of site-related contamination in the groundwater, soils and surface water at the Site.	1985
Remedial Investigation (RI) – Site-wide	1986 – 1993
Six homes located north of the Chemical Leaman property along Route 44 were connected to an extension of the Bridgeport Municipal Water System.	1987
OU3 RI	1991 - 1993
Remedial Investigation/Feasibility Study (RI/FS) completed for OU1	7/1990
OU1 Record of Decision issued	9/1990
PRP enters into Consent Decree with EPA for Remedial Design (RD)/Remedial Action (RA) for OU1	1991
OU2 RI initiated	1991

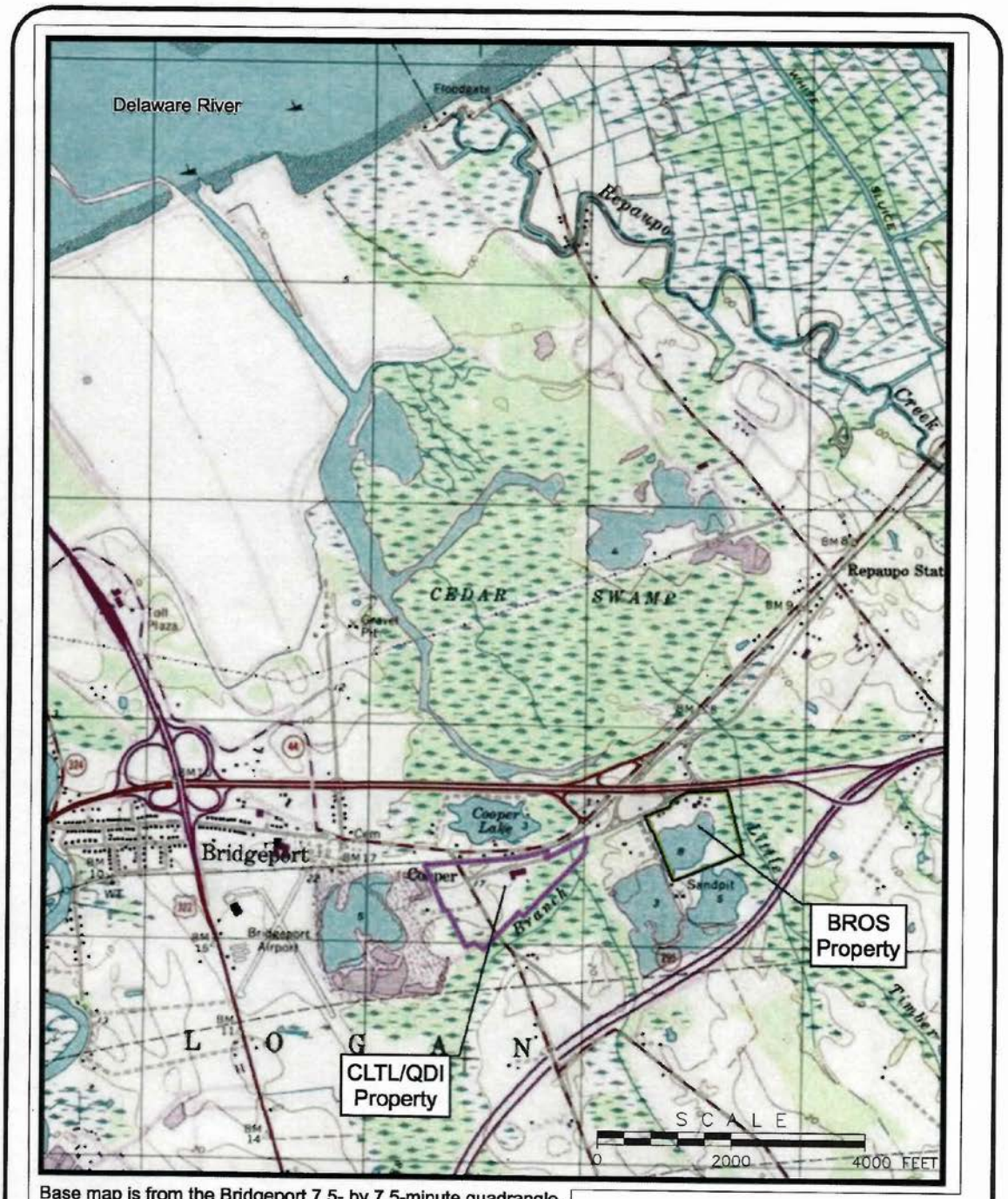
OU1 Remedial Design (RD) conducted	1991 – 1997
OU3 Record of Decision (ROD) issued	10/1993
Three more homes with threatened water supplies south and west of the Site were connected to the municipal water line in March 1993 and August 1995	1993-1995
Administrative Order issued to Responsible Party (PRP) for the performance of the remedial design and implementation of the OU3 wetlands remediation	1998
The Responsible Party (PRP) approached the EPA with a request to develop an alternate OUl remedial design comprised of both conventional pump-and-treat and innovative in-situ technologies.	1998
Additional OU2 RI investigations conducted	2000- 2005
OU3 RD Completed	2003
OU3 RA activities	2004 – 2006
PRP's proposal to modify the design and revise the groundwater extraction scheme for OUl was approved by the EPA	2004
OUl ESD	2005
Construction of OUl groundwater extraction and treatment system	2005-2007
OU3 Operations and Maintenance (O&M) activities begin. These activities are ongoing.	7/2006
Startup/shakedown of the OUl groundwater extraction and treatment system initiated	2007
OU2 RI Report completed	6/2009
OU2 FS Report Completed	6/2009
OU2 ROD issued	9/2009
PRP enters into Consent Decree with EPA for Remedial Design (RD)/Remedial Action (RA) for OU2	2010
O&M for OUl groundwater extraction and treatment system begins. These activities are ongoing.	2011
OU2 Final 100% Remedial Design completed	6/2014
OU2 Final Remedial Action Work Plan (RAWP) completed	11/2014
OU2 100% Remedial Design Addendum (Design of Extraction Wells and related Modifications to the OU1 Treatment Plant) Completed	2/2015

