U.S. Army Corps of Engineers

Philadelphia District

Final 2014 - 2015 Annual Report

Lipari Landfill Superfund Site

Gloucester County, New Jersey

Prepared for

United States Environmental Protection Agency

Prepared by

U.S. Army Corps of Engineers

Philadelphia District

January 10, 2017

483018

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Acronyms and Abbreviations

BCEE	bis (2-chloroethyl) ether
BF	bio-filter
Cabrera	Cabrera Services
CDM Smith	CDM Federal Programs Corporation
cfm	cubic feet per minute
COC	contaminant of concern
CP	carbon pack
1,2-DCA	1,2-dichloroethane
DPE	dual phase extraction
EMP	Environmental Monitoring Plan
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
GCL	geosynthetic clay liner
GCUA	Gloucester County Utilities Authority
HAP	hazardous air pollutants
HDPE	high-density polyethylene
Hg	mercury
kg	kilograms
lb/hr	pound per hour
LPVES	landfill passive vapor extraction system
MDL	method detection limit
MG	million gallons
MW	monitoring well
NJDEP	New Jersey Department of Environmental Protection
ppmv	parts per million by volume
ROD	Record of Decision
SBD	Shallow Backfill Drain
Sevenson	Sevenson Environmental Services
The site	Lipari Landfill Superfund Site
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
TAL	target analyte list
TCL	target compound list
TOU	thermal oxidation unit
µg/l	micrograms per liter
UCL	upper confidence limit
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers
VGAC	Vapor Phase Granular Activated Carbon
VOC	volatile organic compound

Section 1
Introduction
1.1 Purpose
This 2014 - 2015 Annual Report for the Lipari Landfill Superfund Site (the site) covers the period from January 2014 through December 2015. The report: 1) concisely summarizes remediation activities, 2) presents conclusions regarding the performance and overall progress of the remediation systems, and 3) provides recommendations relevant to future operation and monitoring of the systems. This is the fourth annual report prepared by the U.S. Army Corps of Engineers (USACE) and, similar to the 2012-2013 combined report, provides information for the two referenced years. CDM Federal Programs Corporation (CDM Smith) prepared the seventeen annual reports for the years preceding 2010.

This annual report includes discussions of onsite and offsite remediation systems. The initial onsite remediation systems at the site consisted of the landfill containment system (soil-bentonite cut-off wall and cap), the extraction system, the injection system, and the wastewater treatment plant. Each of these components was a key element of the batch flushing process, which removed groundwater-dissolved contaminants from the landfill. Dual phase extraction (DPE) and soil vapor extraction (SVE) systems were added to enhance contaminant removal.

The batch flushing was terminated in May 2008, and the onsite treatment plant was shut down in July 2008. The offsite remediation system originally included the French Drain, Rabbit Run Drain, Seep Collection Trench, Interceptor Trench, Shallow Backfill Drains, and the C-29 Area Drains; the latter two components were taken out of operation prior to 2008 after successful attainment of their performance goals. There were several modifications to remediation features in and around the site that took place throughout the 2014 – 2015 reporting period, and these activities are described in the latter portion of the introductory section of this report.

In general, many of the evaluations, conclusions, and recommendations that appear in this 2014 - 2015 Annual Report are similar to those presented in the 2012-2013 Annual Report since there were no major changes to most of the operations.

1.2 Report Organization
This report is composed of three sections, with tables and figures presented at the end of the text. The organization of the report and the contents of each section are described below.

- **Section 1 – Introduction**: provides an overview and briefly describes the treatment systems and remediation efforts

- **Section 2 – Remediation Progress**: discusses the remedial operations and results of the operation in 2014 - 2015

- **Section 3 – Conclusions and Recommendations**: presents the conclusions and recommendations based on the results

1.3 Overall Description of Site and Remediation Efforts

1.3.1 Description of Site

The site is located in Mantua Township in the southwestern part of New Jersey, about 20 miles south of Philadelphia (Figure 1-1). The site borders the Boroughs of Pitman and Glassboro and is adjacent to residential, commercial, educational, and agricultural properties. The Lipari Landfill is reported to have received a variety of hazardous wastes including solvents, paint thinners, formaldehyde, paints, phenol and amine wastes, dust collector residues, resin, and ester press cakes predominantly in the 1960s. The New Jersey Department of Environmental Protection (NJDEP) closed the Lipari Landfill in 1971.

1.3.2 Remediation Efforts in Prior Years

Remedial work at the site is designed to eliminate the threat of contaminants of concern (COCs), as defined in the July 1988 Record of Decision (ROD). The COCs, with their corresponding cleanup criteria, are listed in Table 1-1. The cleanup criteria are based on the Federal Water Quality Criteria (40 CFR Part 131.36 dated July 1, 2009). Bis (2-chloroethyl) ether (BCEE), benzene, and 1,2-dichloroethane (1,2-DCA) are considered the primary COCs because of their low cleanup levels relative to the contaminant concentrations. Onsite activities have been aimed at removal and containment of landfill contaminants. In addition, several offsite collection systems have been operated to control and capture contaminated groundwater. A comprehensive description of the original onsite and offsite remediation systems and modifications to these systems is presented in sections 1.3.2.1 and 1.3.2.2 of the 2011 Annual Report (USACE 2015). Figure 1-2 presents a schematic diagram of the current offsite collection system for groundwater, while Figures 1-3 present a schematic diagram of the onsite system for vapor phase extraction of COCs during the 2014 – 2015 operational period.

1.3.3 Remediation Efforts in 2014 and 2015

After the onsite aqueous treatment system was shut down in July 2008, dual phase extraction or DPE (vapor phase portion only)/soil vapor extraction or SVE became the exclusive onsite remedial path for landfill contaminant removal. This vapor phase COC removal is performed via the vertical extraction wells as opposed to the horizontal SVE wells formerly utilized as a part of the DPE system, and the term SVE will be used in subsequent sections of this report to reference vapor removal of COCs by the system.

Extraction of landfill vapor continued throughout 2014 – 2015. The SVE system also triggered influx of a monthly average of 480 cfm of atmospheric air into the landfill, which promotes aerobic bioremediation of BCEE (Shaw 2006) and other organic COCs. In addition, the offsite collection systems continue to capture and control contaminated groundwater.

1.3.4 Site Modifications Completed in 2015

Various modifications to the site, which included changes to conveyance of the offsite collection tank stream to bypass the effluent storage tank and termination of the Thermal Oxidizer Unit (TOU) operation for treatment of the SVE stream, were completed in 2015, and these activities are described in the remainder of this section.

1.3.4.1 Effluent Conveyance Change

Inspection of the effluent tank identified severe deterioration in the condition of the roof of the effluent tank. An evaluation of the costs to complete repairs to the tank as well as several revised treatment options was completed by Cabrera (Cabrera 2014). An evaluation of the cost impact and technical merits of the alternatives indicated that diversion of the raw water from the collection tank away from the effluent tank was the option that proved most advantageous in that treatment of the effluent prior to discharge was equivalent to the current process and existing plant infrastructure was utilized, which minimized capital expenditures and necessitated only minor modifications to piping by onsite personnel.

The modified treatment process entailed diverting the raw water from the collection tank away from the effluent tank and directing the flow to the treatment plant building. Within the treatment building, the water enters the existing clarifier effluent sump, where sodium hydroxide can be introduced (if necessary) for pH control and mixing can take place. Upon exiting the clarifier effluent sump, the treated water is sent directly to the Gloucester County Utility Authority (GCUA) discharge line.

1.3.4.2 Replacement of Thermal Oxidizer Unit with Granular Activated Carbon for Removal of Organic Compounds from the SVE Stream

Concentrations of organic compounds introduced to the TOU have continued to decrease steadily on an annual basis. These reduced concentrations favor the use of lower cost Vapor Phase Granular Activated Carbon (VGAC) as a method to remove organic compounds from SVE stream prior to release to the environment.

In September and October of 2015, operation of the TOU was terminated and VGAC became the method for organic compound removal from the SVE stream. This change to the SVE treatment utilized the three existing 500 pound VGAC units, which were available for site emission control when the system was in passive mode due to TOU maintenance, as well as the two blowers associated with the TOU operation. The blowers, one a 500 cubic feet per minute (cfm) unit and the second a 1,000 cfm unit modified to operate at approximately 500 cfm, were employed in the same manner as with the TOU operation, with one unit providing backup operation while preventive maintenance was performed on the companion unit. The changeover to VGAC operation included a modification to the piping configuration to allow any of the existing 500 pound GAC units at the site to serve as lead or secondary carbon units via appropriate valve switching operations. In addition, a heat exchanger was incorporated into the flow stream to reduce SVE moisture levels prior to entry to the VGAC units, thereby optimizing VGAC longevity and cost-effectiveness.

Section 2
Remediation Progress

For the 2014 - 2015 operational period, SVE and the groundwater collection system were the exclusive remedial paths for landfill contaminant removal. Other operations included tracking of remediation system effectiveness through the monitoring of groundwater and surface water outside of the containment system, the water phase discharged to the GCUA, and the vapor phase discharged to the atmosphere. The monitoring program components and monitoring scheme of the Environmental Monitoring Plan (EMP) are presented in the Lipari Landfill Superfund Site Uniform Federal Policy Quality Assurance Project Plan (Cabrera 2013).

The primary purpose of the EMP is to verify that the onsite and offsite remediation systems are adequately protecting the offsite marsh area, the surface water bodies, and the water supply aquifers. Under the EMP, samples are collected monthly and annually as shown in Table 2-1. Figure 2-1 presents the sampling locations discussed in this report and various components of the remediation system. Cross sectional depictions of the site geology are provided in Figures 2-2A and 2-2B, with the geologic formations that define the areal boundaries discussed in the report presented in Figure 2-2A and remedial system components in relation to the associated geologic formations presented in Figure 2-2B.

The annual sampling events for this reporting period took place in August of 2014 and 2015. The samples collected in 2014 were analyzed for target compound list (TCL) volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and selected target analyte list (TAL) metals per Contract Laboratory Program (CLP) procedures. Samples from certain locations were also analyzed for low-level BCEE using the Selected Ion Monitoring (SIM) technique to achieve lower reporting and detection limits. In an effort to reduce overall project costs, certain analyses for locations were eliminated for the 2015 event when additional data was considered redundant or unnecessary. These revisions to the sampling program are summarized in Table 2-1 and are also described in related sections of this report. Appendix A contains a complete set of the 2014 and 2015 annual sampling analytical data.

In 2011, a trend of unexpected low-level positive results for BCEE was noted. This situation was of particular concern when encountered in the offsite sentinel well samples. These positive results for BCEE were attributed to cross contamination either in the field or in the laboratory, when “clean samples” analyzed for BCEE to sub ug/l levels of sensitivity were handled in close proximity to samples with mg/l levels of BCEE. In numerous instances, USACE resampled the locations presumably affected by contamination and submitted these for BCEE SIM analysis, and results for the resampling were always non-detect for BCEE. To minimize the potential for BCEE cross-contamination, a two phased sampling sequence was implemented for the 2013 annual sampling event, with all low-level BCEE samples requiring BCEE SIM analysis submitted in the first phase of sampling, followed by a two-week delay prior to collection of high-concentration BCEE samples in the second phase.

Implementation of this phased sampling approach in 2013 yielded improved performance, but sporadic low-level positive results persisted. With the August 2014 annual sampling event, EPA and USACE determined that a more controlled laboratory environment was required to ensure that all intra-laboratory sources of BCEE contamination were kept under control. This was accomplished via contracting of all BCEE SIM analysis for the project to the USACE Environmental Research and Development Center laboratory (ERDC) in Vicksburg, Mississippi. Work at ERDC focusses primarily on projects related to Army concerns, which excludes samples contaminated with chemicals from typical commercial chemical manufacturing sites. The ability to eliminate intra-laboratory sample contamination was considered a key aspect impacting the interpretation of the BCEE SIM data for the project, and proved successful for the 2014 and 2015 annual sampling events. Discussion of individual BCEE SIM results is presented in related sections of this report, along with a description of additional monitoring work to substantiate that BCEE containment continues to be achieved in the offsite sentinel wells.

Assessment of the water quality and vapor phase data collected in 2014 and 2015 serves as the basis for evaluating the attainment of current remediation objectives, which focus predominantly on protection of offsite media and receptors. Additionally, trend analysis is used as a method for evaluating conditions within the containment system.

2.1 Onsite Remediation Systems

2.1.1 Remedial Operations and Data Collection Activities in 2014 and 2015

Water quality samples are collected on an annual basis from selected onsite groundwater monitoring and extraction wells, as presented in Table 2-1. Sampling locations are shown on Figure 2-1. In addition, soil gas concentrations and flow rates from the full-scale SVE system were collected and reported by the USACE and its site contractor, Cabrera Services (Cabrera 2014/2015), to monitor system operations. The flow and vapor quality data from this program of frequent sampling have been very useful in assessing the performance of the components. This is because the operational parameters are recorded frequently (daily or weekly), and the resulting data provide operational trends of components. The full-scale SVE system soil gas samples were collected monthly using Summa™ canisters and were analyzed for VOCs. The data provided an indication of the types and approximate quantities of contaminants removed from the landfill through the SVE operation.

2.1.2 Results of Operations in 2014 and 2015

2.1.2.1 SVE Operation

Soil vapor samples were collected monthly from TO01 (influent to the TOU) and TO02 (effluent from the TOU) to monitor the SVE and TOU performance when the system was in operation during the reporting period. When the TOU operation was terminated in September of 2015 and the GAC system was brought online in November of 2015, monthly soil vapor samples were then collected from GAC01 (influent to the GAC) and GAC02 (effluent from the GAC). The TO01 sample results for selected COCs are summarized in Tables 2-2A and 2-2B, with GAC sample results also included in Table 2-2B. The complete sample results can be found in the monthly reports prepared by Cabrera.

A plot of influent sample results for selected COCs, from system start up through 2015, is provided in Figure 2-3. There were drops in contaminant concentrations from 2002 to 2007. However, the contaminant concentrations moved back up slightly in 2008 and 2009, with a moderate decrease observed in 2010 followed by a return to 2008/2009 levels in 2011. These trends in concentrations are likely due to the contaminant mass being depleted in 2002 to 2007. Starting in 2008, the water level within the containment was lower and more waste materials were exposed for the soil gas extraction. The moderate decline in mass removal throughout 2010 is attributed to a modification of the soil gas influent flow to accommodate the pilot biofilter (BF) system testing performed through part of 2009 and most of 2010. Termination of the BF pilot test in late 2010 combined with the addition of another extraction well to the TOU influent flow restored influent organic levels to 2008/2009 amounts in 2011.

Operation of the system was shut down for the first two months of 2012 as seven new SVE wells were installed and connected to the system. Similarly, the system was shut down for the months of September and October of 2015 to complete work to bring the GAC units online. Results for most VOCs exhibited a marked increase with the first influent samples collected after each of these shutdown events due to temporary accumulation of VOCs around the SVE wells when the system was not in operation. As monitoring continued in 2012 and 2013, results for all compounds but benzene stabilized or decreased moderately. Benzene results showed a higher rate of concentration reduction after the first sample collected in 2012, likely due to the higher volatility of benzene relative to the other compounds presented in this figure. A similar trend is expected with continued operation of the system into 2016.

Samples were collected from TO02 and GAC02 to monitor for compliance with the air permit. The permit requires monitoring for total VOCs, Hazardous Air Pollutants (HAPs), selected chemicals, and other parameters. The permit requirements for total VOCs and selected chemicals, and the operation results are presented in Tables 2-3A and 2-3B for comparison. As can be seen from the results presented in these tables, the operation of the TOU and VGAC met the requirements for the individual compound and total VOC discharge rates throughout the reporting period.

2.1.2.2 Contaminant Mass Removed from the Containment System

With the termination of groundwater extraction in July 2008, the SVE system became the exclusive onsite remedial path for landfill contaminant removal. Significant quantities of VOCs have been removed through the SVE system, with the estimated mass of total and individual organic compounds extracted by the SVE system operation summarized in Table 2-4. The estimate provides only an approximation of the total VOC mass removed for the following reasons:

- The samples were collected infrequently;
- The operation of the SVE system was not at a steady state, and;
- The calculations assume the concentrations were constant between samples.

Figure 2-4A plots the mass removal rate of total VOCs throughout the operational lifetime of the system while Figure 2-4B presents a subset of the more recent data, ranging from 2006 through 2015. The 2014 mass removal rate of total VOCs by the SVE system fluctuated from a high of 0.31 pounds per hour (lbs/hr) of total VOCs, reported in the September sample to a low of 0.10 lbs/hr in the February sample, with an average monthly removal rate of 0.20 lbs/hr for 2014. Removal rates throughout 2015 ranged from 0.05 to 0.22 lbs/hr, with the exception of a temporary elevated removal rate of 0.47 lbs/hr in November following a two month shutdown period. The rate for the last reporting month of December 2015 dropped to a rate of 0.20 lbs/hr, which was similar to the rate observed earlier in 2015 prior to the shutdown. The average monthly removal rate for 2015 is calculated as 0.15 lbs/hr. In general, removal rates continue to decline on an annual basis, as evidenced by the average monthly rates for the years 2013, 2014, and 2015 of 0.38, 0.20, and 0.15 lbs/hr, respectively. The total mass of VOCs removed through the SVE system in 2014 and 2015 was estimated at 580 kilograms (kg) and 183 kg, respectively. The estimated total mass removals for the previous two years were reported as 1,777 kg in 2012 and 1.110 kg in 2013.

Table 2-4 compares the estimated total organic COC mass extracted to the estimated total organic COC mass in the landfill for each of the organic COCs. In 2014 and 2015, the mass removal was only through the SVE. The data indicates that a mass greater than the pre-flushing estimates of total mass has been removed for benzene, methylene chloride, 1,2-dichloroethane, xylenes, ethylbenzene, and toluene. However, only 90 percent of the pre-flushing estimate of total mass has been removed for BCEE. This original mass estimate was calculated using a set of soil sample results and statistical analysis (“Baseline Soil Study”, CDM Smith 1988). It should be noted that because of the heterogeneities in the landfill, high variability in the soil-sorbed mass within the containment system was observed. Due to the variable concentrations of contaminants present in the landfill, it is likely that pockets of highly contaminated soil were present in the landfill but were not sampled and were not accounted for in the original mass estimate. Because of the difficulty of obtaining a more accurate estimate of the mass of contaminants in the landfill, the original estimates are used here as a point of reference for comparison. In total, the maximum estimated amount of groundwater and soil vapor extracted from the landfill is about 86 percent of the original 95% upper confidence limit (UCL) estimate of organic COC contaminant mass of the landfill. Results shown in Table 2-4 indicate that the SVE system has been successful at removing VOCs.

2.1.2.3 Water Quality from the Containment System

As part of the EMP, annual sampling from three extraction wells (E-17B, PW-1A, and PW-2) was performed in 2014, with a fourth extraction well, E-13A included in the 2015 sampling event. These wells are screened in the Cohansey sand and landfill materials inside the cut-off wall containment system. These wells were selected for sampling to provide data on water quality trends and contaminant spatial distribution within the containment system. Comprehensive extraction well sample results obtained in 2014 and 2015 are included in Appendix A. Analysis for metals in extraction well samples was discontinued in 2015 as results for metals remained relatively low and inconsequential when compared to concentrations of organic compounds. All extraction wells but E-7A and PW-1A (which remain ready, if needed, for emergency pumping) were decommissioned in December 2009.

Some of the annual samples collected from the containment system were analyzed at dilutions due to the presence of high concentrations of organic COCs in the samples. As a result, several compounds with lower concentrations than the ones triggering the dilutions have elevated reporting limits (RLs). However, with the exception of mercury, reported RLs are below the cleanup criteria of the COCs.

Organic COC sample results for the 2014 – 2015 reporting period are summarized in Table 2-5. All extraction wells exceeded the BCEE cleanup criterion and one of the three extraction wells, PW-2, exceeded the benzene cleanup criterion. Other contaminants with elevated concentrations were chlorobenzene, ethylbenzene, toluene, and xylenes, but these concentrations were all below the cleanup criteria.

The BCEE sample results for the extraction wells sampled from 2008 through 2015 are summarized in Table 2-6. Overall, the BCEE concentrations for locations E-13A, E-17B and PW-2 exhibit a decreasing trend. The BCEE concentrations for location PW-01A continue to remain low as well, but fluctuating within the range of 240 ug/l in 2011 and 500 ug/l in 2015. The average BCEE concentration of all extraction wells in a given year also exhibit a generally decreasing trend, with 510 ug/l reported in 2013, a very slight increase to 520 ug/l in 2014, and a significant decrease to 348 ug/l in 2015. A similar decreasing pattern is also noted for the median concentrations obtained for the last three years. In looking at long-term trends for average and median BCEE results in Table 2-6, it is important to note that fewer extraction wells were sampled in 2009 (6 wells), 2010/2011 (5 wells), 2012/2014 (3 wells), and 2015 (4 wells) when compared with the 20 or more wells samples in the years preceding 2009. This lower well total yields average BCEE results in later years that are especially susceptible to bias from a significant change in one well. Nevertheless, decreasing BCEE concentrations are evident within the containment system, based on the available extraction well data for the last four years.

A visual perspective on the long-term trend in BCEE concentrations within the containment system is provided in Figures 2-5A and 2-5B. The data in Figure 2-5A presents the average BCEE extraction well concentrations for the 23-year period of 1992 to 2015 and indicates a significant decrease in BCEE for the first eight years of modified batch flushing followed by an apparent leveling off of removal rates starting in 2000. However, the more focused 15-year view of the average BCEE concentrations in the extraction wells provided in Figure 2-5B, with data starting in the year 2000 when concentrations first appeared to level off and extending into 2015, clearly shows a continued long-term decreasing trend in BCEE concentrations within the containment system. The scatter in the data for the first ten years depicted in Figure 2-5B makes it difficult to definitively state that BCEE landfill concentrations are decreasing, but the post-2010 results show a clearly discernible trend.

In 2008 batch flushing was discontinued due to the lack of BCEE reduction noted in the trend graph. Without injection the landfill water level reverted to an equilibrium level approximately 9 feet lower than the batch flushing elevation thereby unsaturating much of the trash. The influx of atmospheric air changed the unsaturated zone in the now unsaturated trash to an aerobic condition which may have helped increase the temperature of the trash. Groundwater temperatures as high as 93 degrees were recorded in the landfill, a change expected to yield as much as a 400% increase in the biological activity of microbes. A study conducted by Shaw for EPA concluded that microbes present within the landfill could degrade BCEE aerobically. It is believed that this heat and accompanying increase in biological activity is largely responsible for the precipitous drop of BCEE concentrations which occurred soon after the termination of batch flushing.

2.2 Water Quality around Mt. Laurel Water Supply Well

The Mt. Laurel supply well (Mt. Laurel Well) is screened in the Mt. Laurel-Wenonah Aquifer, approximately 100 feet beneath the Kirkwood formation. The Mt. Laurel Well (Mt. Laurel Well on Figure 2-1) is located upgradient of the containment system, approximately 100 feet beyond the southwest side of the cut-off wall. Prior to 2009, clean water pumped from the Mt. Laurel Well was used for batch flushing and later, "modified" batch flushing at the site as well as potable water and general washing use. Since the onsite treatment was shut down in 2008, the Mt. Laurel Well is only used for potable water and general washing use. The average pumping rate was significantly lower since 2009 when compared to prior years. The water quality of this well is protected from potential contamination from the Lipari Landfill by overlying aquitard layers.

In the 2014 - 2015 reporting period, one sample was collected each year from the Kirkwood well, MW-K8, and the Vincentown well, V-5, which are located near the Mt. Laurel Well. V-5 and MW-K8 are sentinel wells that provide early warning in the event that Lipari Landfill contaminants migrate downward into Vincentown or Mt. Laurel-Wenonah aquifer units due to pumping of the Mt. Laurel Well. Table 2-7 summarizes the sample results for the Mt. Laurel Well in 2014 and 2015 and MW-K8 and V-5 from 2009 to 2015. Testing for metals was eliminated for the Mt. Laurel Well sample in 2012 as detections for these analytes in previous years were sporadic and at fairly low-levels, and were attributed to metallic components of the pump. Similarly, testing for all organic compounds but BCEE was discontinued at locations MW-K8 and V-5 in 2015 as there were very few positive results for organic compounds with recent sampling rounds, and the enhanced mobility and elevated concentrations of BCEE within the landfill make this a reliable compound to indicate that containment of site COCs continues to be maintained.

No organic COCs were detected above the clean-up criteria in wells V-5 and MW-K8. Positive results were reported for several metals in these wells, with concentrations for arsenic, chromium, and zinc in MWK-8 above the cleanup criteria in various samples. Inspection of these two wells after the 2013 sampling event revealed that unused submersible pumps and transducers in both of these wells had significant levels of corrosion, which likely contributed to the elevated metals concentrations with the 2013 sampling event as well as subsequent events. The corroded equipment was removed from the wells prior to the 2014 event, and a notable decrease in certain metals was encountered at these two locations. Metals concentrations will continue to be monitored at locations MW-K8 and V-5 for at least one more year.

Water quality data collected from the Mt. Laurel Well during the 2014/2015 reporting period indicate that contamination from the Lipari Landfill has not impacted the Mt. Laurel Aquifer at the wellhead, with no positive results reported for either year. New Jersey Groundwater Quality Standards and the State or Federal Drinking Water Standards (the lower of the two Drinking Water Standards is provided) are included in Table 2-7 for comparison of the results with these standards. It should be noted that certain groundwater standards are lower than routine laboratory reporting limits and default to the higher reporting limit concentration. Both values are presented in Table 2-7 for informational purposes.

In 1996, additional wells were installed in the Kirkwood formation (K-31, K-32, K-33, K-34, K-36 and K-37) and in the Vincentown formation (V-6 and V-7) to monitor these aquifers for possible effects of Mt. Laurel pumping. Vincentown well V-6, which is located in the marsh area northeast of the containment system, and V-7, which is located in the Rabbit Run area northwest of the containment system, were also sampled in the 2014 – 2015 reporting period. In 2014, samples collected from well V-7 were analyzed for all organic and metals COCs, while only results for BCEE are available for well V-6 due to misidentification of this location during the 2014 annual sampling event. In 2015, sampling for metals and all organic compounds but BCEE was discontinued at locations V-6 and V-7. The rationale for this reduction in analyses for 2015 is the same as described previously (i.e., very few positive results/exceedances and the ability of BCEE to adequately serve as a surrogate to indicate containment for all site COCs). Table 2-8 summarizes the available sample results for these wells from 2009 to 2015. There were no organic COC detected in these wells in this reporting period. Some metals were also detected in the samples collected from well V-7. These metals concentrations are similar to what was reported in previous years, and their presence is attributed to background contributions from the surrounding area.