Mobilization for installation of ERG-MPE System in all OU2 Treatment Areas	7/2015
OU2 ERH-MPE system electrodes are shut off due to PCB detection in the NAPL	2/2016
Complete, Restart of System Modifications to OU2 System Complete/System restart	3/2017

Table 2
Documents, Data, and Information Reviewed in completing the Five-Year Review

OUl Record of Decision	1990
OUl 4th Annual Groundwater Extraction System Performance Report (GSC)	2016
OUl Q19 Groundwater Report (April - June 2016) (GSC)	2016
OUl Semi-Annual Treatment System Performance Report Q17-18 (Envirogen)	2016
OUl Draft Semi-Annual Treatment System Performance Report Q19-20 (Envirogen)	2016
OU2 Record of Decision	2009
OU2 100% Remedial Design Report (ERM)	2014
OU2 Final Remedial Action Work Plan (ERM)	2014
OU2 Draft Evaluation of Effectiveness-ERH-MPE (CB&I)	2016
OU3 Record of Decision	1993
OU3 Wetland Monitoring Plan for the Second 5-Year Monitoring Period (CB&I)	2013
OU3 Final Wetland Monitoring Report for the First Half of2016 - Year 4A (CB&I)	2016

APPENDIX B



Base map is from the Bridgeport 7.5- by 7.5-minute quadrangle.
From ESRI web mapping service.