The 2014 - 2015 results confirm that the contamination from the Lipari Landfill has not been drawn into the Mt. Laurel aquifer, the Vincentown aquifer, or the upgradient area of the Kirkwood aquifer (location MW-K8) due to pumping from previous years.

2.3 Hydraulic Conditions Affecting the Containment System

One of the concerns expressed in the Feasibility Study (CDM Smith 1985) regarding the integrity of the cut-off wall was that of potential hydrofracturing. Hydrofracturing may occur when confined hydrostatic forces exceed resistance provided by the overburden pressure of the soil plus its tensile strength. In addition, hydrofracturing could occur when the difference in hydraulic pressure across the cut-off wall causes excess tensile stress to occur in the wall. This phenomenon does not necessarily occur due to large, short-term differences in pressure. Only significant, long-term durations of pressure difference are anticipated to lead to hydrofracturing. Hydrofracturing can self-heal, but if it is allowed to continue, higher permeability sediments can fill in the hydrofracture, thereby permanently increasing the permeability of the wall.

A maximum value for the head differential across the cut-off wall of 15 feet was established in the feasibility study to avoid damage to the cut-off wall due to hydrofracturing. USACE re-evaluated the factors used to calculate the 15 foot head differential maximum and concluded that the safety factor included in the CDM calculation was unusually conservative. Consequently, the maximum recommended head differential value across the cut-off wall was increased from 15 feet to 22.5 feet by USACE in 1997 (USACE 1997a).

To monitor the head differential across the cut-off wall water levels are measured in paired monitoring wells that are located inside and outside of the cut-off wall. These water levels are measured using transducers, with results verified on a quarterly basis via manual measurements to check the transducer's accuracy. In the years preceding 2014, the head differential across the cut-off wall was monitored weekly at seven sets of paired wells located along its circumference. Three additional wells were constructed in 2012 to obtain water level data on the cut-off wall addition installed in 2011. These three new wells provided two additional well pairs, C-101/C-100 and C-101/C-102. However, water level measurements for these new well pairs were not recorded until 2014.

Additional changes incorporated in 2015 included elimination of measurements for paired wells C-21/C-22A, the change of pair E-22A/C-63 to C-17/C-63, the change of pair C-10A/C-46 to C-25A/C-46, and a reduction in measurement frequency from weekly to monthly. This revised plan provides a total of 8 paired monitoring wells, with certain wells used for more than one pair. Pairs C-101/C-100 and C-101/C-102 are used to determine the head differential across the addition to the cut-off wall. All other pairs are used to measure the differential across the original cut-off wall. All monitoring wells pairs are presented in Figures 2-6A and 2-6B. The water level measurements for the 2014-2015 reporting period are presented in Appendix B.

Tables 2-9A and 2-9B present the observed maximum head differences that occurred across the cut-off wall at the well pairs throughout the 2014 – 2015 reporting period. The head differential equals to interior water level minus the exterior water level for each set of paired wells. A positive head differential value indicates the potential for outward flow of water from the containment system because the containment system water level exceeded the exterior groundwater level. Conversely, a negative head differential value indicates the potential for flow of groundwater into the containment system because the exterior groundwater level exceeded the containment system water level. The USACE-recommended maximum head differential of 22.5 feet was not exceeded during the reporting period. The maximum differentials observed were similar to what was reported for the well pairs in the preceding year.

Based on the paired well water level measurements in 2014 and 2015, groundwater around the landfill flows from west/southwest to east/northeast direction. Paired wells C-15/CDB-4, C-17/C-16, C-10A/C-46, C-25A/C-46, C-100/C-101, C-102/C-101, and C-25A/C-26A, located in the hydraulically upgradient side of the landfill, have negative differential values; paired wells E-22A/C-63, C-21/C-22A, C-17/C-63, and C-23/C-56, located in the downgradient side of the landfill, have positive differential values. This implies there is potential for infiltration of groundwater into the landfill in the upgradient side and outflow of water from the landfill to the aquifer from the downgradient side. The water levels within the landfill were higher in the upgradient areas and were lower in the downgradient areas, implying there is inflow of groundwater into the landfill in the upgradient areas and outflow of water from the containment to the aquifer in the downgradient areas. The uneven water levels within the landfill also suggest water flows from the upgradient areas to the downgradient areas within the landfill.

Since the termination of the batch flushing operation in 2008, groundwater conditions in and around the landfill have reached equilibrium conditions, with a constant but very limited flow of water passing through the landfill on a regular basis. This is confirmed by the consistency of the water level readings, the known permeability of the cut-off wall, and the groundwater modelling performed by the USACE (USACE, 2008). In addition, the groundwater model showed that the cut-off wall was still working as designed with permeabilities still meeting the original design criteria.

2.4 Offsite Control Systems

2.4.1 Remedial Operations and Data Collection Activities in 2014 and 2015

In September of 2014 and 2015 samples were collected annually from the offsite groundwater collection system, which includes the French Drain Sump and Interceptor Trench locations. Sampling locations are shown on Figure 2-1. In 2014, all French Drain and Interceptor Trench samples were analyzed for TCL VOCs and

SVOCs, and selected TAL metals. Metals were eliminated from the analysis list for these locations in 2015 as this data is considered ancillary to the data for organic compounds at the site.

The water quality data from the Chestnut Branch and Rabbit Run, surface water bodies outside the landfill containment system, were collected to evaluate containment system effectiveness. Information on the locations for surface water sampling can be found in Section 2.4.2.6 and Figure 2-1. Additionally, groundwater samples were collected from offsite sentinel wells located downgradient of the site and east of Chestnut Branch.

2.4.2 Results of Operations in 2014 and 2015

2.4.2.1 Water Quality of French Drain

Samples from the three French Drain sumps (FD-01, the south sump; FD-02, the center sump; and FD-03, the north sump) were collected annually in 2014 and 2015. Results for COCs are presented in Tables 2-10A and 2-10B, with comprehensive results for both annual sampling events associated with this reporting period provided in Appendix A.

Table 2-10C shows the maximum concentrations of organic COCs detected in the French Drain from 1996 to 2015. In 2014 and 2015, BCEE was the only organic COC reported at a concentration above the cleanup criteria, with BCEE concentrations exceeding the cleanup criterion in all samples for the reporting period. The highest BCEE concentration was detected in sump FD-03 for both 2014 and 2015. Levels of BCEE in FD-03 have been trending upward in recent years, with a high concentration of 370 ug/l reported in 2014 for the years ranging from 2009 to 2015. While BCEE concentrations continue to fluctuate to some extent, it is noted that increasing concentrations are evident in the 2011 – 2012 time frame, which coincides with a period of extensive work at the site. This increase is likely due to significant soil disturbances associated with this work, and concentrations are expected to moderate as site conditions continue to equilibrate.

2.4.2.2 Water Quality of Interceptor Trench

The Interceptor Trench system samples were collected to evaluate the effectiveness of the Interceptor Trench collection system in contaminant mass removal. Table 2-11A presents the COC concentrations reported for the Interceptor Trench A and B samples collected in 2014, with COC results for the 2015 samples provided in Table 2-11B. Comprehensive results for the annual Interceptor Trench samples are summarized in Appendix A. Figure 2-7 presents a plot of historic BCEE concentrations for both of the Interceptor Trenches.

The only organic COC that exceeded the cleanup criterion was BCEE, which exceeded the level in all samples. Metal concentrations of arsenic, mercury, and zinc also exceeded the criteria. The 2014 Trench A metals results were significantly higher than what has been observed in recent years. In light of the fact that there were no elevated metals results observed with the effluent samples during or after the related time period and historical results for this location have been substantially lower, the situation encountered in 2014 was considered anomalous. Effluent results for metals will continue to be monitored to determine if additional investigation is required.

Concentrations of BCEE have historically exceeded the cleanup criterion in both trenches. The BCEE concentrations in Interceptor Trench A exhibit a decreasing trend, with the exception of a spike to 1,500 ug/l in October of 2012 followed by a return to concentrations consistently below 1,000 ug/l in 2013. This temporary spike is likely attributable to the extensive site work performed in 2011 and 2012, which was noted previously in the discussion of the results for the French Drain sumps. Concentrations of BCEE in Trench B remained relatively constant and well below 500 ug/l.

2.4.2.3 Water Quality in Onsite Kirkwood Well K-31

Kirkwood monitoring well K-31 was installed in 1996 and is screened to monitor deep groundwater concentrations in the Kirkwood Formation. Sampling of well K-31 continued in 2014 and 2015, with COC results for the years 2009 through 2015 summarized in Table 2-12. Sampling in 2014 included analysis for TCL VOCs and SVOCs, and selected TAL metals. Sampling for all organic compounds but BCEE was discontinued in 2015 as results for a number of years were consistently either "non-detect" or sporadic low concentration results well below the cleanup criteria for these compounds. Metals analysis was continued for well K-31 and all other monitoring wells screened in the Kirkwood aquifer. The purpose of the continued metals analysis was to assess trends with recent low-level arsenic concentrations encountered since 2013 with the change to a more sensitive method for this analysis and to confirm positive results for other metals in Kirkwood wells which previously have been attributed to factors other than the groundwater.

There were no 2014 – 2015 results for organic COCs above the cleanup criteria at location K-31. The only positive result, BCEE at a concentration of 0.0499 ug/l reported in 2015, was well below the cleanup criteria. With the exception of 2011, this trend of sporadic low-level positive results well below the cleanup criteria has been consistent throughout the 2009 – 2015 reporting period. The positive BCEE result above the cleanup criteria encountered in 2011 was attributed to field and/or laboratory contamination. Modifications to the timing of sample collection for the 2013 were implemented to minimize the potential for BCEE contamination going forward. Nevertheless, the low-level positives for BCEE reported in 2013 and 2015 as well as the 2010 result indicate that BCEE concentrations in the deeper portion of the Kirkwood aquifer warrant continued evaluation with subsequent sampling events.

Arsenic was the only inorganic analyte reported above the "non-detect "cleanup criteria, with a concentration of 1.5 ug/l obtained for the 2015 sampling event. This concentration is significantly lower than the 10 ug/l reporting limit obtained with previous sampling events due to improved method sensitivity, and remains below the NJDEP Groundwater Quality Standard (GWQS) of 3 ug/l.

2.4.2.4 Water Quality in Offsite Kirkwood Wells

Kirkwood monitoring wells (K-7 and K-8) were sampled in 2014 and 2015. Well K-7 is located on the east side of the containment system, and well K-8 is located in the Rabbit Run area, side gradient from the containment system. The 2014 samples were analyzed for TCL VOCs and SVOCs, and selected TAL metals while the 2015 samples were analyzed for only BCEE and metals, similar to location K-31. Sample results are summarized in Table 2-13. For the 2014 – 2015 reporting period, there were no organic COC concentrations reported above the cleanup criteria for these locations. The only organic compound positive result encountered was the BCEE result reported for well K-7 in 2015, at 0.112 ug/l. The well K-7 BCEE results are similar to what was observed historically, with the exception of the unusually high 2011 result at this location. However, the 2012 positive result for well K-8 represents the only positive detection for this location in the 2009 – 2015 time period. Previously encountered BCEE detections for both of these locations have been attributed to field and/or laboratory contamination. The BCEE data for these wells will continue to be monitored with subsequent sampling events to determine if the modifications to the timing of sample collection and the laboratory selection process have an impact on future results.

There were no positive metals results above the cleanup criteria for well K-7 in either year. Well K-8 metals results for arsenic were above the "non-detect" goal in 2014 and 2015. Both of these metals concentration are significantly lower than the 10 ug/l reporting limit obtained with previous sampling events due to improved method sensitivity, and remains below the NJDEP GWQS concentrations.

2.4.2.5 Hydraulic Performance of Offsite Control Systems

The locations of these offsite control systems are shown in Figure 2-8. Groundwater captured by the French Drain and Interceptor Trench systems is pumped into the Offsite Collection Tank and on to the east extraction header. The 2014 - 2015 data for the French Drain and Interceptor Trench were obtained from the monthly reports provided by Cabrera. Table 2-14 provides a summary of the monthly volumes extracted from the French Drain and Interceptor Trench systems during this reporting period. The total volume for the French Drain (5.14 million gallon [MG] in 2014 and 4.45 MG in 2015) is similar to the 4.70 MG and 5.10 MG volumes reported in 2012 and 2013, respectively. Reduced volumes were initially encountered with the French Drain in 2012 and are a result of the additional cut-off wall and the cap gap work performed in late 2011. Work on both of these site features was designed with the intent of reducing French Drain volumes and associated GCUA discharge volumes, for the ultimate purpose of lowering operational costs for the site. The overall reduction of greater than 50% for the French Drain volumes observed since 2012 supports EPA's decision to pursue the site enhancements to the cut-off wall and cap. Gradually increasing flows have been noted for the Interceptor Trenches over the last five years, with total annual volumes going from 4.38 MG in 2010 to 4.89 MG in 2015, an increase of over 500,000 gallons. Flows in the French Drain have not shown this trend thus it is not explainable simply due to an increase in precipitation. This situation will continue to be evaluated to determine if this five-year trend continues and to identify possible sources of the additional water.

2.4.2.6 Water Quality in Offsite Surface Water

Surface water bodies surrounding the landfill have been monitored to verify that landfill contamination is not impacting the offsite surface waters (Figure 2-1). One surface water sampling location (SW-01) is located upstream of the site, in Chestnut Branch. Two surface water sampling locations, SW-06, and SW-07 are in Chestnut Branch; SW-07 is prior to the confluence with Rabbit Run; and SW-06 is downstream of the confluence with Rabbit Run at the entrance of Alcyon Lake. Location SW-05 is in Rabbit Run immediately downstream of the landfill. Surface water samples were collected in 2014 and 2015 as part of annual sampling activities. The 2014 samples were analyzed for TCL VOCs and SVOCs, and selected TAL metals while the 2015 samples were analyzed BCEE only. The rationale for this reduction in analyses for 2015 is the same as described previously (i.e., very few positive results, no exceedances and the ability of BCEE to adequately serve as a surrogate to indicate containment for all site COCs).

No site COCs were detected above the cleanup criteria in the surface water samples as can be seen from the summary of surface water data in Table 2-15. Based on the surface water sampling results, the site contaminant containment and capture systems continue to be protective of the surface water bodies sampled.

2.4.2.7 Water Quality in Offsite Sentinel Wells

Groundwater samples were collected in 2014 and 2015 from four offsite sentinel wells, SA-63B, SA-64B, SA-65B, and SA-66B. These wells are in the area downgradient of the site, screened in the Kirkwood aquifer, and are located east of the Chestnut Branch. Sample results for COCs are presented in Table 2-16. Sampling in 2014 included analysis for TCL VOCs and SVOCs, and selected TAL metals. Sampling for all organic compounds but BCEE was discontinued in 2015 as results for a number of years were consistently either "non-detect" or sporadic low concentration positive results well below the cleanup criteria for these compounds. Metals analysis also continued for all offsite sentinel wells in 2015 for continued assessment of trends with recent low-level arsenic concentrations encountered since 2013 and for the continued evaluation of the positive results reported for zinc.

The only positive result reported for an organic COC in the sentinel wells was a trace concentration of methylene chloride (a common laboratory contaminant) in 2014 that was well below the cleanup criteria. Positive results for certain metal COCs were reported for 2014 and 2015. Results for zinc at locations SA-64B and SA-65B were above the cleanup criteria for both years. Stainless steel contains zinc and components for these wells, such as hose clamps and centralizers, contain stainless steel. Similar to the problems encountered with V-5, some of the components of these wells may be contributing metals to the groundwater samples collected. Additionally, arsenic results for all locations but SA-63B were above the "non-detect" cleanup goal and the NJDEP GWQS of 3 ug/l at location SA-65B. As discussed previously, the site cleanup goal of "non-detect" can be especially challenging in light of the enhanced sensitivity available with the new methodology. Nevertheless, the consistently elevated zinc concentrations at locations SA-64B and SA-65B and arsenic at locations SA-65B warrant continued evaluation with future events.

2.4.2.8 Continued Evaluation of Contamination with Low-Level BCEE Analysis

Over the last five years, sporadic and unexpected low-level positive results for BCEE were encountered at various sentinel well and other monitoring well locations sampled during the annual events. These BCEE results were attributed to laboratory and/or field contamination since numerous resampling efforts for suspect results performed by USACE consistently yielded "non-detect" results for BCEE. While the suspect BCEE results were typically below the cleanup criteria, the detection of this site COC in any of the sentinel wells was of particular concern due to the close proximity to the residential community and the potential impact on the groundwater.

Implementation of a phased sampling approach in 2013 yielded improved performance, but occasional positive results were still encountered with the initial sampling, followed with "non-detect" results for resampling efforts performed by USACE. While the additional samples collected by USACE support the premise that the containment system is functioning adequately, the continued random detections of low-levels of BCEE with the annual sampling events remained a concern for the critical offsite sentinel well locations. Consequently, EPA directed USACE to complete a quarterly sampling program for the four sentinel wells, beginning with the 2014 annual sampling event. This additional sampling would provide a more rigorous data set and increase confidence in results for these locations. Additionally, it would allow for the evaluation of possible seasonal variations that could be impacting these locations since the annual samples are always collected during the summer months.

All samples were collected by USACE personnel and submitted to the USACE Environmental Research and Development Center (ERDC) laboratory located in Vicksburg, Mississippi. Utilization of the ERDC laboratory allowed for greater control over potential internal laboratory contamination for BCEE, as this facility is not a production laboratory in receipt of samples contaminated with common commercial chemical products (i.e., BCEE) from a wide variety of clients. As an additional measure of Quality Assurance, two double blind performance evaluation samples spiked with BCEE were prepared at the site and submitted to the laboratory for analysis.

Collection of samples took place in August and November of 2014 as well as March and June of 2015. The August 2014 sentinel well samples served as the data for the 2014 annual sampling event for these locations. In addition to the sentinel wells, all other 2014 annual sampling event locations requiring the low-level BCEE SIMS analysis were also collected by USACE and submitted to the ERDC laboratory for analysis.

There were no positive results reported for BCEE in any of the quarterly sentinel well samples collected throughout 2014 and 2015 or any of the other 2014 annual samples submitted to the ERDC laboratory. The samples collected during the November 2014 event were analyzed several days outside of the 40 day holding time for semivolatile sample extracts. The data for the November event was considered usable as the holding time exceedance was marginal.

Blind performance evaluation samples were prepared at the site and submitted to the laboratory with the August 2014 and March 2015 sampling events. The concentrations of BCEE in these spikes were 0.123 ug/l in the August sample and 0.062 ug/l in the March sample. Excellent performance was observed for the initial sample, with the laboratory reporting a BCEE concentration of 0.083 ug/l, which is within 35 % of the true spike value. An apparent field error attributed to cross contamination likely introduced during preparation of the sample onsite rendered second sample unusable, as a very high level of a non-target compound interfered with the ability to detect the low-level of BCEE added to the sample.

The consistent set of results obtained with the quarterly samples submitted for the sentinel wells increased confidence that the containment system is functioning as desired and that the sporadic low-level detections for BCEE encountered with previous annual sampling events were attributable to contamination introduced in an uncontrolled laboratory environment. This was reinforced by the consistent results obtained for the other low-level BCEE samples submitted for the 2014 annual sampling event. Consequently, sampling for all 2015 annual locations for low-level BCE analysis was turned over to the contractor, with all of the analysis performed by the ERDC laboratory. Similar results were obtained for the critical sentinel wells and surface water samples. While positive BCEE results were obtained for two of the 2015 samples, K-7 and K-31, as discussed in preceding section of this report, the overall improved consistency with the BCEE analysis has increased the confidence in the interpretation of the BCEE data for the site.

2.5 Discharge to GCUA POTW

2.5.1 Remedial Operations and Data Collection Activities in 2014 and 2015

All landfill water injection was ended on May 1, 2008 under the direction of EPA. The treatment plant was shut down in July 12, 2008, and the SVE was used as the exclusive onsite remedial path for landfill contaminant removal. At the start of the 2014-2015 reporting period, groundwater from the offsite collection tank was piped directly to the effluent tank and discharged to the GCUA sewer. Integrity problems with the top of the effluent tank triggered changes to the conveyance pathway for the water stored in the offsite collection tank, and the flow path was revised to bypass the effluent tank, resulting in a continuous discharge to the GCUA. When required, the pH of the collection tank water was adjusted when pH levels were near or below the permit required levels. Measurements of offsite collection system volumes and water quality water discharged to the GCUA were recorded on a monthly basis.

2.5.2 Results of Operations in 2014 and 2015

The total quantity of flow discharged to the GCUA based on the monthly reporting was 10.3 MG in 2014 and 9.7 MG in 2015, as presented in Table 2-14. These GCUA discharge volumes were higher than the total volumes obtained for the French Drain and the Interceptor Trench, which were 9.9 MG in 2014 and 9.3 MG in 2015. The volume difference is attributed to the contribution from the waste holding tank, which is combined with the treated water before discharge to the GCUA. There is no flow measurement for the waste holding tank, but estimates of its contribution to the combined French Drain and Interceptor Trench volumes support the increase to the total volume discharged. Tables 2-17A and 2-17B present the 2014 – 2015 discharge concentrations compared to the GCUA discharge limits. No parameter exceeded its respective discharge limit. Table 2-18 shows that mass of organic contaminants of concern removed from the French Drain and the Interceptor Trench were 10.5 kg in 2014 and 5.82 kg in 2015.

2.5.3 Variable BCEE Effluent Concentrations

A consistent pattern of changing BCEE effluent concentrations was identified and described in the Final 2012 – 2013 Annual Report prepared for the site (USACE 2016). In evaluating the monthly BCEE effluent results dating back to 2010 for each year, the pattern begins with BCEE concentrations above 100 ug/l for the first five to six months of the year followed by a reduction to non-detect concentrations starting in the June/July timeframe. The BCEE effluent concentrations remain at low or non-detect concentrations until the November/December timeframe, when they return to concentrations above 100 ug/l.

The overall conclusion from these observations as well as additional testing that was performed was that the water from the offsite collection system becomes oxygenated as it progresses through the collection system and accumulates in the effluent tank. The increased temperature in the effluent tank in the warmer months yields an increased growth rate of the aerobic bacterial population in the effluent tank. This higher bacterial population is capable of metabolizing the BCEE in the effluent tank during the typical residence time, thereby reducing the BCEE concentration below detectable levels.

This trend continued throughout 2014 and was also observed through May of 2015. But with the diversion of the flow away from the effluent tank, which was initiated 30 June 2015, the BCEE concentration reductions in the effluent abated, as evidenced by BCEE concentrations in the range of 64 to 200 ug/l through the entire second half of 2015. This trend is consistent with the concept of the combination of increased residence time and elevated temperatures providing reaction conditions within the effluent tank that facilitate biological degradation of BCEE. With the diverted effluent flow started at the end of June 2015, there is no longer sufficient residence time for the water to allow for appreciable bacterial growth and the subsequent degradation of BCEE.

Section 3
Conclusions and Recommendations

Conclusions regarding the 2014 - 2015 operations for the onsite and offsite remediation systems and effectiveness monitoring are presented herein. Recommendations for changes or additions to the systems and monitoring programs are also presented.

3.1 Conclusions

3.1.1 Onsite Control Systems

The total organic COC mass removed by the onsite SVE system was approximately 580 kg in 2014 and 183 kg in 2015. The system has been very effective in the removal of VOCs, particularly xylenes and toluene. But removal rates continue to decline, as evidenced by the average annual masses of 6,300 kg removed in the three year period 2009 through 2011 and 1,400 kg for the two year period 2012 through 2013. Additionally, the SVE system is not as effective in removing BCEE, a semi-volatile compound and a primary contaminant that is removed more effectively through water flushing. The COC removal rates had remained relatively constant throughout the 2003 – 2011 time frame, with the first evidence of an extended tailing effect in contaminant removal rates apparent throughout 2012 and 2013 followed by a continued decrease in 2014 and 2015.

The following conclusions can be drawn regarding the overall performance of the remediation systems for the 2014 – 2015 reporting period:

- The SVE system has performed as expected, with a gradual decline in removal efficiency after startup through 2007, as the VOC mass was depleted. Moderate increases were observed in 2008, 2009, and 2011, but overall removal rates have decreased steadily since 2012.

- The SVE process continually brings in from 400 to 500 cfm of atmospheric air to the landfill. The aeration of portions of the landfill should enable the aerobic degradation of BCEE and other organic contaminants within the containment area.

- The EPA's cleanup strategy appears to be working. Prior to 2008 the BCEE concentrations had become asymptotic. Batch flushing and pre-treatment were not reducing BCEE concentrations. EPA chose to cease batch flushing and instead rely on the SVE system, which included the influx of fresh air to bioremediate BCEE contamination and the reduction of the landfill water table to unsaturate BCEE contamination and allow for unsaturated aerobic and anaerobic biological degradation. Relatively consistent and significant decreases in BCEE concentrations (relative to 2011 concentrations) continue to be observed for wells E-13A, E-17B and PW-2. Organic COCs in well PW-1A exhibit no consistent concentrations declines over the four year period ranging from 2012 to 2015, but BCEE concentrations for this location remain relatively low when compared with historic site data, with a low concentration of 300 ug/l in 2012 and a high concentration of 500 ug/l in 2015. These relatively consistent results for BCEE as well as benzene and chlorobenzene at PW-1A may be an indication of limited aeration at this part of the landfill. The continued downward trend in BCEE concentrations for the 2014 – 2015 reporting period observed at locations E-13A, E-17B and PW-2 indicates that the post batch flushing reduction of BCEE has not yet become asymptotic. The concentrations of BCEE and benzene still exceed the cleanup criteria in the annual groundwater samples collected from the four wells within the containment system, E-13A, E-17B, PW-1A, and PW-2.

- Containment system groundwater concentrations of 1,2-DCA, ethylbenzene, methylene chloride, chlorobenzene, chloroform, toluene, and phenol are below their cleanup criteria. Xylenes and 4-methyl-2-pentanone do not have cleanup criteria.

- The results indicate that larger amounts of some organic COCs were in the landfill than initially estimated.

3.1.2 Mt. Laurel Supply Water

The Mt. Laurel-Wenonah Aquifer has not been adversely impacted by landfill contaminants, based upon the water quality data collected prior to and during the 2014 – 2015 reporting period from the Mt. Laurel supply well.

3.1.3 Containment Systems

Groundwater levels in and around the containment system indicate that the system is performing according to design, and that the movement of groundwater through the containment system is at the rate predicted by USACE modeling and meets the original cut-off wall design criteria.

3.1.4 Offsite Control Systems

Based on the flow rates measured in 2014 and 2015, hydraulic performance of the French Drain and Interceptor Trench collection systems are as desired. This includes reduced (greater than 50%) French Drain flow rates due to site modifications incorporated into the work performed on the cut-off wall and cap in 2011 and 2012. Flow rates for the Interceptor Trenches remain at levels similar to previous years.

Surface water samples, offsite sentinel wells, and monitoring well results for both the Kirkwood and Vincentown aquifers demonstrate that the various control systems are working effectively to prevent contamination from entering the surface waters and groundwater around the Lipari site. Low concentration positive results in 2015 were reported for BCEE in deep Kirkwood well K-31 and side gradient Kirkwood well K-7, which is east of the containment area. The K-7 contamination is in an area that will be captured by the Interceptor Trenches and is therefore not a concern since surface water and sentinel wells remain clean. The K-31 contamination is residual site contamination that fluctuates at very low-levels but shows no signs of increasing, indicating that the situation continues at a steady state and shows no signs of deteriorating as the site matures.

3.1.5 Discharge to GCUA POTW

Total effluent volumes discharged to the GCUA were 10.3 MG in 2014 and 9.7 MG in 2015. No effluent concentrations exceeded the GCUA discharge limits. The facility continues to meet all of its discharge requirements even after the Lipari treatment system was shut down.

3.2 Recommendations

3.2.1 SVE System

Most of the COCs have met their respective cleanup levels in the containment system groundwater samples except for BCEE and benzene, which both continue to be detected at concentrations above their cleanup criteria. Currently, EPA continues to operate the SVE system resulting in continued removal of VOCs (albeit at lower rates) and landfill aeration to stimulate aerobic degradation of organic COCs. The TOU unit was removed from operation in 2015, with a changeover to GAC treatment for the SVE stream for cost reduction purposes. The economics of operation of this revised SVE treatment system should continue to be assessed in light of the lower removal efficiencies.

As VOC concentrations continue to decrease, more thought should be given to the degradation of constituents such as BCEE which is being biologically degraded by the influx of atmospheric air into the landfill. EPA should consider altering the air injection locations to add atmospheric air to the vicinity of PW-1A to attempt to reduce the BCEE in this area. This would require an analysis of wells in the area to determine if suitable unsaturated wells exist which can be vented to the atmosphere.

3.2.2 Containment Systems

- Water level monitoring of paired wells inside and outside of the original cut-off wall and the addition to the cut-off wall should be continued.

3.2.3 Offsite Control Systems

- The offsite control systems, consisting of the French Drain and the Interceptor Trenches, have significant BCEE contamination when compared to the cleanup criterion. Therefore, these systems should continue to be operated and their volumes and COC concentrations monitored for tracking effectiveness and trends. The steadily increasing flows into the interceptor trench are troubling. Since 2010, the volume of water collected from the interceptor trenches has gone up every year and is now over 500,000 gallons more than 2010. Flows in the French Drain have not shown this trend thus it is not explainable simply due to increases in precipitation.

3.2.4 Environmental Monitoring

- The overall sampling and monitoring scheme should continue to be evaluated for cost effectiveness and technical value given the modified situation and the historical data trends that are available.

- Sampling of additional extraction wells should be considered to determine if the decrease in BCEE concentrations observed for the extraction wells tested in the 2014 – 2015 reporting period is observed in other extraction wells. These results would be useful in determining if natural biological processes are contributing to the reduction of BCEE concentrations within the containment system.

- Onsite Kirkwood well K-31 should continue to be monitored to ensure that the residual contamination in the deep Kirkwood aquifer beneath the landfill remains at a steady level.

- Offsite Kirkwood wells K-7 and K-8 should continue to be monitored to evaluate the effectiveness of the containment system.

- Annual sampling of offsite surface water and offsite sentinel wells should be continued to ensure that the offsite collection system remains protective of the environment.

- Metals analysis of samples from the Kirkwood aquifer should continue to be monitored to verify that low-level arsenic detections obtained as a result of the change to a more sensitive analytical method remain below NJDEP GWQS.

- Samples for low-level BCEE analysis should continue to be submitted to the USACE ERDC laboratory to obtain the benefits of a more controlled non-commercial laboratory scenario to minimize BCEE contamination.

- Monitoring for metals in specific off-site wells such as SA-63B, 64B, 65B and 66B should continue. Metals such as zinc are not nearly as soluble as BCEE thus are not likely indications that landfill COCs are migrating to these wells. If further metals are detected, these wells should be re-developed. If that does not reduce the metals, they may need to be abandoned and replaced.

Section 4
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Table 1-1
Contaminants of Concern Remediation Goals
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Chemicals	Cleanup Criteria [1]
Organic	
1,2-Dichloroethane [2]	99
4-Methyl-2-pentanone	NS
Benzene [2]	71
Bis(2-chloroethyl)ether [2]	1.4
Chlorobenzene	21,000
Chloroform	470
Ethylbenzene	29,000
Methylene Chloride	1,600
Phenol	4,600,000
Toluene	200,000
Xylenes (total)	NS
Metals	
Arsenic	16/ND/ND [3]
Chromium	180 [4]
Lead	71/20/3.9 [3]
Mercury	0.15
Nickel	4,600
Selenium	5 [4]
Silver	3.4 [4]
Zinc	100 [4]

Notes:

All concentrations are in microgram per liter.

NS - not specified ND - Not Detected

(1) Federal Water Quality Criteria (40 CFR Part 131.36, Toxic Criteria for those states not complying with the Clean Water Act Section 303(c)(2)(B)) - dated 7/1/2009 - surface water, consumption of organisms only

(2) Primary contaminant of concerns (COCs)

(3) Cleanup criteria are set at the background levels in accordance with EPA policy "Role of Background in the CERCLA Cleanup Program (2002)". The background levels are set for Cohansey Aquifer/Kirkwood Aquifer/Surface Water using results from:

- Well C-8a for Cohansey Aquifer (source: 1988 ROD, page 103)
- Well K-5 for Kirkwood Aquifer (source: 1988 ROD, page 103)
- Sample SW-01 for Surface water (source 1999 to 2003 Annual Reports)

(4) Federal Water Quality Criteria (40 CFR Part 131.36, Toxic Criteria for those states not complying with the Clean Water Act Section 303(c)(2)(B)) - dated 7/1/2009 - surface water, freshwater

Table 2-1
Environmental Monitoring Program Sampling Locations
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Annual Sampling	2014	2015	2015 Modifications
Groundwater Sampling			
• Extraction Wells: E-17B, PW-1A, and PW-2	[1], [2], [3]	[1], [2]	Eliminated Metals
• Extraction Wells: E-13A	NS	[1], [2]	Location Added in 2015
• Mt. Laurel Supply Well	[1], [4], [6]	[1], [4], [6]	No Change
• Vincentown Well: V-5	[1], [2], [3], [4]	[3], [4]	Eliminated VOCs and SVOCs
• Vincentown Well: V-6	[4]	[4]	No Change
• Vincentown Well: V-7	[1], [2], [3], [4]	[4]	Eliminated Metals, VOCs and SVOCs
• Kirkwood Wells: MW-K8, K-7, K-8, and K-31	[1], [2], [3], [4]	[3], [4]	Eliminated VOCs and SVOCs
• Surface Water Locations: SW01, SW05, SW06, and SW07	[1], [2], [3], [4]	[4]	Eliminated Metals, VOCs and SVOCs
• French Drain Sump Locations: FD01, FD02, and FD03	[1], [2], [3]	[1], [2]	Eliminated Metals
• Interceptor Trench Sump Locations: Trench-A and Trench-B	[1], [2], [3]	[1], [2]	Eliminated Metals
• Sentinel Wells: SA-63B, SA-64B, SA-65B, and SA-66B	[1], [2], [3], [4]	[3], [4]	Eliminated VOCs and SVOCs
• Peach Country	[4]	[4]	No Change
Monthly Sampling	**2014**	**2015**	**2015**
Effluent Sampling			
• Treatment Plant: ET01	[1], [2], [3], [5]	[1], [2], [3], [5]	No Change
Vapor Sampling			
• Treatment Plant: TO01 and TO02	[7]	[7]	Sampled through August 2015
• Treatment Plant: VGAC Influent and Effluent	NS	[7]	Sampled November and December 2015

Analsysis Code:

1) Volatile Organic Compounds (VOCs)
2) Semivolatile Organic Compounds (SVOCs)
3) Metals
4) Bis(2-chloroethyl)ether by Selected Ion Monitoring
5) Biochemical Oxygen Demand, Total Suspended Solids, Total Dissolved Solids, Cyanide, Ammonia, Oil and Grease, Pesticides/PCBs, Sulfide and pH.
6) Nitrate and Total Coliform
7) Method TO-15 Volatile Organic Compounds
NS No sampling performed

Table 2-2A
Summary of Influent Soil Gas Analytical Results - 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Sample ID	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**
Sample Date	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Flow, scfm	487	499	497	560	543	505	511	487	463	449	450	445
VOC, lbs/hr	0.12	0.10	0.17	0.14	0.25	0.22	0.24	0.26	0.31	0.24	0.25	0.13
Concentrations in µg/m^3												
Benzene	179	86	211	94	112	102	135	150	261	252	ND	144
Carbon disulfide	2,253	1,229	1,787	1,192	1,189	1,513	1,955	2,804	6,349	4,669	4,077	2,991
Chlorobenzene	ND	ND	166	147	ND	ND	ND	ND	889	778	332	ND
Chloroform	988	535	720	521	652	745	959	1,212	2,030	2,069	1,684	1,304
1,2-Dichlorobenzene	601	1,251	1,209	4,780	11,423	3,457	3,649	5,904	4,257	1,413	8,537	1,479
1,4-Dichlorobenzene	ND	ND	ND	332	ND	ND	ND	ND	328	150	589	ND
1,2-Dichloroethane	6,074	3,612	5,264	4,292	4,940	4,818	5,385	6,236	9,677	9,313	7,450	6,317
Ethylbenzene	4,010	3,434	5,463	3,867	7,067	7,023	8,020	8,758	11,055	10,405	8,237	4,379
Methylene Chloride	1,521	406	504	389	500	698	635	691	2,094	629	1,229	563
4-Methyl-2-pentanone	ND	ND	ND	84	105	156	ND	ND	256	ND	183	ND
Tetrachloroethene	1,919	1,370	1,878	1,560	2,997	2,841	3,153	3,689	4,801	4,720	6,300	2,428
Toluene	12,267	7,940	15,578	8,353	11,665	13,358	17,045	17,836	26,791	23,931	17,008	12,267
Trichloroethene	1,473	1,037	1,392	1,344	1,677	1,542	1,499	2,150	3,122	2,972	2,246	1,849
Xylene (m&p)	16,171	16,778	27,096	18,339	35,420	40,189	41,403	46,822	55,493	43,094	40,709	19,509
Xylene (o)	9,711	10,362	16,041	13,570	25,059	26,923	26,056	29,784	32,992	24,061	30,564	13,830
Total Xylenes	25,882	27,140	43,137	31,908	60,479	67,112	67,459	76,606	88,485	67,155	71,274	33,339
Total VOCs(1)	68,064	54,495	92,280	68,720	121,053	115,138	123,075	142,756	181,587	144,431	150,091	78,835

Notes:

VOC - volatile organic compound

µg/m^3 - micrograms per cubic meter

TO01 - influent sample port to thermal oxidation unit

(1) Includes other organic compounds not listed

ND - not detected

lbs/hr - pounds per hour

scfm - cubic feet per minute

Table 2-2B
Summary of Influent Soil Gas Analytical Results - 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Sample ID	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**	**TO01**			**GAC01**	**GAC01**
Sample Date	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Flow, scfm	437	447	457	487	498	469	431	447			567	522
VOC, lbs/hr	0.09	0.05	0.05	0.08	0.09	0.12	0.12	0.22			0.47	0.20
Concentrations in μg/m^3									Not Available			
Benzene	94	67	ND	88	161	128	91	312			840	340
Carbon disulfide	2,530	1,189	965	1,534	1,376	1,363	1,952	9,411			20,000	3,400
Chlorobenzene	129	ND	ND	ND	289	437	ND	1,160			1,600	560
Chloroform	1,090	569	442	672	1,081	1,124	935	1,521			1,900	1,100
1,2-Dichlorobenzene	842	601	691	ND	563	3,824	2,838	6,665			11,000	5,000
1,4-Dichlorobenzene	ND	108	ND	ND	ND	ND	ND	582			960	390
1,2-Dichloroethane	5,466	2,806	2,579	4,373	5,993	5,709	4,899	7,345			8,000	10,000
Ethylbenzene	2,874	1,717	1,700	2,640	2,835	3,850	3,889	6,991			10,000	4,500
Methylene Chloride	771	1,358	406	392	736	455	476	980			2,700	890
4-Methyl-2-pentanone	150	ND	ND	ND	ND	ND	ND	ND			ND	ND
Tetrachloroethene	1,668	1,126	1,912	2,095	3,343	3,859	3,024	3,280			3,500	2,400
Toluene	8,843	4,741	3,989	7,789	7,074	7,676	7,337	17,065			31,000	15,000
Trichloroethene	1,688	919	876	1,596	2,542	2,639	1,989	2,762			3,200	4,100
Xylene (m&p)	12,573	6,677	8,324	10,969	9,408	14,654	19,206	31,459			51,000	24,000
Xylene (o)	8,888	4,465	5,419	6,807	5,940	11,099	13,656	19,225			31,000	15,000
Total Xylenes	21,460	11,142	13,743	17,775	15,347	25,752	32,862	50,684			82,000	39,000
Total VOCs(1)	55,630	32,560	31,236	43,720	46,349	67,450	73,155	129,156			219,360	100,862

Notes:

VOC - volatile organic compound
μg/m^3 - micrograms per cubic meter
TO01 - influent sample port to thermal oxidation unit
GAC01 - influent sample port to granular activated carbon units
(1) Includes other organic compounds not listed

ND - not detected
lbs/hr - pounds per hour
scfm - cubic feet per minute

Not Available - TOU shutdown and transition to GAC units.

Table 2-3A
2014 Effluent Compliance of Dual Phase Extraction/Soil Vapor Extraction System with Permit Requirements
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Sample ID Sample Date	Permit Requirements [1]	TO02 Jan-14	TO02 Feb-14	TO02 Mar-14	TO02 Apr-14	TO02 May-14	TO02 Jun-14	TO02 Jul-14	TO02 Aug-14	TO02 Sep-14	TO02 Oct-14	TO02 Nov-14	TO02 Dec-14
Benzene	1.00E-02	1.57E-06	0	0	0	2.44E-06	0	0	1.57E-06	0	0	0	0
Carbon disulfide	2.28E-02	0	0	0	0	0	0	0	2.26E-05	0	0	0	0
1,4-Dichlorobenzene	6.85E-02	0	0	0	0	0	0	0	0	0	0	0	0
1,2-Dichloroethane	1.00E-02	0	0	0	0	0	0	0	0	0	0	0	0
Ethylbenzene	2.28E-01	0	0	0	0	3.26E-06	0	0	0	0	0	0	0
Methylene Chloride	2.28E-01	0	0	0	0	3.46E-05	1.08E-05	3.45E-06	0	4.16E-06	0	2.53E-06	0
4-Methyl-2-pentanone	2.28E-01	0	0	0	0	0	0	0	0	0	0	0	0
Tetrachloroethene	1.00E-02	0	0	0	0	0	0	0	0	0	0	0	0
Toluene	2.28E-01	4.75E-06	1.40E-06	2.61E-06	1.66E-06	6.76E-05	3.22E-06	2.87E-06	8.21E-06	1.74E-06	0	0	0
Trichloroethene	1.00E-02	0	0	0	0	0	0	0	0	0	0	0	0
Xylene (m&p)	2.28E-01	0	0	7.45E-06	0	6.92E-06	0	0	0	0	0	0	0
Xylene (o)	2.28E-01	0	0	2.42E-06	0	3.05E-06	0	0	0	0	0	0	0
VOC, lbs/hr	5.00E-02	1.18E-04	3.56E-05	1.18E-04	4.23E-05	6.93E-04	1.08E-04	2.34E-04	4.81E-04	1.51E-04	7.54E-05	1.45E-04	8.57E-05
VOC Control Efficiency for TOU, %	>99.5	99.9	100	99.9	100	99.7	100	99.9	99.8	100	100	99.9	99.9

Notes:

All results are in pounds per hour

0 - not detected

TO02 - Sample port after the thermal oxidation unit (TOU)

[1] From NJAC 7:27-8 App 1

value — indicates exceedance of the permit requirements

Table 2-3B
2015 Effluent Compliance of Dual Phase Extraction/Soil Vapor Extraction System with Permit Requirements
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Sample ID / **Sample Date**	**Permit Requirements** [1]	**TO02** Jan-15	**TO02** Feb-15	**TO02** Mar-15	**TO02** Apr-15	**TO02** May-15	**TO02** Jun-15	**TO02** Jul-15	**TO02** Aug-15	Sep-15	Oct-15	**GAC02** Nov-15	**GAC02** Dec-15
Benzene	1.00E-02	0	0	0	0	0	0	0	2.19E-06			0	0
Carbon disulfide	2.28E-02	0	0	0	0	0	0	0	8.34E-06			0	3.91E-05
1,4-Dichlorobenzene	6.85E-02	0	0	0	0	0	0	0	3.52E-07			0	0
1,2-Dichloroethane	1.00E-02	0	0	0	0	0	0	0	0			0	0
Ethylbenzene	2.28E-01	0	0	0	0	0	0	0	8.71E-07			0	0
Methylene Chloride	2.28E-01	1.60E-05	1.37E-05	0	0	0	5.45E-06	0	0			0	1.90E-03
4-Methyl-2-pentanone	2.28E-01	0	0	0	0	0	0	0	0			0	0
Tetrachloroethene	1.00E-02	0	0	0	0	0	0	0	1.36E-06			0	0
Toluene	2.28E-01	3.77E-06	3.85E-06	2.91E-06	4.56E-06	0	3.52E-06	9.21E-06	4.03E-06			0	0
Trichloroethene	1.00E-02	0	0	0	0	0	0	0	4.14E-07			0	0
Xylene (m&p)	2.28E-01	0	0	0	0	0	0	0	3.56E-06			4.89E-06	0
Xylene (o)	2.28E-01	0	0	0	0	0	0	0	1.38E-06			1.98E-06	0
VOC, lbs/hr	5.00E-02	2.53E-04	1.32E-04	2.64E-05	4.75E-05	8.02E-05	3.04E-04	1.85E-04	7.94E-05			4.38E-04	2.44E-03
VOC Control Efficiency for TOU, %	>99.5	99.7	99.8	100	99.9	99.9	99.7	99.8	100				
VOC Control Efficiency for GAC, %	>95											99.9	98.8

Notes:
All results are in pounds per hour
0 - not detected
TO02 - Sample port after the thermal oxidation unit (TOU)
GAC02 - Sample port after the granular activated carbon units.
[1] From NJAC 7:27-8 App 1
Not Available - TOU shutdown and transition to GAC units.
value indicates exceedance of the permit requirements

Table 2-4
Estimated Mass of Organic Contaminants of Concern of Groundwater and Soil Vapor Extracted
Compared with Estimated Mass in Landfill
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Estimated Mass Extracted						Ranges of Estimated Total Mass in Landfill [1,2]		Total Mass Extracted as Percent of Estimated Totals	
	1993 - 1998[3]	1999-2008[4]	2009-2013 [6]	2014 [6]	2015 [6]	Total	Mean	95% UCL	Mean	95% UCL
Methylene Chloride	1,564	2,925	65	5.5	3.1	4,562	2,566	4,709	178	97
Chloroform	2	85	43	7.4	3.9	141	617	894	23	16
Benzene	1,262	2,657	78	1.0	0.6	3,998	741	1,134	540	353
1,2-Dichloroethane	5,853	9,371	682	41	23	15,970	3,684	5,860	434	273
4-Methyl-2-pentanone	1,096	62	20	0.4	0.1	1,178	2,237	3,528	53	33
Toluene	15,782	74,204	7,838	103	37	97,963	49,773	80,726	197	121
Chlorobenzene	2	452	24	1.2	1.1	480	NA	NA	NA	NA
Ethylbenzene	1,485	8,049	1,226	46	14	10,820	10,283	18,484	105	59
Xylenes (total)	5,570	55,602	10,718	374	101	72,365	71,381	119,734	101	60
Phenol	1,044	1,115	NA	NA	NA	2,159	3,487	5,406	62	40
Bis(2-Chloroethyl)ether	3,500	1,692	NA	NA	NA	5,192	5,778	8,948	90	58
Total Organic COCs	37,160	156,212	20,694	580	183	214,829	150,547	249,423	143	86
BTEX[5]	24,099	140,511	19,860	525	152	185,146	132,178	220,078	140	84
Non-BTEX COCs[6]	13,061	15,701	834	56	31	29,683	18,369	29,345	162	101

Notes:

All contaminant mass results are shown in kilograms.

Soil gas samples were not collected in 2005. Sample results from January 2006 were used to calculate mass removal.

[1]calculated based on 1992-93 groundwater quality data within the containment system prior to start of flushing in 1993

[2]range of estimated mass includes mean estimated mass to upper 95% confidence limit, as reported in the Baseline Soil Study (CDM 1987)

[3]estimated mass extracted through water flushing only

[4]estimated mass extracted through water flushing and soil gas extraction

[5]BTEX consists of benzene, toluene, ethylbenzene, and total xylenes

[6]estimated mass extraction through soil gas extraction only

NA - not available

ND - not detected

COC - contaminant of concern

UCL - upper confidence limit

Table 2-5
Organic Contaminant of Concern Sample Results in 2014 and 2015 from Selected Extraction Wells
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	E-17B 9/10/2014	E-17B 10/5/2015*	PW-1A 9/10/2014	PW-1A 9/14/2015	PW-2 9/10/2014	PW-2 9/14/2015	E-13A 9/14/2015
1,2-Dichloroethane	99	6.6	27	2.5 U	0.50 U	0.78 J	0.50 U	1.2
4-Methyl-2-Pentanone	NS	25 U	5.0 U	25 U	5.0 UJ	20 U	5.0 U	5.0 U
Benzene	71	5.8	6	26	36	**170**	**72**	6.3
bis(2-Chloroethyl)ether	1.4	**640**	**190**	**440**	**500**	**480**	**320**	**380**
Chlorobenzene	21,000	79 J-	130	270	450	96	58	330
Chloroform	470	2.5 U	0.64	2.5 U	0.50 U	2.0 U	0.50 U	0.50 U
Ethylbenzene	29,000	25	61	6.2 J+	2.1	53 J+	4.2	0.79
Methylene Chloride	1,600	2.5 U	0.50 U	2.5 U	0.50 U	2.0 U	0.73	0.50 U
Phenol	4,600,000	5.0 U	10 U	5.0 U	10 U	5.0 U	10 U	10 U
Toluene	200,000	66	0.88 U	2.5 U	0.50 U	250	1.2	0.50 U
Xylenes (total)	NS	500	51	2.5 U	0.62	210	22	0.38 J

<u>**Notes:**</u>
All results are in microgram per liter.
Bold figures indicate exceedance of the cleanup criteria.
J - estimated concentration.
J+ - estimated concentration that is biased high.
J- - estimated concentration that is biased low.
U - not detected at the specified reporting limit.

NS - Not specified

*Sample for bis(2-Chloroethyl)ether and Phenol collected on 9/14/2015.

Table 2-6
bis(2-Chloroethyl)ether Concentrations in Individual Extraction Wells (2008-2015)
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well No.	Well Locations	BCEE Concentrations in µg/L							
		2008	2009	2010	2011	2012	2013	2014	2015
E-1A	East Header	NS	NS	NS	NS	NS	NS	NS	NS
E-2A	East Header	NS	NS	NS	NS	NS	NS	NS	NS
E-3A	East Header	44	NS	NS	NS	NS	NS	NS	NS
E-4A	East Header	330	NS	NS	NS	NS	NS	NS	NS
E-5A	East Header	4	8.8	17	21	NS	NS	NS	NS
E-6A	Middle Header, south	1,000	NS	NS	NS	NS	NS	NS	NS
E-7A	Middle Header, center	1,000	NS	NS	NS	NS	NS	NS	NS
E-8A	Middle Header, center	450	NS	NS	NS	NS	NS	NS	NS
E-9A	Middle Header, center	720	NS	NS	NS	NS	NS	NS	NS
E-10A/B	Middle Header, north	***1,200***	***2,200***	1,200	***1,300***	NS	NS	NS	NS
E-11A/B	Middle Header, north	710	NS	NS	NS	NS	NS	NS	NS
E-12A	Middle Header, north	270	NS	NS	NS	NS	NS	NS	NS
E-13A	West Header, south	***2,500***	***3,300***	NS	NS	NS	NS	NS	***380***
E-14A/B	West Header, south	550	NS	NS	NS	NS	NS	NS	NS
E-15A/B	West Header, center	490	NS	NS	NS	NS	NS	NS	NS
E-16A/B	West Header, center	1,300 U	NS	NS	NS	NS	NS	NS	NS
E-17A/B	West Header, center	***2,300***	***4,800***	***5,900***	***1,700***	***1,200***	***620***	***640***	190
E-18A/B	West Header, center	760	NS	NS	NS	NS	NS	NS	NS
E-19A/B	West Header, center	***1,500***	NS	NS	NS	NS	NS	NS	NS
E-20A/B	West Header, north	***1,700***	NS	NS	NS	NS	NS	NS	NS
E-21A/B	West Header, north	***1,600***	NS	NS	NS	NS	NS	NS	NS
E-22A/B	West Header, north	***2,100***	NS	NS	NS	NS	NS	NS	NS
E-23	Middle Header, south	***1,400***	NS	NS	NS	NS	NS	NS	NS
E-24B	West Header, north	***3,100***	NS	NS	NS	NS	NS	NS	NS
PW-01A	Middle Header, south	360	360	300	240	300	380	440	***500***
PW-02	Middle Header, north	***1,400***	2,100	***1,900***	***1,200***	***930***	***530***	480	***320***
	Maximum	**3,100**	**4,800**	**5,900**	**1,700**	**1,200**	**620**	**640**	**500**
	Average	**1,108**	**2,128**	**1,863**	**892**	**810**	**510**	**520**	**348**
	Median	**1,000**	**2,150**	**1,200**	**1,200**	**930**	**530**	**480**	**350**

Notes:

NS - not sampled

µg/L - microgram per liter

U - not detected at the listed detection limit

Bold Italic indicates wells with above average BCEE concentrations

Bold indicates wells with above median BCEE concentrations

Table 2-7
MW-K8 and V-5 (2009-2015) and Mt. Laurel Well Sample Results
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	MWK-8							V-5							GWQS[1]	DWS[2]	Mt. Laurel Well[3]	
		2009	2010	2011	2012	2013	2014	2015	2009	2010	2011	2012	2013	2014	2015			2014	2015
Organics																			
1,2- Dichloroethane	99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.3/2 (a)	2 (c)	0.5 U	0.25 U
4-Methyl-2-pentanone	NS	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	NA	NS	NS	NA	NA
Benzene	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.2/1 (a)	1 (c)	0.5 U	0.25 U
bis(2-Chloroethyl)ether	1.4	0.1 U	0.027 J	0.54 U	0.05 U	0.05 U	0.05 U	0.025 U	0.1 U	0.05 U	0.82 U	0.05 U	0.05 U	0.025 U	0.025 U	0.03/7 (a)	NS	0.1 U	0.01 U
Chlorobenzene	21,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	50	50 (c)	0.5 U	0.5 U
Chloroform	470	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.24 J	0.5 U	NA	70	80 (b)	NA	NA
Ethylbenzene	29,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	700	700 (b)	0.5 U	0.25 U
Methylene Chloride	1,600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	3	3 (c)	0.5 U	0.5 U
Phenol	4,600,000	5 U	5 U	5 UJ	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	NA	2,000	NS	NA	NA
Toluene	200,000	0.5 U	0.059 J	0.5 U	0.5 U	0.5 U	0.15 J	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	600	1,000 (b)	0.5 U	0.25 U
Xylenes (total)	NS	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	1,000	1,000 (c)	NA	0.25 U
Metals																			
Arsenic	ND*	10 U	10 U	10 U	10 U	**4.7**	**3.4**	1 U	10 U	10 U	10 U	10 U	1 U	**1.1**	1 U	NA	NA	NA	NA
Chromium	180	48.1	91.5	46.2	17.3	**1,130**	**360**	7.8	32.7	11.2	7.8 J	9.2 J	**251**	31.2	43	NA	NA	NA	NA
Lead	20*	4.4 J	2.2 J	10 U	10 U	10.2	4.1	1.4	3.2 J	10 U	10 U	10 U	1 U	0.3 J	1 U	NA	NA	NA	NA
Mercury	0.15	*0.2 U*	*0.2 U*	**0.18 J**	0.025 J	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	**0.17 J**	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	NA	NA	NA	NA
Nickel	4,600	9.1 J	NA	NA	NA	243	87.2	23.1	17 J	NA	NA	NA	128	22.3	27.1	NA	NA	NA	NA
Selenium	5	*35 U*	NA	NA	NA	5 U	5 U	5 U	*35 U*	NA	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA
Silver	3.4	*10 U*	NA	NA	NA	**27.3**	0.4 J	1 U	*10 U*	NA	NA	NA	**4.6**	0.28 J	0.079 J	NA	NA	NA	NA
Zinc	100	37.9 J	17.1 J	19.3 J	22.4 J	91.2	48.7	**100**	35 J	6.1 J	60 U	60 U	8.8	7.9	6.5	NA	NA	NA	NA

Notes:
*Background results for Kirkwood Aquifer
All results are in microgram per liter.
Bold figures indicate exceedance of cleanup criteria.
Italic indicates reporting limit was greater than cleanup criteria
NA - not analyzed
J - estimated concentration
U - not detected at the listed reporting limit
NS - no standard
1 - New Jersey Groundwater Quality Standards (a = the standard is lower than the laboratory quantitation limit - the first value presented is the standard; the second value is the quantitation limit.)
2 - Drinking Water Standards. (b = National Primary Standard; c = New Jersey Primary Standard)
3 - These samples were also tested for total coliform. There were no positive results for these tests.