CBI

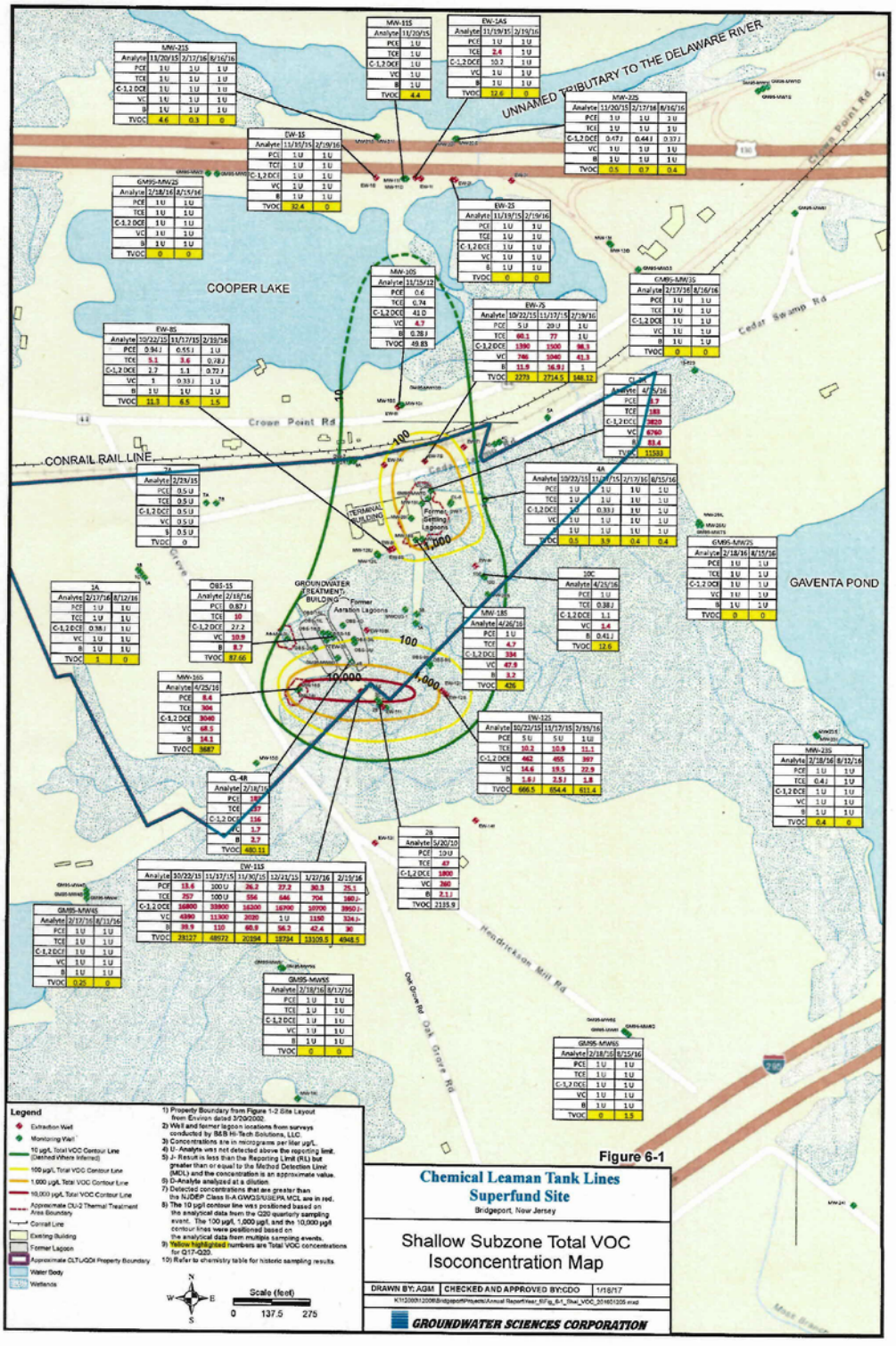
Drawn By:	Checked By:	Approved By:
A. Yanavicius	K. Kolibas	K. Kolibas
Date:	Scale:	Drawing No.
4/29/13	AS SHOWN	140682-A1