Table 2-8
V-6 and V-7 Sample Results (2009-2015)
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	V-6							V-7						
		2009	**2010**	**2011**	**2012(a)**	**2013(a)**	**2014(a)**	**2015(b)**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015(b)**
Organics															
1,2- Dichloroethane	99	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
4-Methyl-2-pentanone	NS	5 U	5 U	5 U	NA	NA	NA		5 U	5 U	5 U	5 U	5 U	5 U	
Benzene	71	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
bis(2-Chloroethyl)ether	1.4	0.1	0.05 UJ	0.54 U	0.1 U	0.02 U	0.025 U	0.025 U	0.15	0.12	0.27	0.05 U	0.05 U	0.025 U	0.025 U
Chlorobenzene	21,000	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Chloroform	470	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Ethylbenzene	29,000	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Methylene Chloride	1,600	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Phenol	4,600,000	5 U	5 U	5 U	NA	NA	NA		5 U	5U	5 U	5 U	5 U	5 U	
Toluene	200,000	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.1 J	0.5 U	
Xylenes (total)	NS	0.5 U	0.5 U	0.5 U	NA	NA	NA		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Metals															
Arsenic	ND*	10 U	**2.7 J**	10 U	NA	NA	NA		10 U	10 U	10 U	10 U	**1.1**	1 U	
Chromium	180	1 J	10 U	1.9 J	NA	NA	NA		21.1	10 U	1.2 J	5.2 J	14.1	5.4	
Lead	20*	10 U	10 U	10 U	NA	NA	NA		1.7 J	10 U	10 U	10 U	1 U	0.31 J	
Mercury	0.15	*0.2 U*	*0.2 U*	*0.2 U*	NA	NA	NA		0.027 J	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	
Nickel	4,600	1 J	NA	NA	NA	NA	NA		10.8 J	NA	NA	NA	12.7	5.6	
Selenium	5	*35 U*	NA	NA	NA	NA	NA		*35 U*	NA	NA	NA	5 U	5 U	
Silver	3.4	*10 U*	NA	NA	NA	NA	NA		*10 U*	NA	NA	NA	1 U	0.92 J	
Zinc	100	13.1 J	4 J	60 U	NA	NA	NA		30.7 J	5.1 J	60 U	2.2 J	7.7	4.6	

Notes:

*Background results for Kirkwood Aquifer
All results are in microgram per liter.
Bold figures indicate exceedance of cleanup criteria.
Italic indicates reporting limit was greater than cleanup criteria
J - estimated concentration
NA - not analyzed
U - not detected at the listed reporting limit
(a) - incorrect location sampled 2012 through 2014. Bis(2-chloroethyl)ether results obtained by USACE sampling through a separate event performed for this parameter only.
(b) - this location was sampled for bis(2-chloroethyl)ether only during the annual sampling event.
The BCEE result for location V-7 under the 2014 column was actually reported from a sample collected in March 2015.

Table 2-9A
Observed Maximum Head Differences Across the Cut-Off Wall - 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well Pair		Maximum Differential Observed			
Interior Well ID	Exterior Well ID	Interior Groundwater	Exterior Groundwater	Head Diff. (feet) (Interior - Exterior)	Dates of Occurrence
C-10A	C-46	El. 104.39	El. 108.06	-3.67	June 17
C-23	C-56	El. 106.62	El. 99.33	7.29	September 12
C-21	C-22A	El. 106.85	El. 100.39	6.46	September 12
E-22A	C-63	El. 108.13	El. 100.58	7.55	August 14
C-17	C-16	El. 104.36	El. 109.65	-5.29	June 17
C-100	C-101	El. 111.30	El. 122.60	-11.30	May 1
C-102	C-101	El. 110.70	El. 122.60	-11.90	May 1
C-15	CDB-4	El. 104.35	El. 121.67	-17.32	June 17
C-25A	C-26A	El. 104.39	El. 113.77	-9.56	June 17

Notes:
- All water level elevations are based on mean sea level as the datum.
- All "Maximum Head Differences" are the interior water level elevations minus the exterior ones at the well pairs.
- Water level data of poor or suspect quality were not considered.
- A positive head difference signifies outflow; a negative indicates inflow.
- Maximum recommended head differential value across the slurry wall per USACE is 22.5' (USACE 1997b)

Table 2-9B
Observed Maximum Head Differences Across the Cut-Off Wall - 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well Pair		Maximum Differential Observed			
Interior Well ID	**Exterior Well ID**	**Interior Groundwater**	**Exterior Groundwater**	**Head Diff. (feet) (Interior - Exterior)**	**Dates of Occurrence**
C-25A	C-46	El. 104.53	El. 107.74	-3.21	June 10
C-23	C-56	El. 107.84	El. 99.01	8.83	November 16
C-17	C-63	El. 109.09	El. 100.28	8.81	August 25
C-17	C-16	El. 105.58	El. 109.37	-3.79	June 10
C-100	C-101	El. 110.67	El. 121.91	-11.24	April 29
C-102	C-101	El. 110.13	El. 121.91	-11.78	April 29
C-15	CDB-4	El. 104.68	El. 120.97	-16.29	June 10
C-25A	C-26A	El. 104.53	El. 114.04	-9.51	June 10

Notes:
- All water level elevations are based on mean sea level as the datum.
- All "Maximum Head Differences" are the interior water level elevations minus the exterior ones at the well pairs.
- Water level data of poor or suspect quality were not considered.
- A positive head difference signifies outflow; a negative indicates inflow.
- Maximum recommended head differential value across the slurry wall per USACE is 22.5' (USACE 1997b)

Table 2-10A
French Drain Sample Results in 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	FD-01 (South Sump) Sep-14	FD-02 (Center Sump) Sep-14	FD-03 (North Sump) Sep-14
Organics				
1,2- Dichloroethane	99	1.7	0.57	1.4
4-Methyl-2-pentanone	NS	5 U	5 U	5 U
Benzene	71	0.5 U	0.5 U	16
bis(2-Chloroethyl)ether	1.4	**10**	**18**	**370**
Chlorobenzene	21,000	0.5 U	0.5 U	0.5 U
Chloroform	470	0.5 U	0.5 U	0.5 U
Ethylbenzene	29,000	0.5 U	0.5 U	0.29 J
Methylene Chloride	1,600	0.5 U	0.5 U	0.5 U
Phenol	4,600,000	5 U	5 U	5 U
Toluene	200,000	0.5 U	0.5 U	0.67
Xylenes (total)	NS	0.5 U	0.5 U	0.43 J
Metals				
Arsenic *	16	1 U	2.5	1 U
Chromium	180	0.99 J	48.9	0.94 J
Lead *	71	1 U	10.5	1 U
Mercury	0.15	*0.2* U	*0.19* J	*0.2* U
Nickel	4,600	1.6 J	49	0.9
Selenium	5	5 U	5 U	5 U
Silver	3.4	1 U	0.084 J	1 U
Zinc	100	19.5 J	**123**	13.3

Notes:
*Background results for Cohansey Aquifer
All results are in microgram per liter
Bold indicates exceedance of cleanup criteria
Italic indicates reporting limit was greater than cleanup criteria
NA - not analyzed
NS - not specified
U - not detected
J - estimated

Table 2-10B
French Drain Sample Results in 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	FD-01 (South Sump) Sep-15	FD-02 (Center Sump) Sep-15	FD-03 (North Sump) Sep-15
Organics				
1,2- Dichloroethane	99	1.9	0.95	0.5 U
4-Methyl-2-pentanone	NS	5 U	5 U	2.1 J
Benzene	71	0.5 U	0.5 U	7
bis(2-Chloroethyl)ether	1.4	**6.9** J	**16**	**220**
Chlorobenzene	21,000	0.5 U	0.55	0.35 J
Chloroform	470	0.5 U	0.5 U	0.5 U
Ethylbenzene	29,000	0.5 U	0.5 U	0.13 J
Methylene Chloride	1,600	0.5 U	0.5 U	0.5 U
Phenol	4,600,000	10 U	10 U	10 U
Toluene	200,000	0.5 U	0.5 U	0.5 U
Xylenes (total)	NS	0.5 U	0.5 U	0.27 J

Notes:

Sampling for metals in French Drains discontinued in 2015.
*Background results for Cohansey Aquifer
All results are in microgram per liter
Bold indicates exceedance of cleanup criteria
Italic indicates reporting limit was greater than cleanup criteria
NA - not analyzed
NS - not specified
U - not detected
J - estimated
J+ - biased high estimate

Table 2-10C
Comparison of French Drain Organic Contaminants of Concern Maximum Concentrations (1996 - 2015)
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Conern	Cleanup Criteria	Highest Concentrations 1996 to 2008	2009	2010	2011	2012	2013	2014	2015
1-2-Dichloroethane	99	560 (FD-03)	2.6 (FD-03)	30.6 (FD-03)	44.6 (FD-03)	32 (FD-03)	5.2 (FD-03)	1.7 (FD-01)	1.9 (FD-01)
4-Methyl-2-pentanone	NS	3,000 (FD-03)	NA	87 (FD-03)	65 (FD-03)	ND	35 (FD-03)	ND	2.1 J (FD-03)
Benzene	71	290 (FD-02)	7 (FD-02)	14.9 (FD-03)	13.6 (FD-03)	16 (FD-03)	6.6 J+ (FD-03)	16 (FD-03)	7 (FD-03)
bis(2-Chloroethyl)ether	1.4	3,200 (FD-03)	**150 (FD-03)**	**186 (FD-03)**	**205 (FD-03)**	**340 (FD-03)**	**140 (FD-03)**	**370 (FD-03)**	**220 (FD-03)**
Chlorobenzene	21,000	270 J (FD-03)	2J (FD-03)	2.8 (FD-03)	1.7 (FD-03)	0.74 (FD-02/03)	1 (FD-03)	ND	0.55 (FD-02)
Chloroform	470	30 (FD-03)	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	29,000	140 (FD-03)	ND	0.11 J (FD-03)	0.14 J (FD-03)	0.29 J (FD-03)	0.11 J (FD-03)	0.29 J (FD-03)	0.13 J (FD-03)
Methylene Chloride	1,600	440 (FD-03)	ND	25.6 (FD-03)	29.3 (FD-03)	26 (FD-03)	6.1 (FD-03)	ND	ND
Phenol	4,600,000	1,210 (FD-03)	ND	24 (FD-03)	17.3 (FD-03)	75 (FD-03)	7.7 J (FD-03)	ND	ND
Toluene	200,000	1,900 (FD-03)	2J (FD-03)	27.3 (FD-03)	26.7 (FD-03)	28 (FD-03)	3.9 (FD-03)	0.67 J (FD-03)	ND
Xylenes (total)	NS	640 (FD-03)	0.8J (FD-03)	0.326 J (FD-03)	0.25 J (FD-03)	ND	0.24 J (FD-03)	0.43 J (FD-03)	0.27 J (FD-03)

Notes:

All results are in microgram per liter.

Bold indicates exceedance of cleanup criteria.

ND - not detected

NS - not specified

NA - not analyzed

(FD-0#) - French Drain sump number

J - estimated

J+ - biased high estimate

Table 2-11A
Interceptor Trench Sample Results in 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	INT 1 (Interceptor Trench A) Sep-14	INT 2 (Interceptor Trench B) Sep-14
Organics			
1,2- Dichloroethane	99	1.9	0.5 U
4-Methyl-2-pentanone	NS	8.9	5 U
Benzene	71	17	6
bis(2-Chloroethyl)ether	1.4	**400**	**140**
Chlorobenzene	21,000	0.5 U	0.5 U
Chloroform	470	0.5 U	0.5 U
Ethylbenzene	29,000	0.3 J	0.5 U
Methylene Chloride	1,600	0.5 U	0.5 U
Phenol	4,600,000	5 U	5 U
Toluene	200,000	0.79	0.5 U
Xylenes (total)	NS	0.45 J	0.5 U
Metals			
Arsenic *	ND	**229**	**10.4**
Chromium	180	132	7.3
Lead *	20	18.4	1.3
Mercury	0.15	**0.47**	*0.2* U
Nickel	4,600	63.3	4.4
Selenium	5	*5* U	*5* U
Silver	3.4	0.23 J	1 U
Zinc	100	**497**	58.7

Notes:
*Background results for Kirwood Aquifer because the trenches collect groundwater from the Kirkwood Aquifer
All results are in microgram per liter
Bold indicates exceedance of cleanup criteria
Italic indicates reporting limit was greater than cleanup criteria
NA - not analyzed
NS - not specified
U - not detected
J - estimated

Table 2-11B
Interceptor Trench Sample Results in 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	INT 1 (Interceptor Trench A) Sep-15	INT 2 (Interceptor Trench B) Sep-15
Organics			
1,2- Dichloroethane	99	0.5 U	0.5 U
4-Methyl-2-pentanone	NS	31	5 U
Benzene	71	18	5.6
bis(2-Chloroethyl)ether □	1.4	**530**	**97**
Chlorobenzene	21,000	0.5 UJ	0.5 U
Chloroform	470	0.5 U	0.5 U
Ethylbenzene	29,000	0.29 J	0.11 J
Methylene Chloride	1,600	0.5 U	0.5 U
Phenol	4,600,000	10 U	10 U
Toluene	200,000	2.1	0.5 U
Xylenes (total)	NS	0.45 J	0.39 J

Notes:
Sampling for metals in Interceptor Trenches eliminated in 2015.
*Background results for Kirwood Aquifer because the trenches collect groundwater from the Kirkwood Aquifer
All results are in microgram per liter
Bold indicates exceedance of cleanup criteria
Italic indicates reporting limit was greater than cleanup criteria
NA - not analyzed
NS - not specified
U - not detected
J - estimated
J+ - biased high estimate

Table 2-12
Onsite Kirkwood Well Sample Results (2009 - 2015)
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	K-31 (Deep)						
		2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Organics								
1,2- Dichloroethane	99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
4-Methyl-2-pentanone	NS	5 U	5 U	5 U	5 UJ	5 U	5 U	
Benzene	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
bis(2-Chloroethyl)ether	1.4	0.1 U	0.12	**4.7 J**	0.05 U	0.071	0.025 U	0.0499
Chlorobenzene	21,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Chloroform	470	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Ethylbenzene	29,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Methylene Chloride	1,600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Phenol	4,600,000	5 U	5 U	5 U	5 U	5 U	5 U	
Toluene	200,000	0.5 U	0.079 J	0.97	0.5 U	0.5 U	0.5 U	
Xylenes (total)	NS	0.5 U	0.5 U	0.5 J	0.5 U	0.5 U	0.5 U	
Metals								
Arsenic	ND*	10 U	10 U	10 U	10 U	**1.9**	**1.5**	1 U
Chromium	180	9.4 J	8.3 J	10 U	2.2 J	5.8	6.5	1.2 J
Lead	20*	10	10 U	10 U	10 U	1 U	0.37 J	1 U
Mercury	0.15	*0.2 U*	*0.2 U*	**0.19 J**	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*
Nickel	4,600	5.5 J	NA	NA	NA	7.1	4.9	4.6
Selenium	5	*35 U*	NA	NA	NA	5 U	5 U	5 U
Silver	3.4	*10 U*	NA	NA	NA	1 U	1 U	1 U
Zinc	100	22.1 J	12.6 J	60 U	60 U	8.8	14.7	25.9

Notes:
*Background results for Kirkwood Aquifer
All results are in microgram per liter.
Bold figures indicate exceedences of cleanup criteria.
Italic indicates reporting limit was greater than cleanup criteria.
ND - not detected
NA - not analyzed
Analysis for all organic compounds but BCEE was discontinued in 2015.
J - estimated concentration
U - not detected at the listed reporting limit

Table 2-13
Offsite Kirkwood Well Sample Results (2009 to 2015)
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Contaminants of Concern	Cleanup Criteria	Well K-7							Well K-8						
		2009	2010	2011	2012	2013	2014	2015	2009	2010	2011	2012	2013	2014	2015
Organics															
1,2- Dichloroethane	99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
4-Methyl-2-pentanone	NS	5 U	5 U	5 U	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U	
Benzene	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
bis(2-Chloroethyl)ether	1.4	0.32	0.05 U	**2.2 J**	0.22	0.26	0.05 U	0.112	0.1 U	5 U	0.05 U	0.25	0.05 U	0.05 U	0.025 U
Chlorobenzene	21,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Chloroform	470	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Ethylbenzene	29,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Methlyene Chloride	1,600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Phenol	4,600,000	5 U	5 U	5 U	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U	
Toluene	200,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Xylenes (total)	NS	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Metals															
Arsenic	ND*	10 U	10 U	10 U	10 U	1 U	1 U	1 U	**6.1 J**	**4.1 J**	10 U	10 U	**2.4**	**3.3**	**1.3**
Chromium	180	0.76 J	10 U	10 U	10 U	2.8	1.9 J	0.59 J	2.5 J	10 U	1.1 J	10 U	10.2	7.3	0.53 J
Lead	20*	10 U	10 U	10 U	10 U	1 U	0.89 J	1 U	10 U	10 U	10 U	10 U	1 U	0.25 J	1 U
Mercury	0.15	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	0.2 U	0.05 J	*0.2 U*	*0.2 U*	0.077 J	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*
Nickel	4,600	40 U	NA	NA	NA	3.1	1.5	1.8	1.8 J	NA	NA	NA	10.7	5	1.8
Selenium	5	*35 U*	NA	NA	NA	5 U	5 U	5 U	*35 U*	NA	NA	NA	5 U	5 U	5 U
Silver	3.4	*10 U*	NA	NA	NA	1 U	0.1 J	1 U	*10 U*	NA	NA	NA	**8.5**	0.4 J	0.077 J
Zinc	100	24.4 J	12.8 J	60 U	60 U	12.8	8.3	19.8	21 J	2.3 J	60 U	60 U	15.5	6.9	2 U

Notes:

*Background results for Kirkwood Aquifer

All results are in microgram per liter.

Bold figures indicate exceedance of cleanup criteria.

Italic imdicates reporting limit was greater than cleanup criteria.

ND - not detected

NS - not specified

NA - not analyzed

Analysis for all organic compounds but BCEE was discontinued in 2015.

J - estimated concentration

U - not detected at the listed reporting limit

Table 2-14

Monthly Offsite Collection System and Discharge to GCUA Volumes - 2014 and 2015

Lipari Landfill Superfund Site

Gloucester County, New Jersey

DATE	FRENCH DRAIN (1) (gallons)	INTERCEPTOR TRENCH (2) (gallons)	C-29 AREA DRAIN (2) (gallons)	TOTAL	DISCHARGE TO GCUA (2) (gallons)
2014					
January	492,514	361,736	Shutdown	854,250	853,995
February	530,216	352,564	Shutdown	882,780	927,674
March	445,322	438,598	Shutdown	883,920	892,593
April	458,966	419,294	Shutdown	878,260	892,762
May	465,261	433,329	Shutdown	898,590	978,221
June	452,244	403,426	Shutdown	855,670	810,193
July	346,154	405,746	Shutdown	751,900	828,253
August	379,728	390,182	Shutdown	769,910	846,959
September	337,469	376,941	Shutdown	714,410	792,625
October	348,779	389,671	Shutdown	738,450	758,541
November	396,842	377,478	Shutdown	774,320	815,755
December	487,715	396,025	Shutdown	883,740	920,107
2015					
January	495,567	398,813	Shutdown	894,380	962,368
February	372,951	360,439	Shutdown	733,390	744,909
March	505,390	433,550	Shutdown	938,940	978,845
April	396,096	421,734	Shutdown	817,830	852,825
May	340,312	418,248	Shutdown	758,560	802,060
June	352,942	395,338	Shutdown	748,280	784,538
July	352,019	422,451	Shutdown	774,470	775,454
August	287,901	412,689	Shutdown	700,590	782,714
September	279,690	391,710	Shutdown	671,400	679,743
October	369,023	416,567	Shutdown	785,590	799,501
November	301,340	408,450	Shutdown	709,790	717,594
December	393,755	410,275	Shutdown	804,030	826,744
2009 Total	10,452,082	4,615,763	0	15,067,845	16,230,895
2010 Total	11,788,871	4,379,719	0	16,168,590	17,479,530
2011 Total	11,604,628	4,442,202	0	16,046,830	16,610,869
2012 Total	4,697,541	4,558,429	0	9,255,970	9,542,623
2013 Total	5,104,660	4,573,640	0	9,678,300	10,116,208
2014 Total	5,141,210	4,744,990	0	9,886,200	10,317,678
2015 Total	4,446,986	4,890,264	0	9,337,250	9,707,295

Notes:

GCUA - Gloucester County Utilities Authority

1. French Drain volume is calculated by Sevenson and provided in Sevenson Monthly Reports; other volumes were metered.
2. Data from Monthly Reports provided by Sevenson. C-29 Area system was shutdown on 10/2/03.

Table 2-15
Surface Water Sample Results in 2014 and 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Chemical	Cleanup Criteria	SW01		SW05		SW06		SW07	
		2014	2015	2014	2015	2014	2015	2014	2015
Organics									
1,2-Dichloroethane	99	0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	NS	5 U		5 U		5 U		5 U	
Benzene	71	0.5 U		0.5 U		0.5 U		0.5 U	
Bis(2-Chloroethyl) ether	1.4	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Chlorobenzene	21,000	0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	470	0.5 U		0.5 U		0.5 U		0.5 U	
Ethylbenzene	29,000	0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	1,600	0.5 U		0.5 U		0.5 U		0.5 U	
Phenol	4,600,000	5 U		5 U		5 U		5 U	
Toluene	200,000	0.5 U		0.5 U		0.5 U		0.5 U	
m-Xylene & p-Xylene	NS	0.5 U		0.5 U		0.5 U		0.5 U	
o-Xylene	NS	0.5 U		0.5 U		0.5 U		0.5 U	
Metals									
Arsenic	ND*	1 U		1 U		1 U		1 U	
Chromium	180	0.99 J		1.2 J		1.4 J		1.5 J	
Lead	3.9*	0.81 J		0.84 J		0.81 J		0.89 J	
Mercury	0.15	*0.2 U*		*0.2 U*		*0.2 U*		*0.2 U*	
Nickel	4,600	1.9		2		1.8		2.2	
Selenium	5	5 U		5 U		5 U		5 U	
Silver	3.4	1 U		1 U		1 U		1 U	
Zinc	100	10		10.9		9.5 J		19.6	

Notes:
*Background results for surface water
All units are in microgram per liter.
Bold indicates an exceedance of cleanup criteria.
Italic indicates reporting limit was greater than cleanup criteria.
NS - not specified
ND - not detected
NA - not analyzed
Analysis for metals and all organic compounds but BCEE was discontinued in 2015.
J - estimated concentration
U - not detected at the listed reporting limit

Table 2-16
Offsite Sentinel Well Sample Results in 2014 and 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Chemical	Cleanup Criteria	SA-63B		SA-64B		SA-65B		SA-66B	
		2014	**2015**	**2014**	**2015**	**2014**	**2015**	**2014**	**2015**
Organics									
1,2-Dichloroethane	99	0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	NS	5 U		5 U		5 U		5 U	
Benzene	71	0.5 U		0.5 U		0.5 U		0.5 U	
Bis(2-Chloroethyl) ether	1.4	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Chlorobenzene	21,000	0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	470	0.5 U		0.5 U		0.5 U		0.5 U	
Ethylbenzene	29,000	0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	1,600	0.5 U		0.5 U		0.13 J		0.5 U	
Phenol	4,600,000	5 U		5 U		5 U		5 U	
Toluene	200,000	0.5 U		0.5 U		0.5 U		0.5 U	
m-Xylene & p-Xylene	NS	0.5 U		0.5 U		0.5 U		0.5 U	
o-Xylene	NS	0.5 U		0.5 U		0.5 U		0.5 U	
Metals									
Arsenic	ND*	1 U	1 U	**2**	**1.8**	**4.6**	**5**	**1.2**	**2**
Chromium	180	2.7	5.2	32.2	7.9	10.2	25.9	5.7	7.9
Lead	20	0.29 J	1.7	6.6	6.4	5.2	8.7	1.9	2.4
Mercury	0.15	*0.2* U	0.05 J	0.034 J	0.09 J	0.015 J	*0.2* U	*0.2* U	*0.2* U
Nickel	4,600	2	5.4	28.5	3.2	9.6	13.3	5.2	5.4
Selenium	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	3.4	1 U	0.049 J	0.044 J	1 U	0.079 J	0.13 J	1 U	1 U
Zinc	100	37.1	76.7	**211**	**121**	**127**	**128**	46.2	32.8

Notes:
*Background results for Kirkwood aquifer.
All units are in microgram per liter.
Bold indicates an exceedance of cleanup criteria.
Italic indicates reporting limit was greater than cleanup criteria.
NS - not specified
ND - not detected
Analysis for all organic compounds but BCEE was discontinued in 2015.
J - estimated concentration
U - not detected at the listed reporting limit

Table 2-17A
Effluent Concentrations vs. Discharge Permit Limits - 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Chemical	Unit	Effluent Concentration [1]												GCUA Monthly Average Discharge Limit
		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	
Flow	gpd	27,548	33,131	28,793	29,759	31,556	27,006	26,718	27,321	26,421	24,469	27,192	29,681	Report Only
BOD_5	mg/L	3.0 U	3.0 U	3.0 U	3.0 U	8.0	3.0 U	3.0 U	8.0	4.0	7.0	3.0 U	3.0 U	2,100
TSS	mg/L	10	43	10 U	81	16	12	8.0	8.0	9.0	9.0	9.0	7.0	600
Ammonia	mg/L	1.4	1.3	1.8	1.1	0.70	0.91	0.94	0.77	0.63	0.42	1.1	0.77	100
Oil and Grease	mg/L	1.0 U	1.0 U	1.0 U	0.30 J	0.30 J	0.59 J	1.0 U	1.0 U	1.0 U	0.30 J	1.0 U	1.0 U	100
TTO[2]	mg/L	0.12	0.13	0.18	0.14	0.14	0.053	0.004	ND	ND	ND	0.018	0.082	Report Only
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	TTO [2]
1,2-Dichloroethane	µg/L	1.0 U	5.4	1.0 U	7.2	1.0 U	1.0 U	3.7	1.0 U	1.0 U	1.0 U	2.7	1.0 U	TTO [2]
bis(2-Chloroethyl)ether	µg/L	120	120	180	130	140	53	10 U	10 U	10 U	10 U	15	82	TTO [2]
Toluene	µg/L	1.0 U	0.61 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	TTO [2]
Xylenes	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	N/A
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	TTO [2]
Zinc	µg/L	14.9 J	5.2 J	6.7 J	12.6 J	15.7 J	39.5 J	11.9 J	12.6 J	9.0 J	10.3 U	23.4 J	28.2 J	1,800 [3]
Iron	µg/L	4,480	3,910	3,180	3,610	7,410	4,590	3,820	4,370	3,630	4,130	4,320	4,210	Report Only

Notes:

[1] Effluent data taken from quarterly CDIRs provided by Cabrera (sample ET01)

[2] TTO = Total Toxic Organics (Report Only) include benzene, 1,2-dichloroethane, bis(2-chloroethyl)ether, toluene, and ethylbenzene.

[3] The actual permit limit was in mass base; 1,800 µg/L was used to derive the mass based limit based on a discharge flow rate of 288,000 gallons per day.

N/A - not applicable or not specified
GCUA - Gloucester County Utilities Authority
TSS - total suspended solid
BOD_5 - 5-day biochemical oxygen demand
ND - not detected

gpd - gallon per day
mg/L - milligram per liter
µg/L - microgram per liter
U - not detected
J - estimated

Table 2-17B
Effluent Concentrations vs. Discharge Permit Limits - 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Chemical	Unit	Effluent Concentration [1]												GCUA Monthly Average Discharge Limit
		Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	
Flow	gpd	31,044	26,604	31,576	28,428	25,873	26,151	25,015	25,249	22,658	25,790	23,920	26,669	Report Only
BOD_5	mg/L	3.0 UJ	3.0 U	3.0 U	3.0 UJ	3.0 U	3.0 UJ	3.0 UJ	5.1	2.2 J	1.8 J	1.9 J	1.9 J	2,100
TSS	mg/L	4.0 J	7.0	10	13	4.0 J	3.0 J	22	13	10	10	11	12	600
Ammonia	mg/L	0.77	2.6	1.1	1.4	1.1	0.98	0.70	0.82	0.81	1.1	0.55	0.57	100
Oil and Grease	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	100
TTO[2]	mg/L	0.17 J	0.14	0.18	0.18	0.13	0.074	0.098	0.13	0.064	0.18	0.20	0.12	Report Only
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.7	0.84 J	1.0 U	1.1 J	1.3 J	0.50 J	TTO [2]
1,2-Dichloroethane	µg/L	1.0 U	4.9	6.4	6.8	1.0 U	1.0 U	1.0 U	0.84 J	1.0 U	1.0 U	0.63 J	0.58 J	TTO [2]
bis(2-Chloroethyl)ether	µg/L	170 J	130	170	170	130	74	96	130	64	180	200	120	TTO [2]
Toluene	µg/L	1.0 U	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.28 J	1.0 U	0.44 UJ	1.0 U	1.0 U	TTO [2]
Xylenes	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	N/A
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	TTO [2]
Zinc	µg/L	18.2 J	36.2 J	33.4 J	28.4 J	25.6 J	22.0 J	27.1 J	33	30	12 J	20	14 J	1,800 [3]
Iron	µg/L	2,770	3,540	4,940	4,190	3,470	2,450	10,000	6,600	3,700	3,200	4,900	5,700	Report Only

Notes:

[1] Effluent data taken from quarterly CDIRs provided by Cabrera (sample ET01)

[2] TTO = Total Toxic Organics (Report Only) include benzene, 1,2-dichloroethane, bis(2-chloroethyl)ether, toluene, and ethylbenzene.

[3] The actual permit limit was in mass base; 1,800 µg/L was used to derive the mass based limit based on a discharge flow rate of 288,000 gallons per day.

N/A - not applicable or not specified
GCUA - Gloucester County Utilities Authority
TSS - total suspended solid
BOD_5 - 5-day biochemical oxygen demand
ND - not detected
gpd - gallon per day
mg/L - milligram per liter
µg/L - microgram per liter
U - not detected
J - estimated

Table 2-18
Mass of Offsite Collection System COC Organics Discharged - 2014 and 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Month	Volume Discharged (gallon)				Concentration (µg/L)			Mass Discharged (kg)		
	FD01	FD02	FD03	Total	FD01	FD02	FD03	FD01	FD02	FD03
2014										
January	158,950	81,440	613,860	854,250						
February	155,500	78,910	648,370	882,780						
March	161,680	83,930	638,310	883,920						
April	159,370	86,730	632,160	878,260						
May	170,230	92,340	636,020	898,590						
June	197,220	70,080	588,370	855,670						
July	145,880	75,880	530,140	751,900						
August	147,590	74,450	547,870	769,910	11.7	18.57	388.79	0.08223	0.06764	10.380
September	137,630	73,970	502,810	714,410						
October	141,450	74,640	522,360	738,450						
November	135,840	74,920	563,560	774,320						
December	148,040	96,360	639,340	883,740						
2015										
January	148,070	104,720	641,590	894,380						
February	133,180	90,490	509,720	733,390						
March	134,250	124,660	680,030	938,940						
April	121,110	118,550	578,170	817,830						
May	111,620	126,680	520,260	758,560						
June	96,260	117,330	534,690	748,280						
July	148,370	94,980	531,120	774,470						
August	138,760	86,970	474,860	700,590	8.8	17.5	229.85	0.05215	0.08075	5.690
September	130,610	81,430	459,360	671,400						
October	139,830	95,780	549,980	785,590						
November	131,480	85,350	492,960	709,790						
December	134,240	93,750	576,040	804,030						

Total Mass Extracted - 2014 10.530 kg

Total Mass Extracted - 2015 5.823 kg

FD01 = South French Drain
FD02 = Center French Drain
FD03 = North French Drain (including Interceptor Trench)
µg/L = microgram per liter
kg = kilogram
= includes an estimated value, J

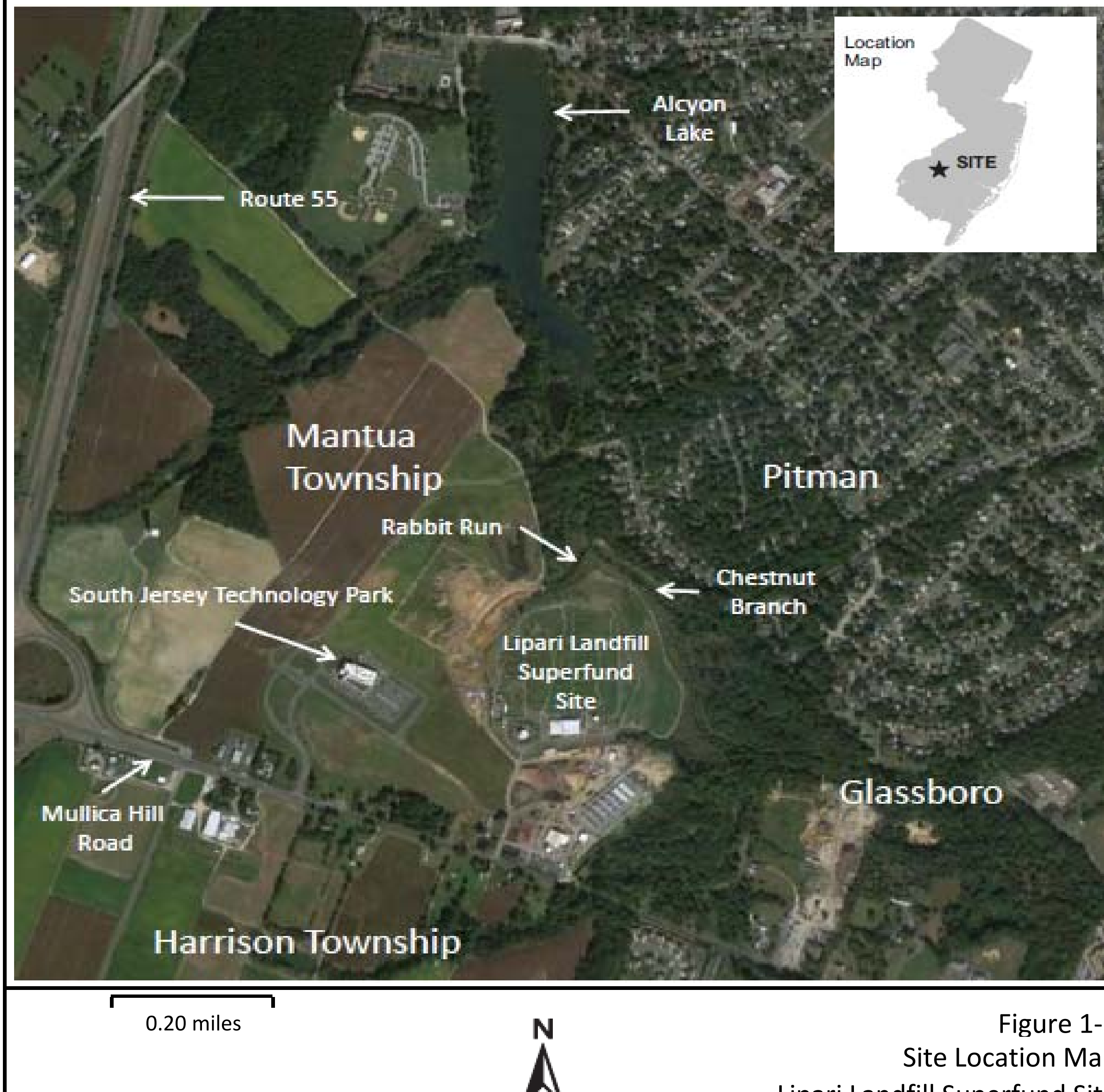


Figure 1-1
Site Location Map
Lipari Landfill Superfund Site
Gloucester County, New Jersey

USACE

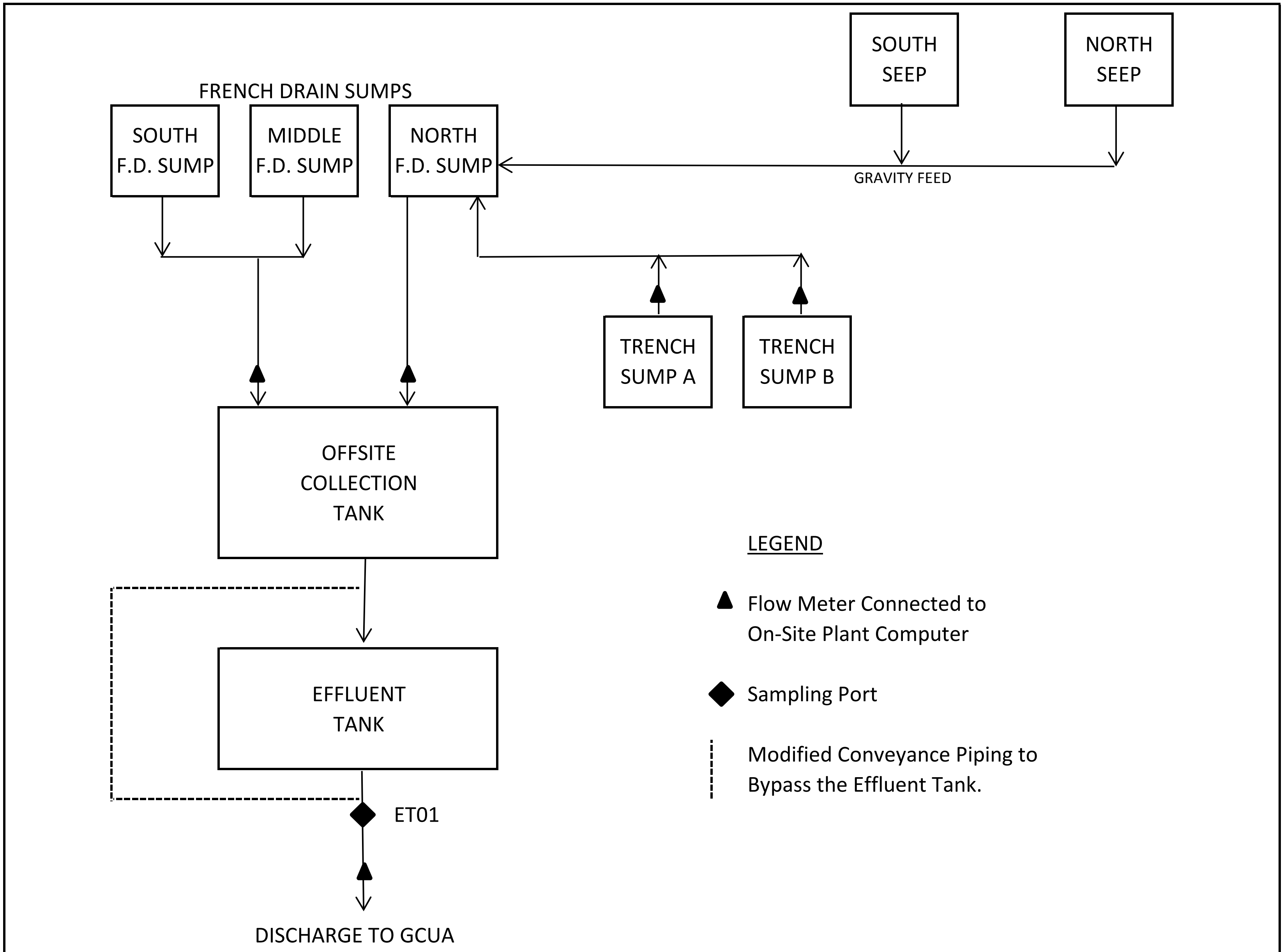


Figure 1-2
Schemtaic Flow Diagram of the Current Lipari Aqueous Phase Remediation System
Lipari Landfill Superfund Site
Gloucester County, New Jersey

USACE

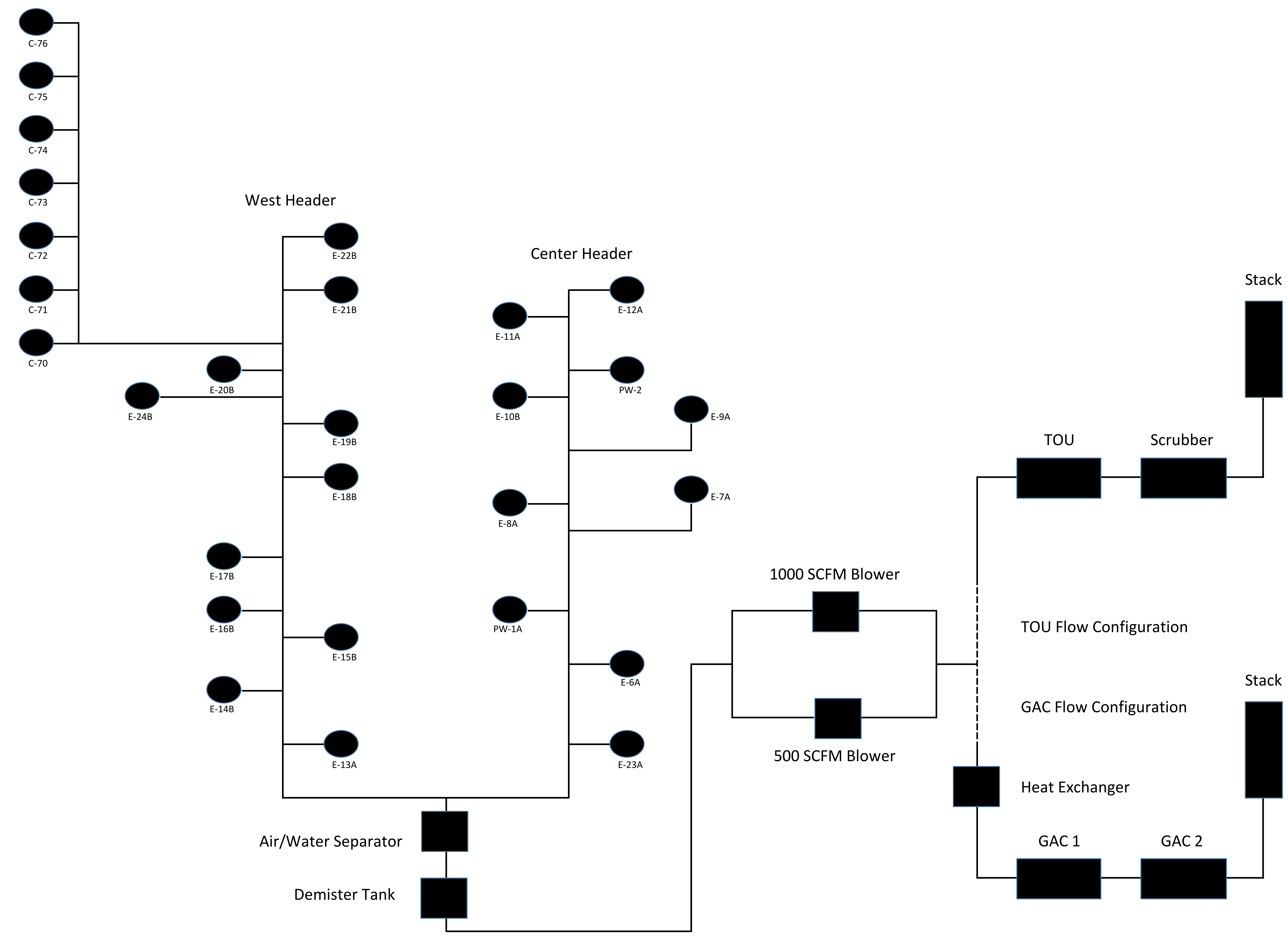


Figure 1-3

Schematic Flow Diagram/Soil Vapor Extraction System

Lipari Landfill Superfund Site

Gloucester County, New Jersey

USACE

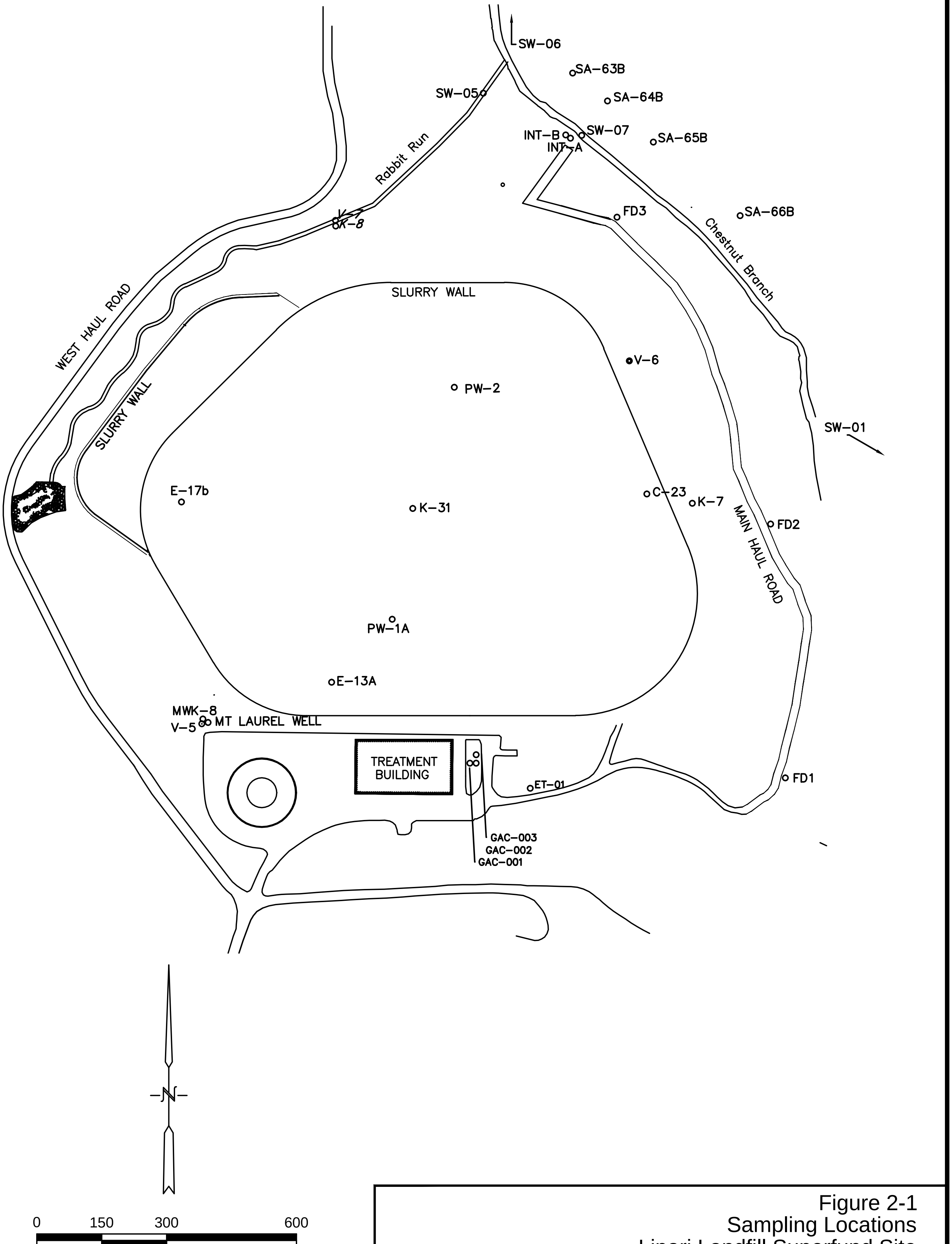
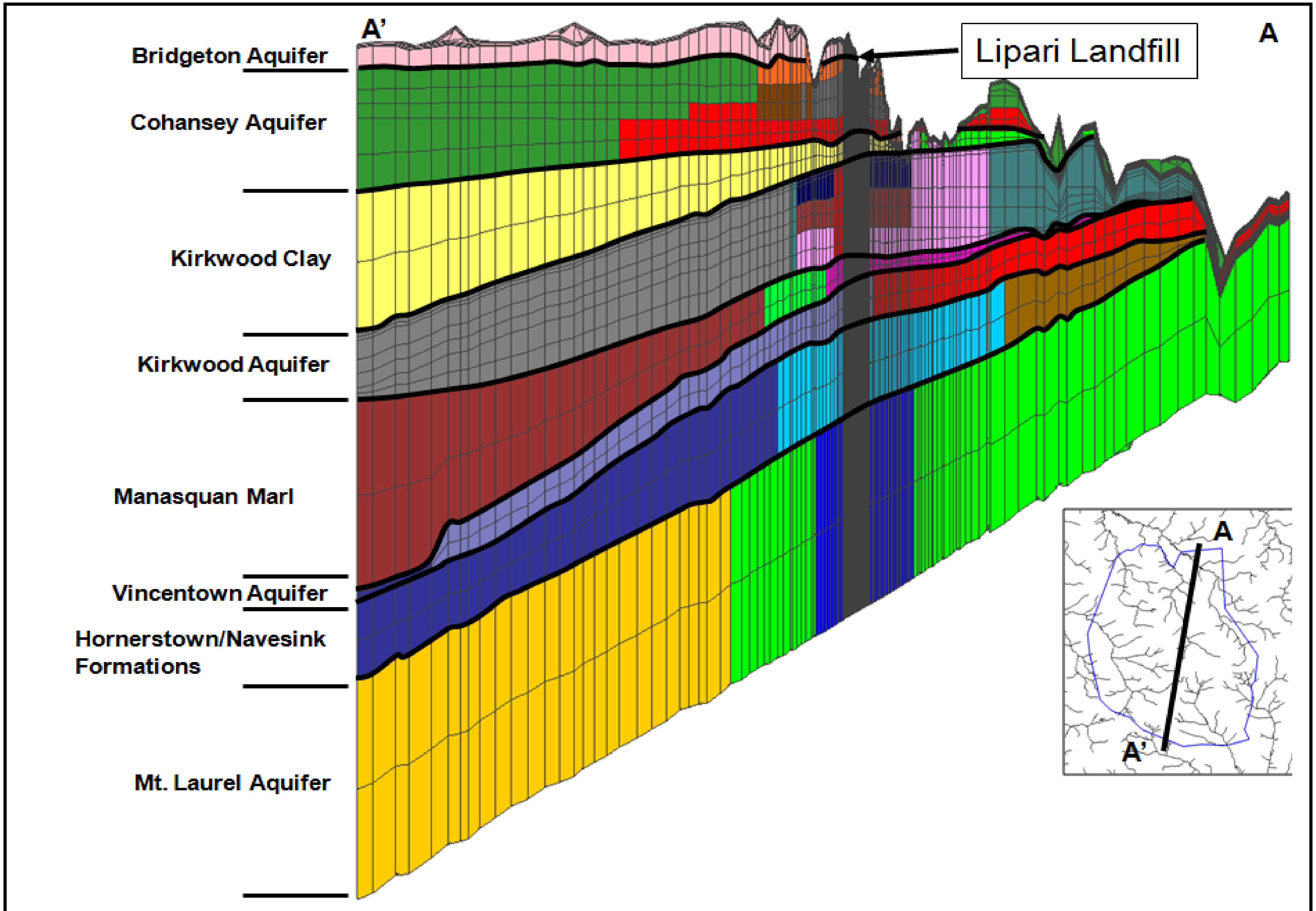