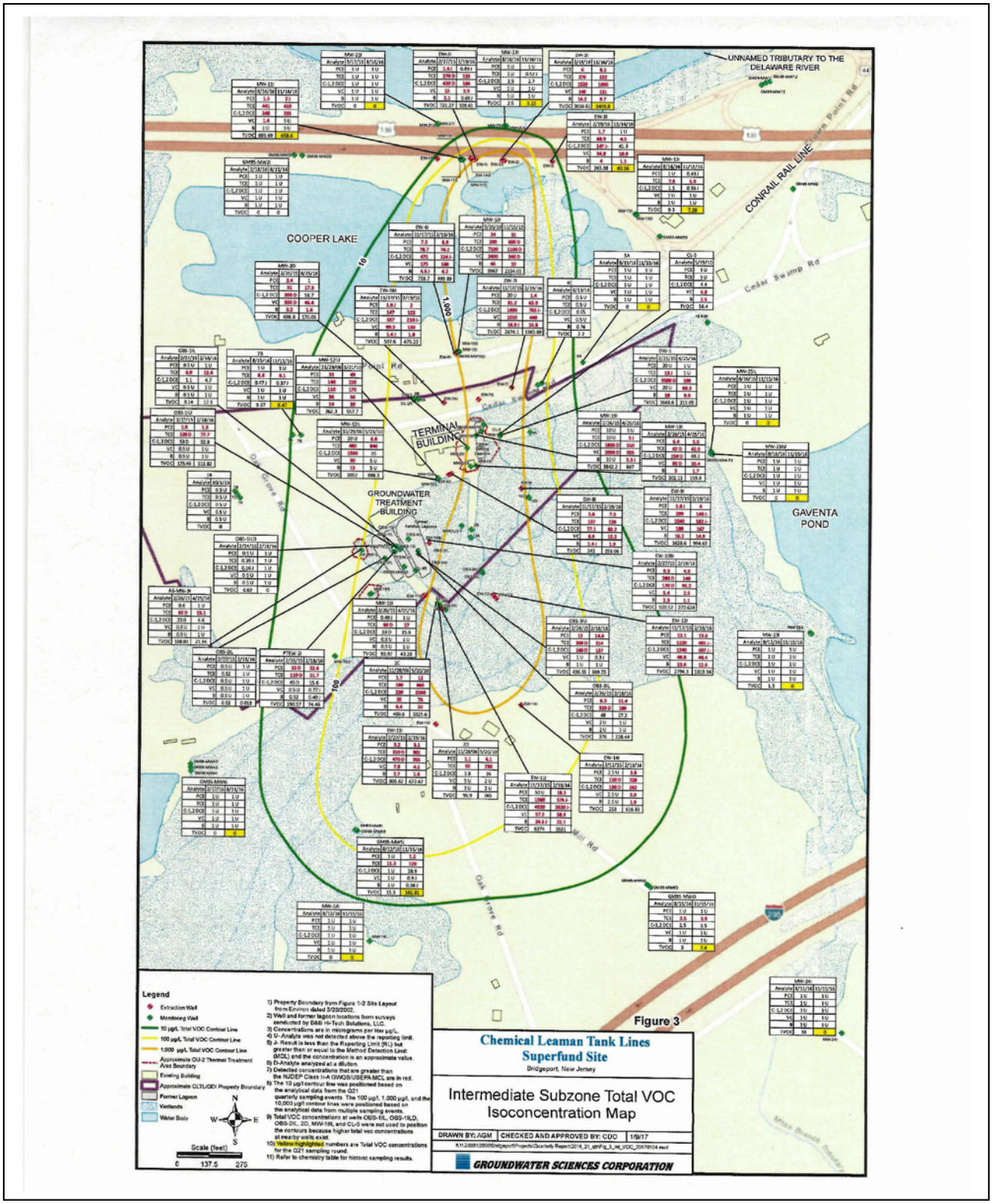
FIGURE 1

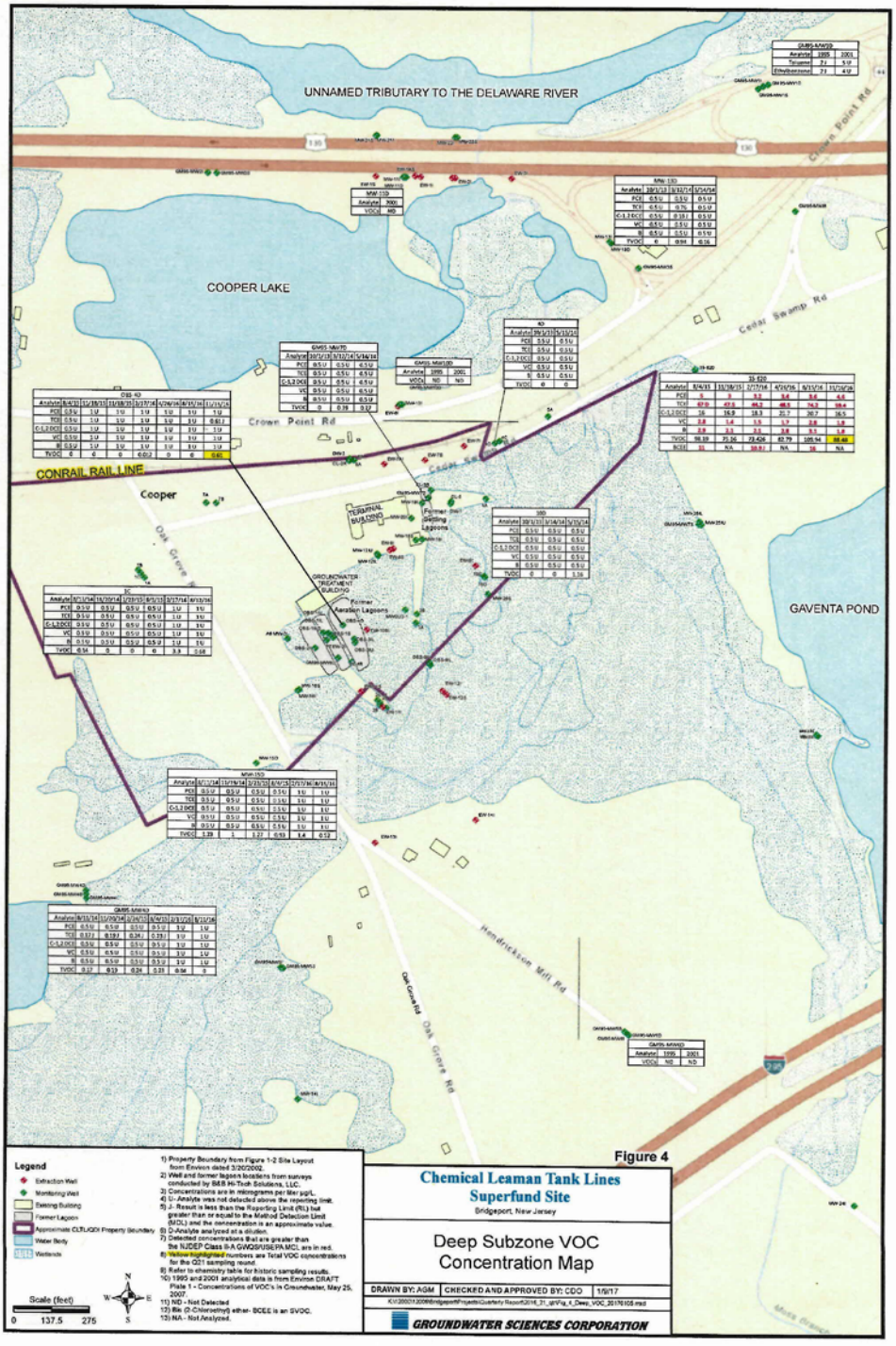
SITE LOCATION MAP
OU3

CHEMICAL LEAMAN TANK LINES, INC.
BRIDGEPORT, NEW JERSEY

File: H:\DWGS\777864-CLTL\200.3\140682-A1.dwg
Plot Date/Time: Apr 29, 2013 - 12:44pm
Plotted By: anarius.yanavicius