Figure 2-1
Sampling Locations
Lipari Landfill Superfund Site
Gloucester County, New Jersey



USACE

Figure 2-2A
Site Geology
Vertically Exaggerated
Lipari Landfill Superfund Site
Gloucester County, New Jersey

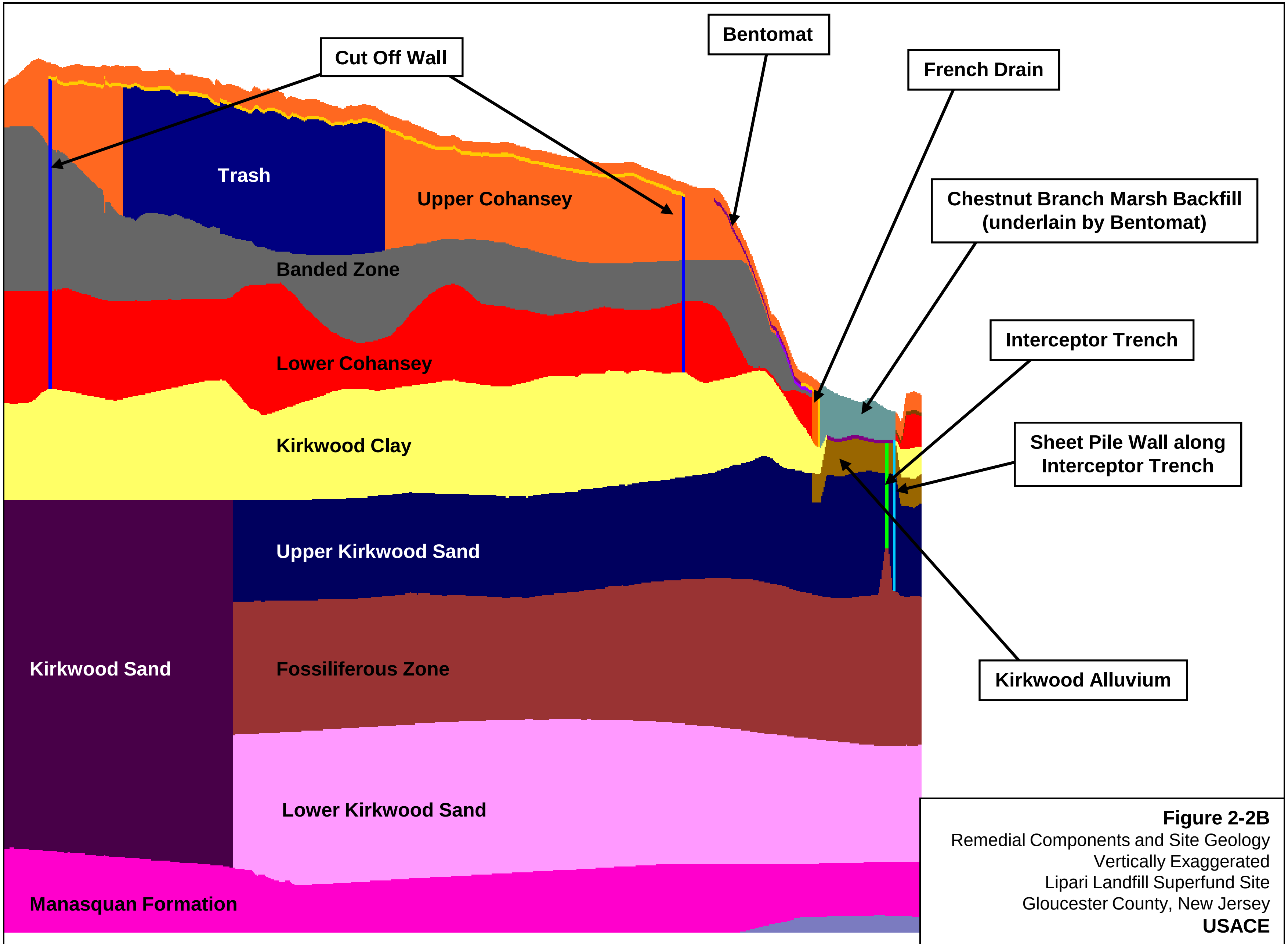


Figure 2-2B
Remedial Components and Site Geology
Vertically Exaggerated
Lipari Landfill Superfund Site
Gloucester County, New Jersey
USACE

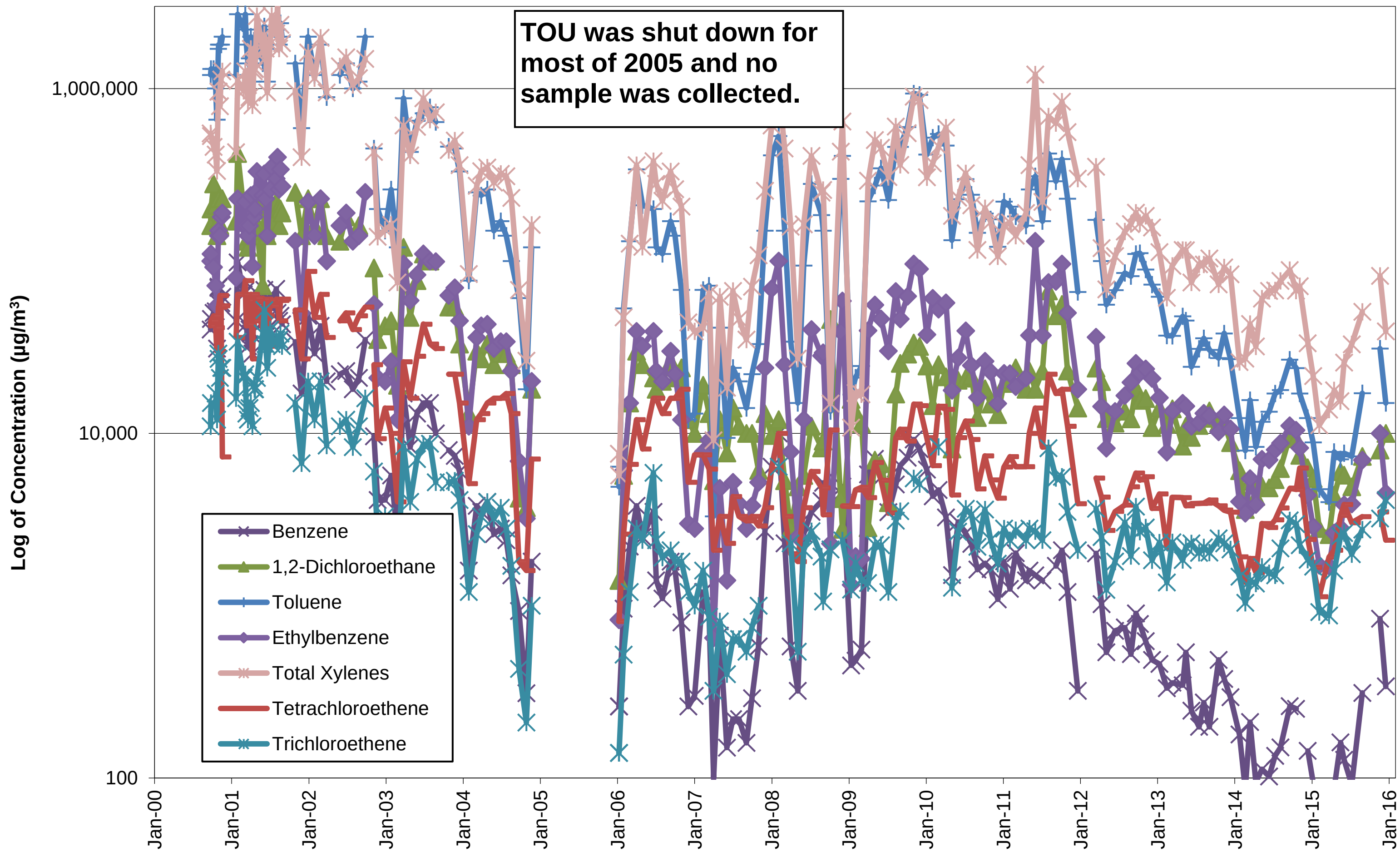


Figure 2-3

Influent Volatile Organic Compound Concentrations in Soil Gas Extraction

Lipari Landfill Superfund Site

Gloucester County, New Jersey

USACE

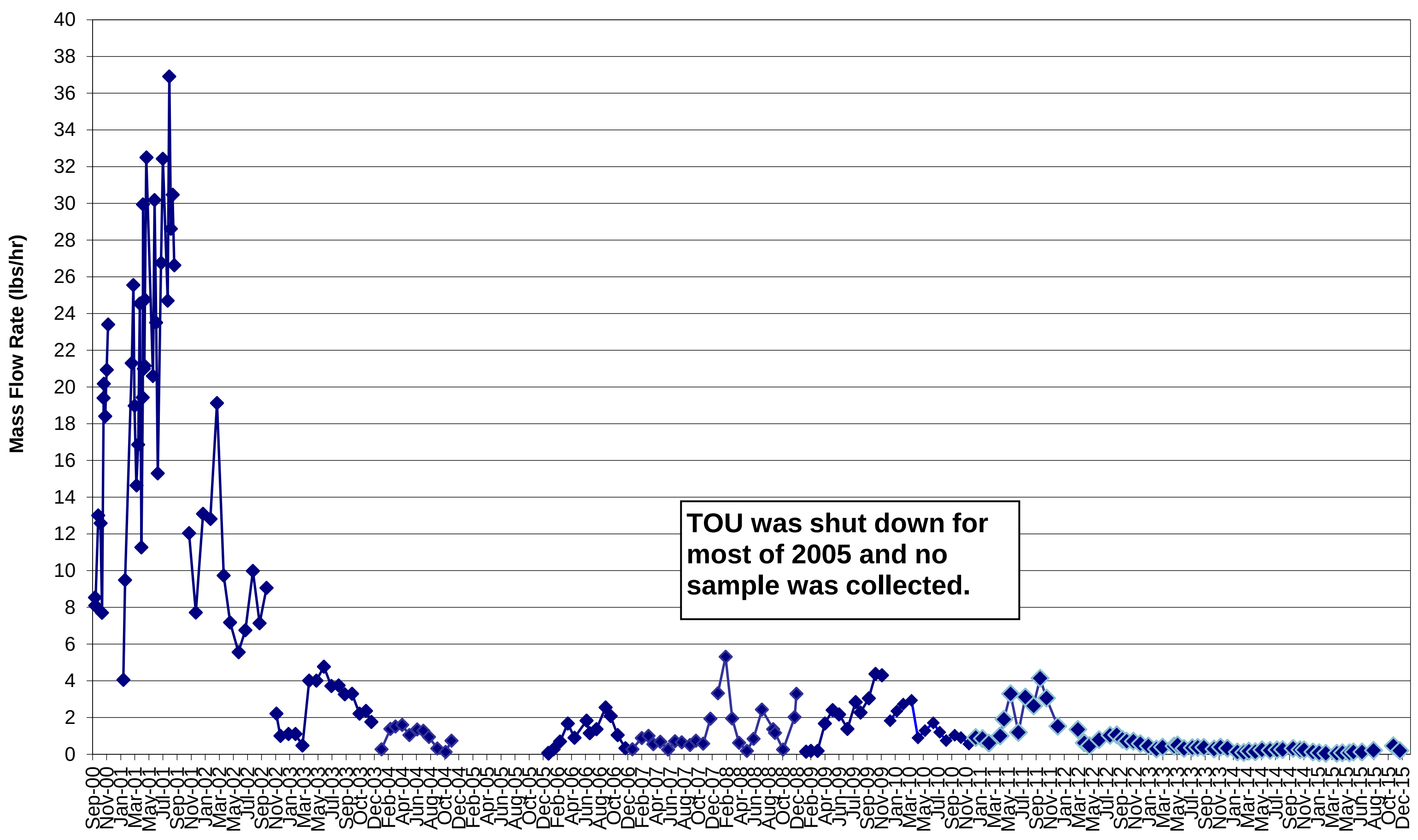


Figure 2-4A

Total Volatile Organic Compound Mass Removal Rate in Soil Gas Extraction

Lipari Landfill Superfund Site

Gloucester County, New Jersey

USACE

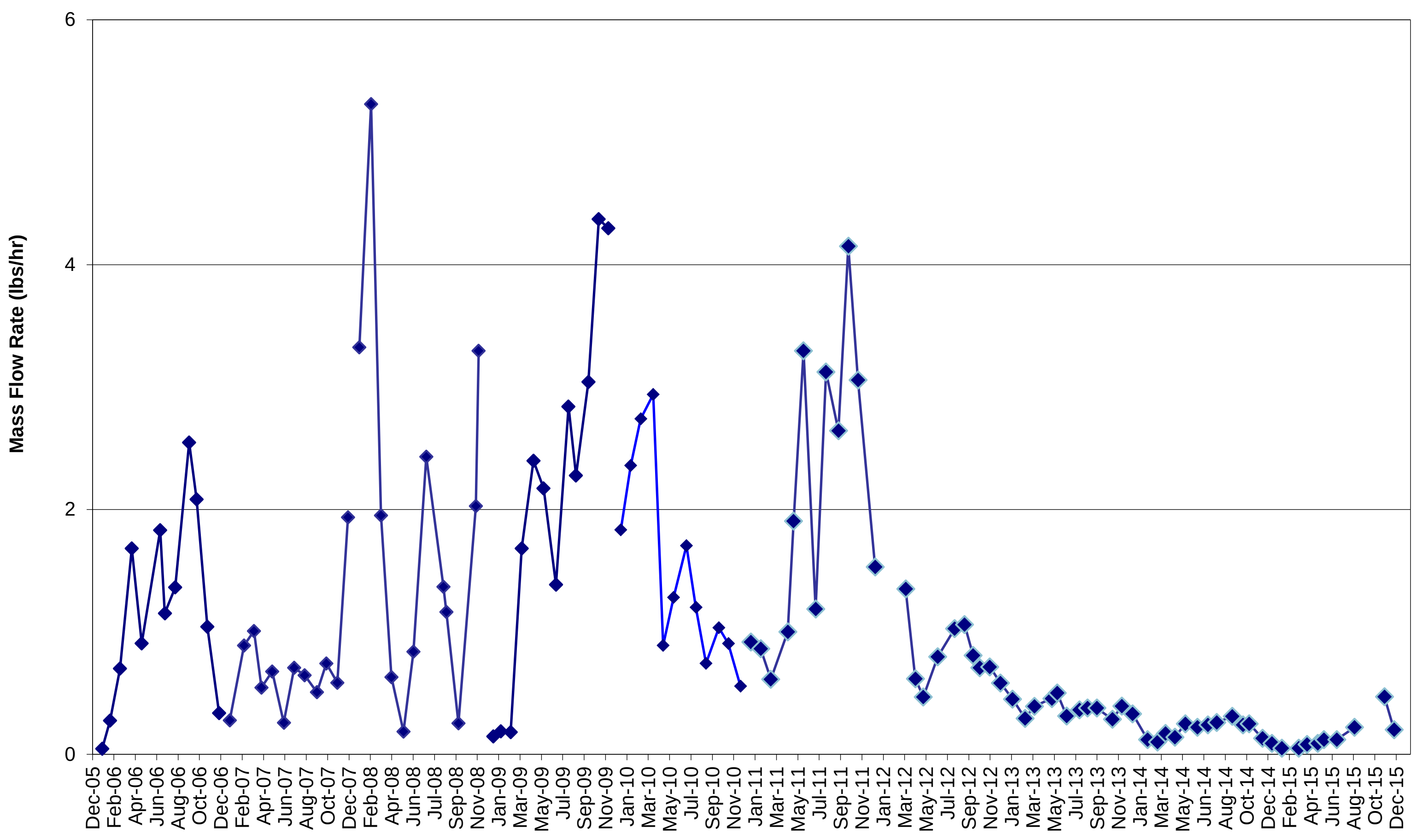


Figure 2-4B

Total Volatile Organic Compound Mass Removal Rate in Soil Gas Extraction - 2006 through 2015

Lipari Landfill Superfund Site

Gloucester County, New Jersey

USACE

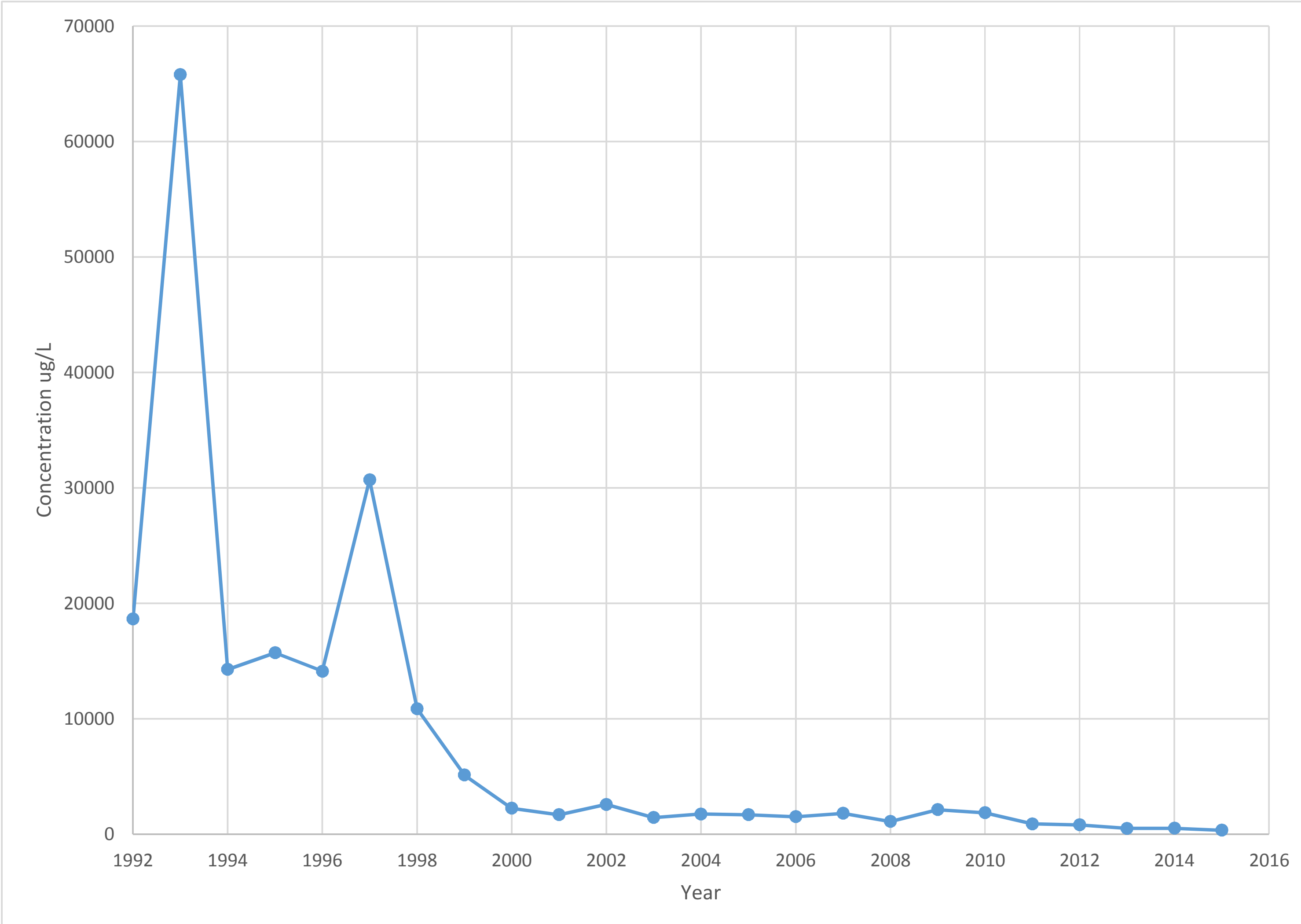


Figure 2-5A
Average Extraction Well Concentrations of bis(2-Chloroethyl)ether - 1992 to 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

USACE

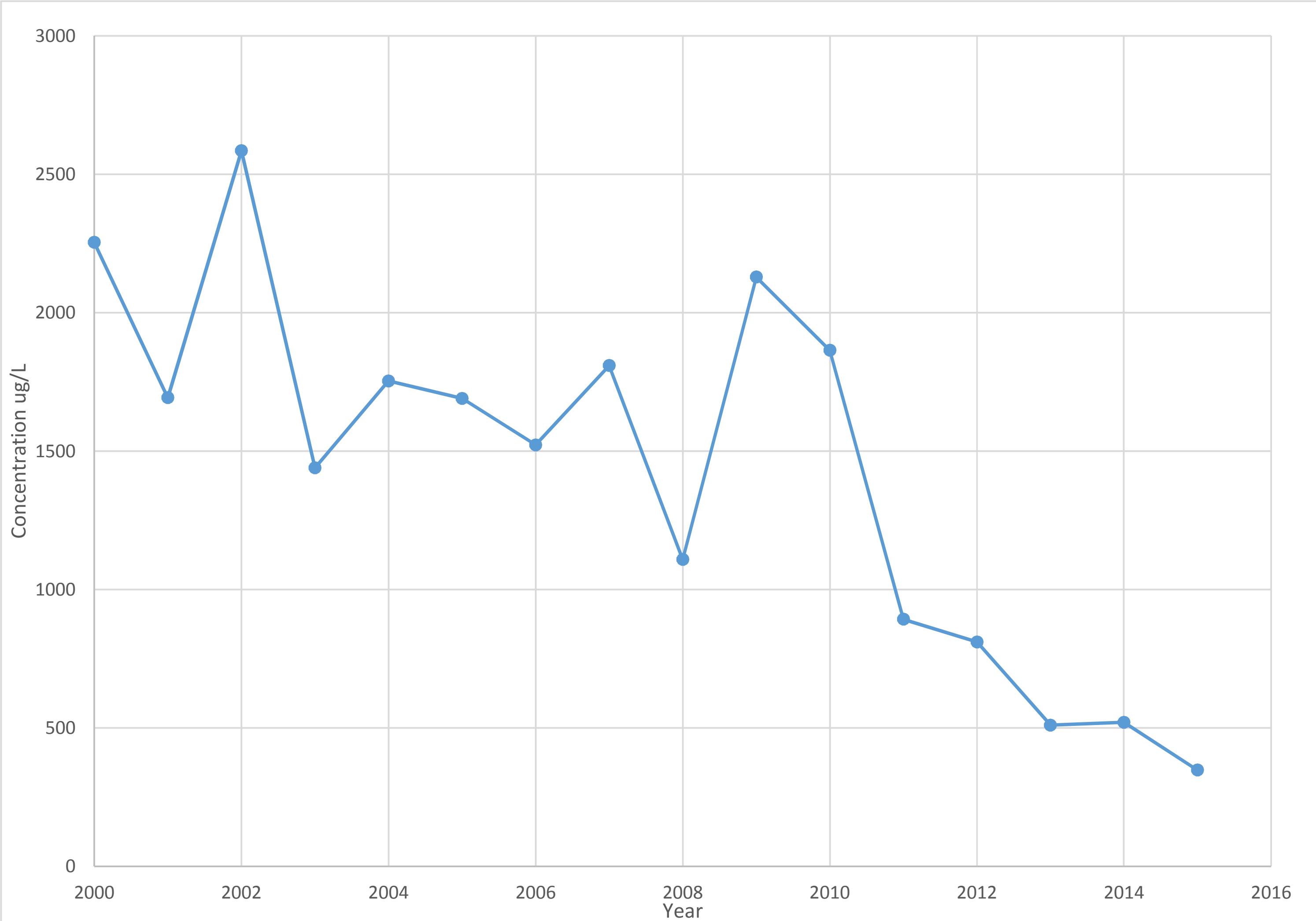


Figure 2-5B
Average Extraction Well Concentrations of bis(2-Chloroethyl)ether - 2000 to 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

USACE

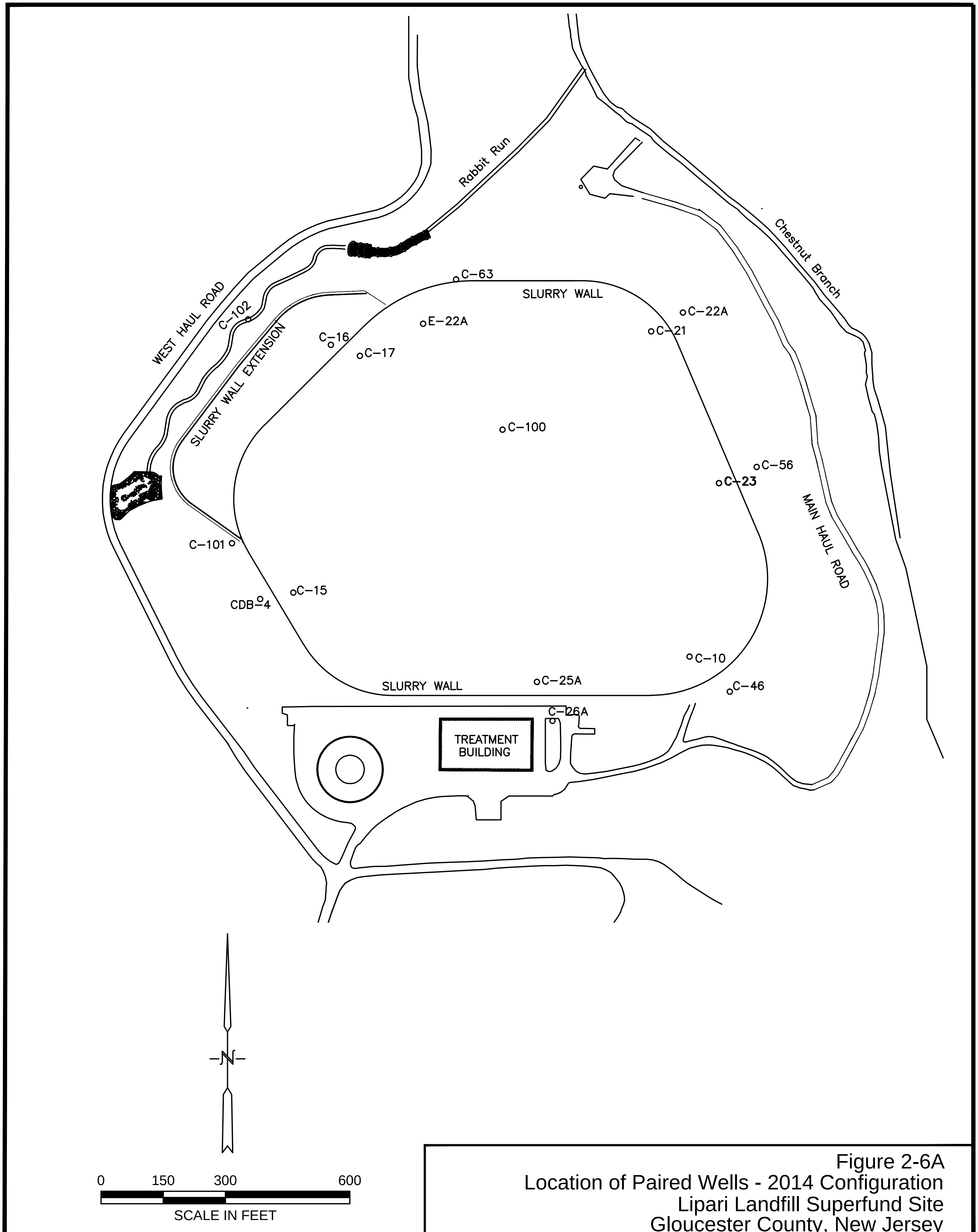


Figure 2-6A
Location of Paired Wells - 2014 Configuration
Lipari Landfill Superfund Site
Gloucester County, New Jersey

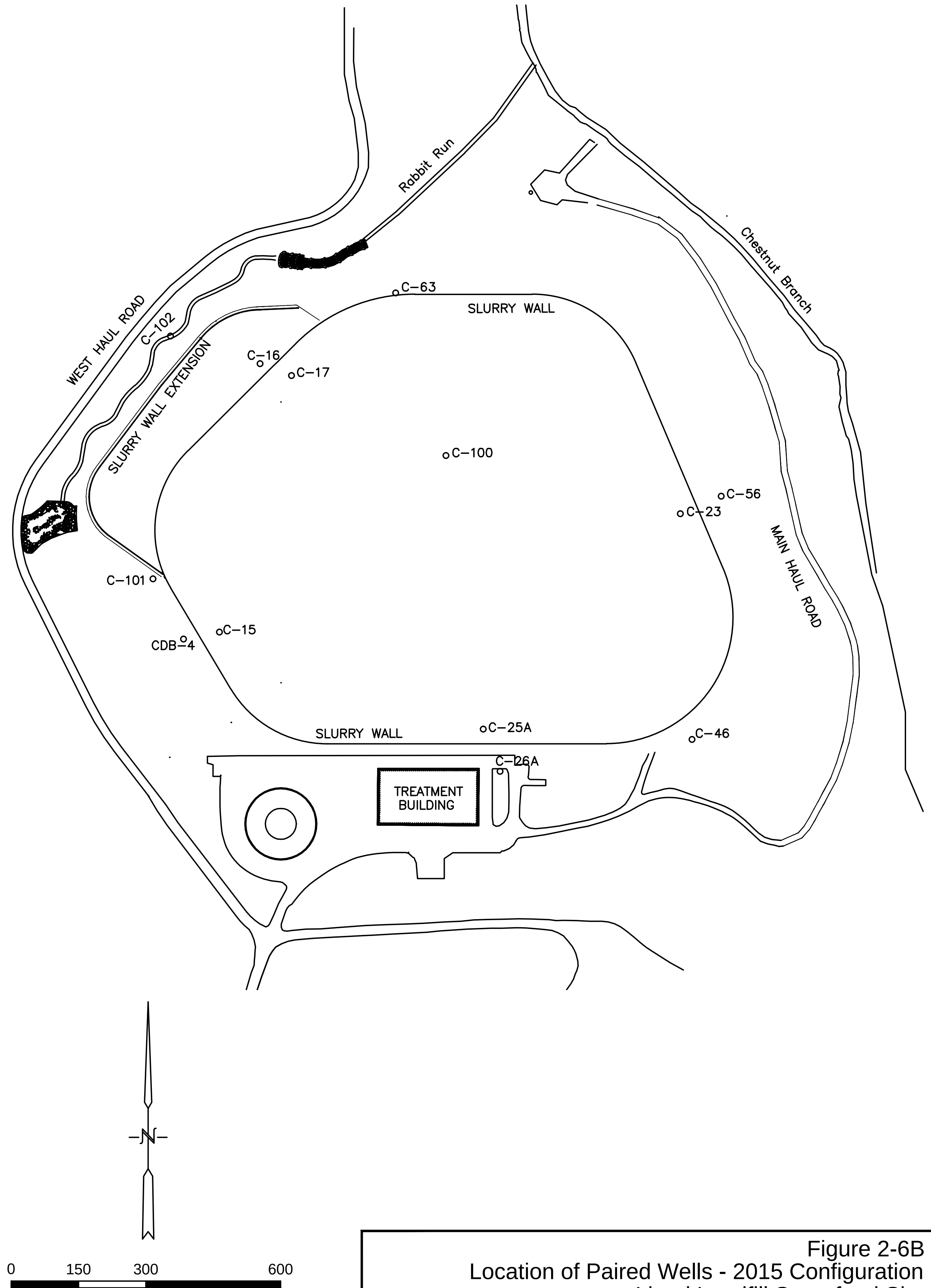


Figure 2-6B
Location of Paired Wells - 2015 Configuration
Lipari Landfill Superfund Site
Gloucester County, New Jersey

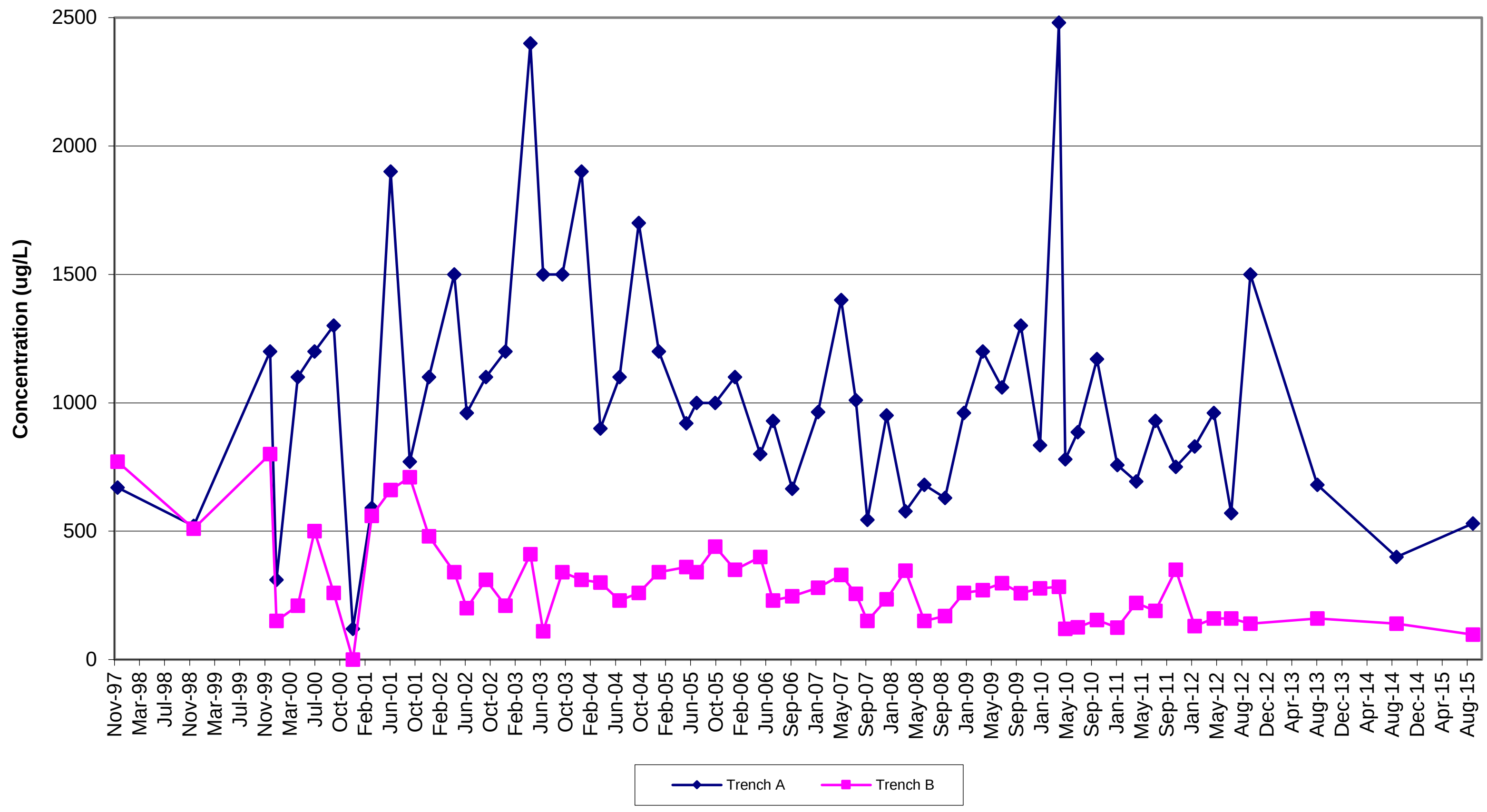


Figure 2-7

Concentrations of bis(2-Chloroethyl)ether in Interceptor Trenches A and B

Lipari Landfill Superfund Site

Gloucester County, New Jersey

USACE

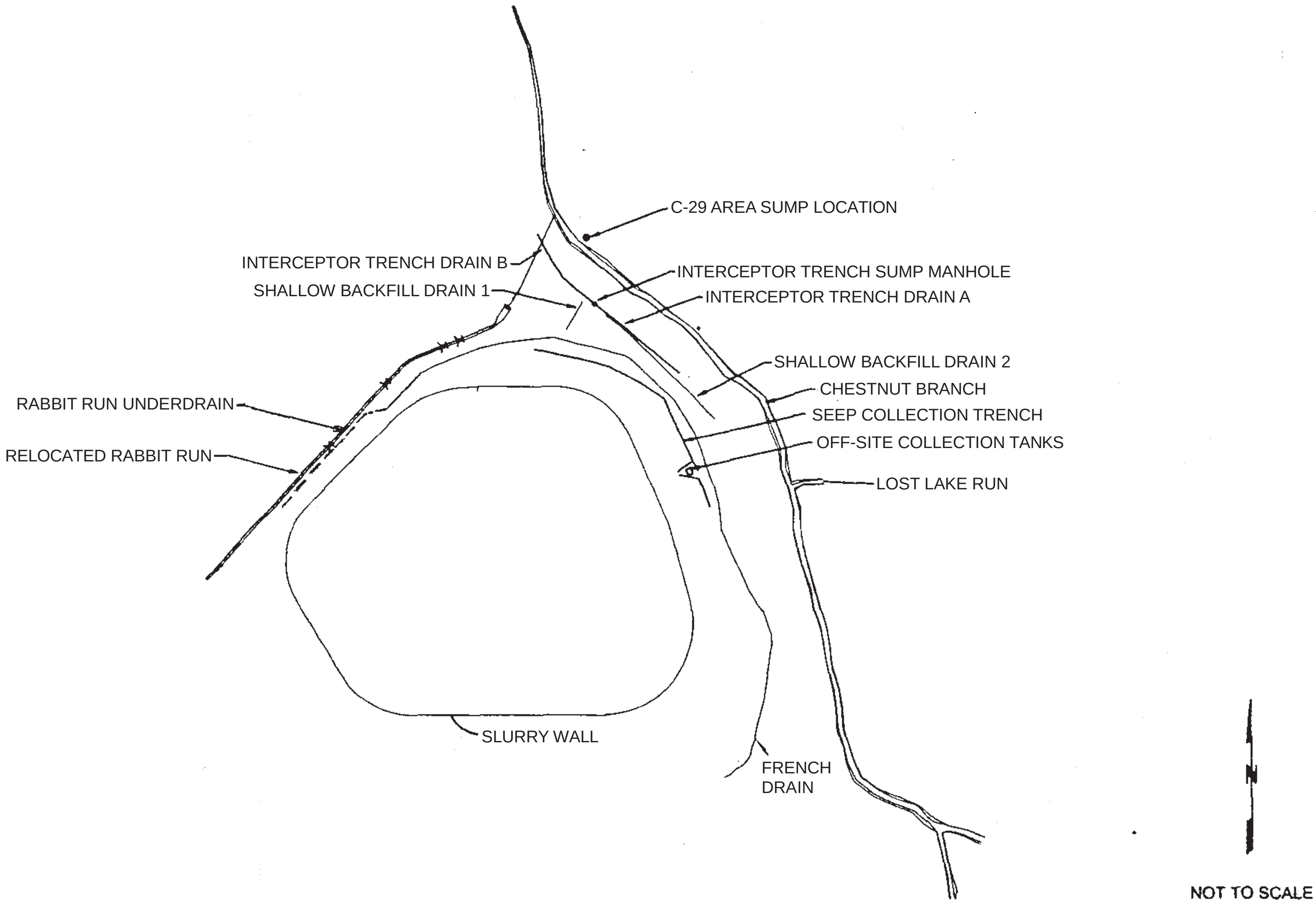


Figure 2-8
Offsite Migration Control Locations
Lipari Landfill Superfund Site
Gloucester County, New Jersey

USACE

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	E-17B 9/10/2014 Water		E-17B-DUP 9/10/2014 Water		PW-1A 9/10/2014 Water		PW-2 9/10/2014 Water	
Metals (µg/L)									
Arsenic	16/ND	9.5		10.5		15.1		12.2	
Chromium	180	6.9		7.7		7.4		8.6	
Lead	71/20/3.9	4.9		3.8		3.2		1.0	U
Mercury	0.15	0.040	J	0.073	J	0.20	U	0.20	U
Nickel	4,600	8.4		9.7		8.7		15.9	
Selenium	5	5.0	U	5.9		5.0	U	9.4	
Silver	3.4	1.0	U	0.040	J	0.14	J	1.0	U
Zinc	100	104		91.7		50.8		241	
Volatile Organic Compounds (µg/L)									
Dichlorodifluoromethane		2.5	U	2.5	U	2.5	U	2.0	U
Chloromethane		2.5	U	2.5	U	2.5	U	2.0	U
Vinyl chloride		2.5	U	2.5	U	2.5	U	33	
Bromomethane		2.5	U	2.5	U	2.5	U	2.0	U
Chloroethane		2.5	U	2.5	U	2.5	U	2.0	U
Trichlorofluoromethane		2.5	U	2.5	U	2.5	U	2.0	U
1,1-Dichloroethene		2.5	U	2.5	U	2.5	U	2.0	U
1,1,2-Trichloro-1,2,2-trifluoroethane		2.5	U	2.5	U	2.5	U	2.0	U
Acetone		25	UJ	25	U	25	U	20	U
Carbon disulfide		2.5	U	2.5	U	2.5	U	2.0	U
Methyl acetate		2.5	U	2.5	U	2.5	U	2.0	U
Methylene chloride	1,600	2.5	U	2.5	U	2.5	U	2.0	U
trans-1,2-Dichloroethene		2.5	U	2.5	U	2.5	U	2.0	U
Methyl tert-butyl ether		2.5	U	2.5	U	2.5	U	2.0	U
1,1-Dichloroethane		2.5	U	2.5	U	2.5	U	3.4	
cis-1,2-Dichloroethene		2.3	J	3.2		2.5	U	73	
2-Butanone		25	UJ	25	U	25	U	20	U
Bromochloromethane		2.5	U	2.5	U	2.5	U	2.0	U
Chloroform	470	2.5	U	2.5	U	2.5	U	2.0	U
1,1,1-Trichloroethane		2.5	U	2.5	U	2.5	U	2.0	U
Cyclohexane		2.5	U	2.5	U	0.90	J	1.7	J

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	E-17B 9/10/2014 Water		E-17B-DUP 9/10/2014 Water		PW-1A 9/10/2014 Water		PW-2 9/10/2014 Water	
Volatile Organic Compounds (µg/L) (Continued)									
Carbon tetrachloride		2.5	U	2.5	U	2.5	U	2.0	U
Benzene	71	5.8		7.1		26		170	
1,2-Dichloroethane	99	6.6		8.7		2.5	U	0.78	J
Trichloroethene		1.0	J	1.3	J	2.5	U	2.0	U
Methylcyclohexane		2.9		3.6		1.6	J	0.66	J
1,2-Dichloropropane		2.5	U	2.5	U	2.5	U	2.0	U
Bromodichloromethane		2.5	U	2.5	U	2.5	U	2.0	U
cis-1,3-Dichloropropene		2.5	UJ	2.5	U	2.5	U	2.0	U
4-Methyl-2-pentanone		25	U	25	U	25	U	20	U
Toluene	200,000	66		76		2.5	U	250	
trans-1,3-Dichloropropene		2.5	UJ	2.5	U	2.5	U	2.0	U
1,1,2-Trichloroethane		2.5	UJ	2.5	U	2.5	U	2.0	U
Tetrachloroethene		1.1	J	1.3	J	2.5	U	2.0	U
2-Hexanone		25	U	25	U	25	U	20	U
Dibromochloromethane		2.5	U	2.5	U	2.5	U	2.0	U
1,2-Dibromoethane		2.5	U	2.5	U	2.5	U	2.0	U
Chlorobenzene	21,000	79	J-	91		270		96	
Ethylbenzene	29,000	25		28		6.2	J+	53	J+
o-Xylene		250		290		2.5	U	97	
m,p-Xylene		250		280		2.5	U	110	
Styrene		2.5	U	2.5	U	2.5	U	2.0	U
Bromoform		2.5	U	2.5	U	2.5	U	2.0	U
Isopropylbenzene		3.6		4.3		31	J+	3.1	J+
1,1,2,2-Tetrachloroethane		2.5	U	2.5	U	2.5	U	2.0	U
1,3-Dichlorobenzene		3.0	J-	3.4		1.7	J	0.86	J
1,2-Dichlorobenzene		120		140		5.5		26	
1,4-Dichlorobenzene		15	J-	17		7.2		2.7	
1,2-Dibromo-3-chloropropane		2.5	U	2.5	U	2.5	U	2.0	U
1,2,4-Trichlorobenzene		2.5	UJ	2.9		2.5	U	2.0	U
1,2,3-Trichlorobenzene		1.3	J	1.5	J	2.5	U	2.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	E-17B 9/10/2014 Water		E-17B-DUP 9/10/2014 Water		PW-1A 9/10/2014 Water		PW-2 9/10/2014 Water	
Semivolatile Organic Compounds (µg/L)									
Benzaldehyde		5.0	U	5.0	U	5.0	U	5.0	U
Phenol	4,600,000	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4	640		600		440		480	
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		13		12		5.0	U	18	
2,2'-Oxybis(1-chloropropane)		5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone		5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol		13		14		5.0	U	5.1	
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		17		18		5.0	U	71	
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		16		19		5.0	U	5.0	U
Bis(2-chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		28		32		5.0	U	5.0	U
4-Chloroaniline		5.0	U	5.0	U	130		17	
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.9		7.0		5.0	U	5.0	U
Hexachlorocyclopentadiene		5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		10	U	10	U	10	U	10	U
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	U	10	U	10	U	10	U
4-Nitrophenol		10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	E-17B 9/10/2014 Water		E-17B-DUP 9/10/2014 Water		PW-1A 9/10/2014 Water		PW-2 9/10/2014 Water	
Semivolatile Organic Compounds (µg/L) (Continued)									
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol		10	U	10	U	10	U	10	U
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		11		11		5.0	U	5.0	U
Di-n-octylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION:	Contaminants of Concern - Remediation Goals	FD-01		FD-01-DUP		FD-02		FD-03		INT-A		INT-B	
DATE COLLECTED:		9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014	
MATRIX:		Water		Water		Water		Water		Water		Water	
Metals (µg/L)													
Arsenic	16/ND	1.0	U	1.5		2.5		1.0	U	229		10.4	
Chromium	180	0.99	J	0.58	J	48.9		0.94	J	132		7.3	
Lead	71/20/3.9	1.0	U	1.0	U	10.5		1.0	U	18.4		1.3	
Mercury	0.15	0.20	U	0.20	U	0.19	J	0.20	U	0.47		0.20	U
Nickel	4,600	1.6	J	2.1		49.0		0.90		63.3		4.4	
Selenium	5	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Silver	3.4	1.0	U	1.0	U	0.084	J	1.0	U	0.23	J	1.0	U
Zinc	100	19.5	J	20.5		123		13.3		497		58.7	
Volatile Organic Compounds (µg/L)													
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.57		0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	UJ	5.0	U	5.0	U
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl acetate		0.50	U	0.46	J	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
Methyl tert-butyl ether		0.50	U	0.50	U	0.71		0.34	J	0.40	J	0.32	J
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	UJ	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/9/2014 Water		FD-01-DUP 9/9/2014 Water		FD-02 9/9/2014 Water		FD-03 9/9/2014 Water		INT-A 9/9/2014 Water		INT-B 9/9/2014 Water	
Volatile Organic Compounds (µg/L) (Continued)													
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	16		17		6.0	
1,2-Dichloroethane	99	1.7		1.8		0.57		1.4		1.9		0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	8.9		5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.67		0.79		0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.29	J	0.30	J	0.50	U
o-Xylene		0.50	U	0.50	U	0.50	U	0.22	J	0.22	J	0.50	U
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.21	J	0.23	J	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	1.8		2.0		0.31	J
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene		1.1		1.1		0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION:	Contaminants of	FD-01		FD-01-DUP		FD-02		FD-03		INT-A		INT-B	
DATE COLLECTED:	Concern -	9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014	
MATRIX:	Remediation Goals	Water		Water		Water		Water		Water		Water	
Semivolatile Organic Compounds (µg/L)													
Benzaldehyde		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Phenol	4,600,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4	10		10		18		370		400		140	
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,2'-Oxybis(1-chloropropane)		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.2	
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		10	U	10	U	10	U	10	U	10	U	10	U
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	U	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol		10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

SAMPLE LOCATION:	Contaminants of	FD-01		FD-01-DUP		FD-02		FD-03		INT-A		INT-B	
DATE COLLECTED:	Concern -	9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014		9/9/2014	
MATRIX:	Remediation Goals	Water		Water		Water		Water		Water		Water	
Semivolatile Organic Compounds (µg/L) (Continued)													
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol		10	U	10	U	10	U	10	U	10	U	10	U
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U	5.0	U	5.0	U	5.0	U	2.6	J	5.0	U
Di-n-octylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION:	Contaminants of	K-7		K-8		K-31		MWK-8	
DATE COLLECTED:	Concern -	8/21/2014		8/25/2014		8/25/2014		8/21/2014	
MATRIX:	Remediation Goals	Water		Water		Water		Water	
Metals (µg/L)									
Arsenic	16/ND	1.0	U	3.3		1.5		3.4	
Chromium	180	1.9	J	7.3		6.5		360	
Lead	71/20/3.9	0.89	J	0.25	J	0.37	J	4.1	
Mercury	0.15	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	4,600	1.5		5.0		4.9		87.2	
Selenium	5	5.0	U	5.0	U	5.0	U	5.0	U
Silver	3.4	0.10	J	0.40	J	1.0	U	0.40	J
Zinc	100	8.3		6.9		14.7		48.7	
Volatile Organic Compounds (µg/L)									
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	U
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U
Methyl acetate		0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-butyl ether		0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION:	Contaminants of Concern - Remediation Goals	K-7		K-8		K-31		MWK-8	
DATE COLLECTED:		8/21/2014		8/25/2014		8/25/2014		8/21/2014	
MATRIX:		Water		Water		Water		Water	
Volatile Organic Compounds (µg/L) (Continued)									
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	UJ	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.15	J
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	UJ	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	UJ	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U
o-Xylene		0.50	U	0.50	U	0.50	U	0.50	U
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.13	J
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	K-7 8/21/2014 Water		K-8 8/25/2014 Water		K-31 8/25/2014 Water		MWK-8 8/21/2014 Water	
Semivolatile Organic Compounds (µg/L)									
Benzaldehyde		5.0	U	5.0	U	5.0	U	5.0	U
Phenol	4,600,000	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4	0.050	U	0.050	U	0.025*	U	0.050	U
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U
2,2'-Oxybis(1-chloropropane)		5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone		5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline		5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene		5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		10	U	10	U	10	U	10	U
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	U	10	U	10	U	10	U
4-Nitrophenol		10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	K-7 8/21/2014 Water		K-8 8/25/2014 Water		K-31 8/25/2014 Water		MWK-8 8/21/2014 Water	
Semivolatile Organic Compounds (µg/L) (Continued)									
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	UJ	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol		10	UJ	10	UJ	10	UJ	10	UJ
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U	5.0	U	5.0	U	5.0	U
Di-n-octylphthalate		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	V-5 8/21/2014 Water		V-6 8/25/2014 Water	V-7 8/25/2014 Water		V-7-DUP 8/25/2014 Water	
Metals (µg/L)				Not Analyzed				
Arsenic	16/ND	1.1			1.0	U	1.0	U
Chromium	180	31.2			5.4		3.7	
Lead	71/20/3.9	0.30	J		0.31	J	0.28	J
Mercury	0.15	0.20	U		0.20	U	0.20	U
Nickel	4,600	22.3			5.6		5.6	
Selenium	5	5.0	U		5.0	U	5.0	U
Silver	3.4	0.28	J		0.92	J	0.85	J
Zinc	100	7.9			4.6		3.9	
Volatile Organic Compounds (µg/L)				Not Analyzed				
Dichlorodifluoromethane		0.50	U		0.50	U	0.50	U
Chloromethane		0.50	U		0.50	U	0.50	U
Vinyl chloride		0.50	U		0.50	U	0.50	U
Bromomethane		0.50	U		0.50	U	0.50	U
Chloroethane		0.50	U		0.50	U	0.50	U
Trichlorofluoromethane		0.50	U		0.50	U	0.50	U
1,1-Dichloroethene		0.50	U		0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U		0.50	U	0.50	U
Acetone		5.0	U		5.0	U	5.0	U
Carbon disulfide		0.50	U		0.50	U	0.50	U
Methyl acetate		0.50	U		0.50	U	0.50	U
Methylene chloride	1,600	0.50	U		0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U		0.50	U	0.50	U
Methyl tert-butyl ether		0.50	U		0.50	U	0.50	U
1,1-Dichloroethane		0.50	U		0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U		0.50	U	0.50	U
2-Butanone		5.0	U		5.0	U	5.0	U
Bromochloromethane		0.50	U		0.50	U	0.50	U
Chloroform	470	0.50	U		0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U		0.50	U	0.50	U
Cyclohexane		0.50	U		0.50	U	0.50	U