UNNAMED TRIBUTARY TO THE DELAWARE RIVER
COOPER LAKE
CONRAIL RAIL LINE
Crown Point Rd
Cedar Swamp Rd
GAVENTA POND
GROUNDWATER TREATMENT BUILDING
Former Aeration Lagoons
Former Settling Lagoons
TERMINAL BUILDING
Hendrickson Mill Rd
Oak Grove Rd
Legend
Extraction Well
Monitoring Well
10 µg/L Total VOC Contour Line (Dashed Where Inferred)
100 µg/L Total VOC Contour Line
1,000 µg/L Total VOC Contour Line
10,000 µg/L Total VOC Contour Line
Approximate OU-2 Thermal Treatment Area Boundary
Conrail Line
Existing Building
Former Lagoon
Approximate CLT/UGDI Property Boundary
Water Body
Wetlands
1) Property Boundary from Figure 1-2 Site Layout from Environ dated 3/20/2002.
2) Well and former lagoon locations from surveys conducted by B&B Hi-Tech Solutions, LLC.
3) Concentrations are in micrograms per liter µg/L.
4) U- Analyte was not detected above the reporting limit.
5) J- Result is less than the Reporting Limit (RL) but greater than or equal to the Method Detection Limit (MDL) and the concentration is an approximate value.
6) D-Analyte analyzed at a dilution.
7) Detected concentrations that are greater than the NJDEP Class II-A GWQS/USEPA MCL are in red.
8) The 10 µg/l contour line was positioned based on the analytical data from the Q20 quarterly sampling event. The 100 µg/l, 1,000 µg/l, and the 10,000 µg/l contour lines were positioned based on the analytical data from multiple sampling events.
9) Yellow highlighted numbers are Total VOC concentrations for Q17-Q20.
10) Refer to chemistry table for historic sampling results.
N
W
E
S
Scale (feet)
0
137.5
275
Figure 6-1
Chemical Leaman Tank Lines Superfund Site
Bridgeport, New Jersey
Shallow Subzone Total VOC Isoconcentration Map
DRAWN BY: AGM
CHECKED AND APPROVED BY: CDO
1/18/17
GROUNDWATER SCIENCES CORPORATION


UNNAMED TRIBUTARY TO THE DELAWARE RIVER
CONRAIL RAIL LINE
COOPER LAKE
TERMINAL BUILDING
GROUNDWATER TREATMENT BUILDING
GAVENTA POND
Cedar Swamp Rd
Oak Grove Rd
Mill Rd
Legend
Extraction Well
Monitoring Well
10 µg/L Total VOC Contour Line
100 µg/L Total VOC Contour Line
1,000 µg/L Total VOC Contour Line
Approximate OU-2 Thermal Treatment Area Boundary
Existing Building
Approximate GLTL/ODI Property Boundary
Former Lagoon
Wetlands
Water Body
Scale (feet)
0 137.5 275
1) Property Boundary from Figure 1-2 Site Layout from Environ dated 3/20/2002.
2) Well and former lagoon locations from surveys conducted by D&B Hi-Tech Solutions, LLC.
3) Concentrations are in micrograms per liter µg/L.
4) U-Analyte was not detected above the reporting limit.
5) J- Result is less than the Reporting Limit (RL) but greater than or equal to the Method Detection Limit (MDL) and the concentration is an approximate value.
6) D-Analyte analyzed at a dilution.
7) Detected concentrations that are greater than the NJDEP Class II-A GWQS/USEPA MCL are in red.
8) The 10 µg/l contour line was positioned based on the analytical data from the Q21 quarterly sampling events. The 100 µg/l, 1,000 µg/l, and the 10,000 µg/l contour lines were positioned based on the analytical data from multiple sampling events.
9) Total VOC concentrations at wells OBS-11L, OBS-11LD, OBS-2IL, 2D, MW-19I, and CL-5 were not used to position the contours because higher total voc concentrations at nearby wells exist.
10) Yellow highlighted numbers are Total VOC concentrations for the Q21 sampling round.
11) Refer to chemistry table for historic sampling results.
Figure 3
Chemical Leaman Tank Lines Superfund Site
Bridgeport, New Jersey
Intermediate Subzone Total VOC Isoconcentration Map
DRAWN BY: AGM
CHECKED AND APPROVED BY: CDC
1/9/17
GROUNDWATER SCIENCES CORPORATION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Former Oxidation Lagoons
GROUNDWATER TREATMENT BUILDING
Former Aeration Lagoons
GAVENTA POND
Hendrickson Mill Rd
Oak Grove Rd
Legend
Extraction Well
Monitoring Well
Existing Building
Former Lagoon
Approximate CLTL/GDX Property Boundary
Water Body
Wetlands
Scale (feet)
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275
N
S
E
W
1) Property Boundary from Figure 1-2 Site Layout from Environ dated 3/20/2002.
2) Well and former lagoon locations from surveys conducted by B&B Hi-Tech Solutions, LLC.
3) Concentrations are in micrograms per liter µg/L.
4) U- Analyte was not detected above the reporting limit.
5) J- Result is less than the Reporting Limit (RL) but greater than or equal to the Method Detection Limit (MDL) and the concentration is an approximate value.
6) D-Analyte analyzed at a dilution.
7) Detected concentrations that are greater than the NJDEP Class II-A GWQS/USEPA MCL are in red.
8) Yellow highlighted numbers are Total VOC concentrations for the Q21 sampling round.
9) Refer to chemistry table for historic sampling results.
10) 1995 and 2001 analytical data is from Environ DRAFT Plate 1 - Concentrations of VOC's in Groundwater, May 25, 2007.
11) ND - Not Detected
12) Bis (2-Chloroethyl) ether- BCEE is an SVOC.
13) NA - Not Analyzed.
Figure 4
Chemical Leaman Tank Lines
Superfund Site
Bridgeport, New Jersey
Deep Subzone VOC
Concentration Map
DRAWN BY: AGM
CHECKED AND APPROVED BY: CDO
1/9/17
GROUNDWATER SCIENCES CORPORATION

APPENDIX C

EPA PUBLIC NOTICE

U.S. Environmental Protection Agency Reviews Cleanup at Chemical Leaman Tank Lines, Inc., Superfund Site

The U.S. Environmental Protection Agency (EPA) is conducting its **second** Five-Year Review of the **Chemical Leaman Tank Lines, Inc., Superfund Site** located in Logan Township, Gloucester County, New Jersey. This review seeks to confirm the site cleanup remedies selected in the three Record of Decisions (RODs) for the site which include the following: The 1990 Operable Unit 1 (OU1) ROD which was for the treatment of contaminated groundwater; the 2009 OU2 ROD which was for soils sources of groundwater contamination, and, the 1993 OU3 ROD which was for contaminated soils and sediments within the wetlands. The OU1 remedy also included implementation of a long-term groundwater monitoring program, and the OU2 remedy included the establishment of a Classification Exception Area (CEA) by NJDEP to monitor contaminants in the groundwater.

A summary of these activities and evaluation of the long-term protectiveness of the remedies will be included in the upcoming Five-Year Review report. **The report is scheduled to be completed by 5/31/17.**

What is an EPA Five-Year Review?

EPA inspects Superfund sites every five years to ensure that cleanups conducted remain fully protective of human health and the environment. These regular reviews, which are required by federal law when contaminants remain at a site, include:

- Inspection of the site and cleanup technologies;
- Review of monitoring data, operating data, and maintenance records, and
- Determining if any new regulatory requirements have been established since EPA's original cleanup decisions were finalized.

For more information

There are several ways to review information on this site. The Administrative Record, which includes EPA documents used for selecting the cleanup plan, is available for public review at:

The Logan Township Municipal Clerk's office
125 Main Street,
Bridgeport, NJ 08014

OR

EPA Region 2, Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
Phone: (212) 637-4308 (Call to make an appointment)

You may also contact

If you have any concerns or information about a change in current site conditions, please contact:

Stephen Cipot
EPA Project Manager
Phone: (212) 637-4411
Email: cipot.stephen@epa.gov

OR

Natalie Loney
EPA Community Liaison
Phone: (212) 637-3639
Email: loney.Natalie@epa.gov