SAMPLE LOCATION:	Contaminants of Concern -	V-5		V-6	V-7		V-7-DUP	
DATE COLLECTED:		8/21/2014		8/25/2014	8/25/2014		8/25/2014	
MATRIX:	Remediation Goals	Water		Water	Water		Water	
Volatile Organic Compounds (µg/L) (Continued)				Not Analyzed				
Carbon tetrachloride		0.50	U		0.50	U	0.50	U
Benzene	71	0.50	U		0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U		0.50	U	0.50	U
Trichloroethene		0.50	U		0.50	U	0.50	U
Methylcyclohexane		0.50	U		0.50	U	0.50	U
1,2-Dichloropropane		0.50	U		0.50	U	0.50	U
Bromodichloromethane		0.50	U		0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U		0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U		5.0	U	5.0	U
Toluene	200,000	0.50	U		0.50	U	0.50	U
trans-1,3-Dichloropropene		0.50	U		0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U		0.50	U	0.50	U
Tetrachloroethene		0.50	U		0.50	U	0.50	U
2-Hexanone		5.0	U		5.0	U	5.0	U
Dibromochloromethane		0.50	U		0.50	U	0.50	U
1,2-Dibromoethane		0.50	U		0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U		0.50	U	0.50	UJ
Ethylbenzene	29,000	0.50	U		0.50	U	0.50	U
o-Xylene		0.50	U		0.50	U	0.50	U
m,p-Xylene		0.50	U		0.50	U	0.50	U
Styrene		0.50	U		0.50	U	0.50	U
Bromoform		0.50	U		0.50	U	0.50	U
Isopropylbenzene		0.50	U		0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U		0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U		0.50	U	0.50	UJ
1,2-Dichlorobenzene		0.50	U		0.50	U	0.50	UJ
1,4-Dichlorobenzene		0.50	U		0.50	U	0.50	UJ
1,2-Dibromo-3-chloropropane		0.50	U		0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U		0.50	U	0.50	UJ
1,2,3-Trichlorobenzene		0.50	U		0.50	U	0.50	UJ

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	V-5 8/21/2014 Water		V-6 8/25/2014 Water		V-7 8/25/2014 Water		V-7-DUP 8/25/2014 Water	
Semivolatile Organic Compounds (µg/L)				Not Analyzed					
Benzaldehyde		5.0	U			5.0	U	5.0	U
Phenol	4,600,000	5.0	U			5.0	U	5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4	0.025*	U	0.025*	U	0.025*	U	5.0	U
2-Chlorophenol		5.0	U			5.0	U	5.0	U
2-Methylphenol		5.0	U			5.0	U	5.0	U
2,2'-Oxybis(1-chloropropane)		5.0	U			5.0	U	5.0	U
Acetophenone		5.0	U			5.0	U	5.0	U
4-Methylphenol		5.0	U			5.0	U	5.0	U
N-Nitroso-di-n-propylamine		5.0	U			5.0	U	5.0	U
Hexachloroethane		5.0	U			5.0	U	5.0	U
Nitrobenzene		5.0	U			5.0	U	5.0	U
Isophorone		5.0	U			5.0	U	5.0	U
2-Nitrophenol		5.0	U			5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U			5.0	U	5.0	U
Bis(2-chloroethoxy)methane		5.0	U			5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U			5.0	U	5.0	U
Naphthalene		5.0	U			5.0	U	5.0	U
4-Chloroaniline		5.0	U			5.0	U	5.0	U
Hexachlorobutadiene		5.0	U			5.0	U	5.0	U
Caprolactam		5.0	U			5.0	U	5.0	U
4-Chloro-3-methylphenol		5.0	U			5.0	U	5.0	U
2-Methylnaphthalene		5.0	U			5.0	U	5.0	U
Hexachlorocyclopentadiene		5.0	U			5.0	U	5.0	U
2,4,6-Trichlorophenol		5.0	U			5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U			5.0	U	5.0	U
1,1'-Biphenyl		5.0	U			5.0	U	5.0	U
2-Chloronaphthalene		5.0	U			5.0	U	5.0	U
2-Nitroaniline		10	U			10	U	10	U
Dimethylphthalate		5.0	U			5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U			5.0	U	5.0	U
Acenaphthylene		5.0	U			5.0	U	5.0	U
3-Nitroaniline		10	U			10	U	10	U
Acenaphthene		5.0	U			5.0	U	5.0	U
2,4-Dinitrophenol		10	U			10	U	10	U
4-Nitrophenol		10	U			10	U	10	U
Dibenzofuran		5.0	U			5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U			5.0	U	5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	V-5 8/21/2014 Water		V-6 8/25/2014 Water	V-7 8/25/2014 Water		V-7-DUP 8/25/2014 Water	
Semivolatile Organic Compounds (µg/L) (Continued)								
Diethylphthalate		5.0	U		5.0	U	5.0	U
Fluorene		5.0	U		5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U		5.0	U	5.0	U
4-Nitroaniline		10	U		10	U	10	U
4,6-Dinitro-2-methylphenol		10	U		10	U	10	U
N-Nitrosodiphenylamine		5.0	U		5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U		5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U		5.0	U	5.0	U
Hexachlorobenzene		5.0	U		5.0	U	5.0	U
Atrazine		5.0	U		5.0	U	5.0	U
Pentachlorophenol		10	UJ		10	UJ	10	UJ
Phenanthrene		5.0	U		5.0	U	5.0	U
Anthracene		5.0	U		5.0	U	5.0	U
Carbazole		5.0	U		5.0	U	5.0	U
Di-n-butylphthalate		5.0	U		5.0	U	5.0	U
Fluoranthene		5.0	U		5.0	U	5.0	U
Pyrene		5.0	U		5.0	U	5.0	U
Butylbenzylphthalate		5.0	U		5.0	U	5.0	U
3,3'-Dichlorobenzidine		5.0	U		5.0	U	5.0	U
Benzo(a)anthracene		5.0	U		5.0	U	5.0	U
Chrysene		5.0	U		5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U		5.0	U	5.0	U
Di-n-octylphthalate		5.0	U		5.0	U	5.0	U
Benzo(b)fluoranthene		5.0	U		5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U		5.0	U	5.0	U
Benzo(a)pyrene		5.0	U		5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U		5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U		5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U		5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U		5.0	U	5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:
U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
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SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SA-63B 8/19,20/2014 Water		SA-64B 8/19,20/2014 Water		SA-65B 8/19,20/2014 Water		SA-66B 8/19,20/2014 Water		Peach Country 8/19/2014 Water
Metals (µg/L)										Not Analyzed
Arsenic	16/ND	1.0	U	2.0		4.6		1.2		
Chromium	180	2.7		32.2		10.2		5.7		
Lead	71/20/3.9	0.29	J	6.6		5.2		1.9		
Mercury	0.15	0.20	U	0.034	J	0.015	J	0.20	U	
Nickel	4,600	2.0		28.5		9.6		5.2		
Selenium	5	5.0	U	5.0	U	5.0	U	5.0	U	
Silver	3.4	1.0	U	0.044	J	0.079	J	1.0	U	
Zinc	100	37.1		211		127		46.2		
Volatile Organic Compounds (µg/L)										Not Analyzed
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	
Acetone		5.0	U	5.0	U	5.0	U	5.0	U	
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	
Methyl acetate		0.50	U	0.50	U	0.50	U	0.50	U	
Methylene chloride	1,600	0.50	U	0.50	U	0.13	J	0.50	U	
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	
Methyl tert-butyl ether		0.50	U	0.50	U	0.50	U	0.50	U	
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SA-63B 8/19,20/2014 Water		SA-64B 8/19,20/2014 Water		SA-65B 8/19,20/2014 Water		SA-66B 8/19,20/2014 Water		Peach Country 8/19/2014 Water
Volatile Organic Compounds (µg/L) (Continued)										Not Analyzed
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U	
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U	
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.50	U	
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U	
o-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U	
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SA-63B 8/19,20/2014 Water		SA-64B 8/19,20/2014 Water		SA-65B 8/19,20/2014 Water		SA-66B 8/19,20/2014 Water		Peach Country 8/19/2014 Water	
Semivolatile Organic Compounds (µg/L)										Not Analyzed	
Benzaldehyde		5.0	U	5.0	U	5.0	U	5.0	U		
Phenol	4,600,000	5.0	U	5.0	U	5.0	U	5.0	U		
Bis(2-chloroethyl)ether (BCEE)	1.4	0.025*	U	0.025*	U	0.025*	U	0.025*	U	0.025*	U
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U		
2-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U		
2,2'-Oxybis(1-chloropropane)		5.0	U	5.0	U	5.0	U	5.0	U		
Acetophenone		5.0	U	5.0	U	5.0	U	5.0	U		
4-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U		
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U		
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U		
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U		
Isophorone		5.0	U	5.0	U	5.0	U	5.0	U		
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U		
Bis(2-chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U		
Naphthalene		5.0	U	5.0	U	5.0	U	5.0	U		
4-Chloroaniline		5.0	U	5.0	U	5.0	U	5.0	U		
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U		
Caprolactam		5.0	U	13		5.0	U	5.0	U		
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U		
2-Methylnaphthalene		5.0	U	5.0	U	5.0	U	5.0	U		
Hexachlorocyclopentadiene		5.0	U	5.0	U	5.0	U	5.0	U		
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U		
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U		
1,1'-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U		
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U		
2-Nitroaniline		10	U	10	U	10	U	10	U		
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U		
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U		
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U		
3-Nitroaniline		10	U	10	U	10	U	10	U		
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dinitrophenol		10	U	10	U	10	U	10	U		
4-Nitrophenol		10	U	10	U	10	U	10	U		
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U		

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SA-63B 8/19,20/2014 Water		SA-64B 8/19,20/2014 Water		SA-65B 8/19,20/2014 Water		SA-66B 8/19,20/2014 Water		Peach Country 8/19/2014 Water
Semivolatile Organic Compounds (µg/L) (Continued)										Not Analyzed
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U	
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	
4-Nitroaniline		10	U	10	U	10	U	10	U	
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U	
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U	
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	
Atrazine		5.0	U	5.0	U	5.0	U	5.0	U	
Pentachlorophenol		10	UJ	10	UJ	10	UJ	10	UJ	
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U	
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U	
Carbazole		5.0	U	5.0	U	5.0	U	5.0	U	
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U	
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	
3,3'-Dichlorobenzidine		5.0	U	5.0	U	5.0	U	5.0	U	
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U	
Bis(2-ethylhexyl)phthalate		5.0	U	5.0	U	5.0	U	5.0	U	
Di-n-octylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U	
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION:	Contaminants of	SW-01		SW-05		SW-06		SW-06-DUP		SW-07	
DATE COLLECTED:	Concern -	8/18,20/2014		8/18,20/2014		8/18,20/2014		8/18,20/2014		8/18,20/2014	
MATRIX:	Remediation Goals	Water		Water		Water		Water		Water	
Metals (µg/L)											
Arsenic	16/ND	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chromium	180	0.99	J	1.2	J	1.4	J	3.0		1.5	J
Lead	71/20/3.9	0.81	J	0.84	J	0.81	J	0.95	J	0.89	J
Mercury	0.15	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	4,600	1.9		2.0		1.8		2.8		2.2	
Selenium	5	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Silver	3.4	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Zinc	100	10.0		10.9		9.5	J	16.5		19.6	
Volatile Organic Compounds (µg/L)											
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl acetate		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-butyl ether		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SW-01 8/18,20/2014 Water		SW-05 8/18,20/2014 Water		SW-06 8/18,20/2014 Water		SW-06-DUP 8/18,20/2014 Water		SW-07 8/18,20/2014 Water	
Volatile Organic Compounds (µg/L) (Continued)											
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
o-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SW-01 8/18,20/2014 Water		SW-05 8/18,20/2014 Water		SW-06 8/18,20/2014 Water		SW-06-DUP 8/18,20/2014 Water		SW-07 8/18,20/2014 Water	
Semivolatile Organic Compounds (µg/L)											
Benzaldehyde		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Phenol	4,600,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4	0.025*	U	0.025*	U	0.025*	U	0.050	U	0.025*	U
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,2'-Oxybis(1-chloropropane)		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		10	U	10	U	10	U	10	U	10	U
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	U	10	U	10	U	10	U	10	U
4-Nitrophenol		10	U	10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SW-01 8/18,20/2014 Water		SW-05 8/18,20/2014 Water		SW-06 8/18,20/2014 Water		SW-06-DUP 8/18,20/2014 Water		SW-07 8/18,20/2014 Water	
Semivolatile Organic Compounds (µg/L) (Continued)											
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol		10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-octylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:
U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION:	Contaminants of	TB 081814		TB 081914		RB 8/19,20/14		TB 82114		RB 082114	
DATE COLLECTED:	Concern -	8/18/2014		8/19/2014		8/19,20/2014		8/21/2014		8/21/2014	
MATRIX:	Remediation Goals	DI Water		DI Water		DI Water		DI Water		DI Water	
Metals (µg/L)		Not Analyzed		Not Analyzed				Not Analyzed			
Arsenic	16/ND					1.0	U			1.0	U
Chromium	180					0.11	J			0.11	J
Lead	71/20/3.9					1.0	U			1.0	U
Mercury	0.15					0.20	U			0.20	U
Nickel	4,600					1.0	U			1.0	U
Selenium	5					5.0	U			5.0	U
Silver	3.4					1.0	U			1.0	U
Zinc	100					2.0	U			2.0	U
Volatile Organic Compounds (µg/L)											
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	U	4.7	J
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl acetate		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-butyl ether		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 081814 8/18/2014 DI Water		TB 081914 8/19/2014 DI Water		RB 8/19,20/14 8/19,20/2014 DI Water		TB 82114 8/21/2014 DI Water		RB 082114 8/21/2014 DI Water	
Volatile Organic Compounds (µg/L) (Continued)											
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
o-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 081814 8/18/2014 DI Water	TB 081914 8/19/2014 DI Water	RB 8/19,20/14 8/19,20/2014 DI Water		TB 82114 8/21/2014 DI Water	RB 082114 8/21/2014 DI Water	
Semivolatile Organic Compounds (µg/L)		Not Analyzed	Not Analyzed			Not Analyzed		
Benzaldehyde				5.0	U		5.0	U
Phenol	4,600,000			5.0	U		5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4			0.050	U		0.050	U
2-Chlorophenol				5.0	U		5.0	U
2-Methylphenol				5.0	U		5.0	U
2,2'-Oxybis(1-chloropropane)				5.0	U		5.0	U
Acetophenone				5.0	U		5.0	U
4-Methylphenol				5.0	U		5.0	U
N-Nitroso-di-n-propylamine				5.0	U		5.0	U
Hexachloroethane				5.0	U		5.0	U
Nitrobenzene				5.0	U		5.0	U
Isophorone				5.0	U		5.0	U
2-Nitrophenol				5.0	U		5.0	U
2,4-Dimethylphenol				5.0	U		5.0	U
Bis(2-chloroethoxy)methane				5.0	U		5.0	U
2,4-Dichlorophenol				5.0	U		5.0	U
Naphthalene				5.0	U		5.0	U
4-Chloroaniline				5.0	U		5.0	U
Hexachlorobutadiene				5.0	U		5.0	U
Caprolactam				5.0	U		5.0	U
4-Chloro-3-methylphenol				5.0	U		5.0	U
2-Methylnaphthalene				5.0	U		5.0	U
Hexachlorocyclopentadiene				5.0	U		5.0	U
2,4,6-Trichlorophenol				5.0	U		5.0	U
2,4,5-Trichlorophenol				5.0	U		5.0	U
1,1'-Biphenyl				5.0	U		5.0	U
2-Chloronaphthalene				5.0	U		5.0	U
2-Nitroaniline				10	U		10	U
Dimethylphthalate				5.0	U		5.0	U
2,6-Dinitrotoluene				5.0	U		5.0	U
Acenaphthylene				5.0	U		5.0	U
3-Nitroaniline				10	U		10	U
Acenaphthene				5.0	U		5.0	U
2,4-Dinitrophenol				10	U		10	U
4-Nitrophenol				10	U		10	U
Dibenzofuran				5.0	U		5.0	U
2,4-Dinitrotoluene				5.0	U		5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 081814 8/18/2014 DI Water	TB 081914 8/19/2014 DI Water	RB 8/19,20/14 8/19,20/2014 DI Water		TB 82114 8/21/2014 DI Water	RB 082114 8/21/2014 DI Water	
Semivolatile Organic Compounds (µg/L) (Continued)		Not Analyzed	Not Analyzed			Not Analyzed		
Diethylphthalate				5.0	U		5.0	U
Fluorene				5.0	U		5.0	U
4-Chlorophenyl-phenylether				5.0	U		5.0	U
4-Nitroaniline				10	U		10	U
4,6-Dinitro-2-methylphenol				10	U		10	U
N-Nitrosodiphenylamine				5.0	U		5.0	U
1,2,4,5-Tetrachlorobenzene				5.0	U		5.0	U
4-Bromophenyl-phenylether				5.0	U		5.0	U
Hexachlorobenzene				5.0	U		5.0	U
Atrazine				5.0	U		5.0	U
Pentachlorophenol				10	UJ		10	UJ
Phenanthrene				5.0	U		5.0	U
Anthracene				5.0	U		5.0	U
Carbazole				5.0	U		5.0	U
Di-n-butylphthalate				5.0	U		5.0	U
Fluoranthene				5.0	U		5.0	U
Pyrene				5.0	U		5.0	U
Butylbenzylphthalate				5.0	U		5.0	U
3,3'-Dichlorobenzidine				5.0	U		5.0	U
Benzo(a)anthracene				5.0	U		5.0	U
Chrysene				5.0	U		5.0	U
Bis(2-ethylhexyl)phthalate				5.0	U		2.1	J
Di-n-octylphthalate				5.0	U		5.0	U
Benzo(b)fluoranthene				5.0	U		5.0	U
Benzo(k)fluoranthene				5.0	U		5.0	U
Benzo(a)pyrene				5.0	U		5.0	U
Indeno(1,2,3-cd)pyrene				5.0	U		5.0	U
Dibenzo(a,h)anthracene				5.0	U		5.0	U
Benzo(g,h,i)perylene				5.0	U		5.0	U
2,3,4,6-Tetrachlorophenol				5.0	U		5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 082514 8/25/2014 DI Water		RB 082514 8/25/2014 DI Water		TB 090914 9/9/2014 DI Water		TB 091014 9/10/2014 DI Water		RB 091014 9/10/2014 DI Water	
Metals (µg/L)		Not Analyzed				Not Analyzed		Not Analyzed			
Arsenic	16/ND			1.0	U					1.0	U
Chromium	180			2.0	U					8.8	
Lead	71/20/3.9			1.0	U					1.0	U
Mercury	0.15			0.20	U					0.20	U
Nickel	4,600			1.0	U					7.4	
Selenium	5			5.0	U					5.0	U
Silver	3.4			1.0	U					1.0	U
Zinc	100			2.8						0.43	
Volatile Organic Compounds (µg/L)											
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	4.4	J	5.0	U	5.0	U	3.7	J
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl acetate		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-butyl ether		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 082514 8/25/2014 DI Water		RB 082514 8/25/2014 DI Water		TB 090914 9/9/2014 DI Water		TB 091014 9/10/2014 DI Water		RB 091014 9/10/2014 DI Water	
Volatile Organic Compounds (µg/L) (Continued)											
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
o-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
m,p-Xylene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

SAMPLE LOCATION:	Contaminants of	TB 082514	RB 082514		TB 090914	TB 091014	RB 091014	
DATE COLLECTED:	Concern -	8/25/2014	8/25/2014		9/9/2014	9/10/2014	9/10/2014	
MATRIX:	Remediation Goals	DI Water	DI Water		DI Water	DI Water	DI Water	
Semivolatile Organic Compounds (µg/L)		Not Analyzed			Not Analyzed	Not Analyzed		
Benzaldehyde			5.0	U			5.0	U
Phenol	4,600,000		5.0	U			5.0	U
Bis(2-chloroethyl)ether (BCEE)	1.4		0.050	U			0.050	U
2-Chlorophenol			5.0	U			5.0	U
2-Methylphenol			5.0	U			5.0	U
2,2'-Oxybis(1-chloropropane)			5.0	U			5.0	U
Acetophenone			5.0	U			5.0	U
4-Methylphenol			5.0	U			5.0	U
N-Nitroso-di-n-propylamine			5.0	U			5.0	U
Hexachloroethane			5.0	U			5.0	U
Nitrobenzene			5.0	U			5.0	U
Isophorone			5.0	U			5.0	U
2-Nitrophenol			5.0	U			5.0	U
2,4-Dimethylphenol			5.0	U			5.0	U
Bis(2-chloroethoxy)methane			5.0	U			5.0	U
2,4-Dichlorophenol			5.0	U			5.0	U
Naphthalene			5.0	U			5.0	U
4-Chloroaniline			5.0	U			5.0	U
Hexachlorobutadiene			5.0	U			5.0	U
Caprolactam			5.0	U			5.0	U
4-Chloro-3-methylphenol			5.0	U			5.0	U
2-Methylnaphthalene			5.0	U			5.0	U
Hexachlorocyclopentadiene			5.0	U			5.0	U
2,4,6-Trichlorophenol			5.0	U			5.0	U
2,4,5-Trichlorophenol			5.0	U			5.0	U
1,1'-Biphenyl			5.0	U			5.0	U
2-Chloronaphthalene			5.0	U			5.0	U
2-Nitroaniline			10	U			10	U
Dimethylphthalate			5.0	U			5.0	U
2,6-Dinitrotoluene			5.0	U			5.0	U
Acenaphthylene			5.0	U			5.0	U
3-Nitroaniline			10	U			10	U
Acenaphthene			5.0	U			5.0	U
2,4-Dinitrophenol			10	U			10	U
4-Nitrophenol			10	U			10	U
Dibenzofuran			5.0	U			5.0	U
2,4-Dinitrotoluene			5.0	U			5.0	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	TB 082514 8/25/2014 DI Water	RB 082514 8/25/2014 DI Water		TB 090914 9/9/2014 DI Water	TB 091014 9/10/2014 DI Water	RB 091014 9/10/2014 DI Water	
Semivolatile Organic Compounds (µg/L) (Continued)		Not Analyzed			Not Analyzed	Not Analyzed		
Diethylphthalate			5.0	U			5.0	U
Fluorene			5.0	U			5.0	U
4-Chlorophenyl-phenylether			5.0	U			5.0	U
4-Nitroaniline			10	U			10	U
4,6-Dinitro-2-methylphenol			10	U			10	U
N-Nitrosodiphenylamine			5.0	U			5.0	U
1,2,4,5-Tetrachlorobenzene			5.0	U			5.0	U
4-Bromophenyl-phenylether			5.0	U			5.0	U
Hexachlorobenzene			5.0	U			5.0	U
Atrazine			5.0	U			5.0	U
Pentachlorophenol			10	UJ			10	U
Phenanthrene			5.0	U			5.0	U
Anthracene			5.0	U			5.0	U
Carbazole			5.0	U			5.0	U
Di-n-butylphthalate			5.0	U			5.0	U
Fluoranthene			5.0	U			5.0	U
Pyrene			5.0	U			5.0	U
Butylbenzylphthalate			5.0	U			5.0	U
3,3'-Dichlorobenzidine			5.0	U			5.0	U
Benzo(a)anthracene			5.0	U			5.0	U
Chrysene			5.0	U			5.0	U
Bis(2-ethylhexyl)phthalate			5.0	U			5.0	U
Di-n-octylphthalate			5.0	U			5.0	U
Benzo(b)fluoranthene			5.0	U			5.0	U
Benzo(k)fluoranthene			5.0	U			5.0	U
Benzo(a)pyrene			5.0	U			5.0	U
Indeno(1,2,3-cd)pyrene			5.0	U			5.0	U
Dibenzo(a,h)anthracene			5.0	U			5.0	U
Benzo(g,h,i)perylene			5.0	U			5.0	U
2,3,4,6-Tetrachlorophenol			5.0	U			5.0	U

**BCEE SIMs analysis performed by ERDC. These samples were collected by USACE on the following dates:*
August 19 - 21, 2014
September 3 and 4, 2014
March 10, 2015

Qualifier Codes:
U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J+ This result is considered a biased high quantitative estimate.
J- This result is considered a biased low quantitative estimate.

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	EW-13A 9/14/2015 Water		EW-17B* 9/14 & 10/5/2015 Water		EW-17B DUP 9/14/2015 Water		PW-1A 9/14/2015 Water		PW-2 9/14/2015 Water	
Volatile Organic Compounds (µg/L)											
Dichlorodifluoromethane		0.20	J	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	15		18		0.50	U	13	
Bromomethane		0.50	U	0.50	UJ	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	2.4	
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	4.7	J	5.0	U	5.0	U	5.0	U
Carbon disulfide		0.50	U	0.50	U	0.50	U	17		0.50	U
Methyl Acetate		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.73	
trans-1,2-Dichloroethene		0.50	U	0.36	J	0.43	J	0.16	J	0.38	J
Methyl tert-butyl Ether		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.19	J	0.97		0.85		0.50	U	2.0	
cis-1,2-Dichloroethene		0.44	J	1.1		1.3		0.50	U	7.5	
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.64		1.2		0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.45	J	0.50	U	0.50	U	1.2		1.7	
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	6.3		6.2		5.5		36		72	
1,2-Dichloroethane	99	1.2		27		34		0.50	U	0.50	U
Trichloroethene		0.50	U	1.2	J	2.0		0.50	U	0.50	U

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Lipari Landfill
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Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	EW-13A 9/14/2015 Water		EW-17B* 9/14 & 10/5/2015 Water		EW-17B DUP 9/14/2015 Water		PW-1A 9/14/2015 Water		PW-2 9/14/2015 Water	
Volatile Organic Compounds (μg/L) (Continued)											
Methylcyclohexane		0.69		2.3		2.1		0.50	UJ	0.74	
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	UJ	5.0	U
Toluene	200,000	0.50	U	0.88	U	2.2		0.50	U	1.2	
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.17	J	0.19	J	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	330		130		100		450		58	
Ethylbenzene	29,000	0.79		61		40		2.1		4.2	
o-xylene		0.19	J	39		55		0.50	U	17	
m,p-xylene		0.19	J	12		14		0.62		4.5	
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		7.0		5.5		4.5		21		2.8	
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		1.3		4.2		4.2		2.3		0.81	
1,2-Dichlorobenzene		7.1		220		180		5.7		29	
1,4-Dichlorobenzene		8.8		16		15		9.3		2.6	
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-trichlorobenzene		0.50	U	5.5		5.5		0.21	J	0.16	J
1,2,3-Trichlorobenzene		0.50	U	2.8		2.7		0.50	U	0.50	U

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SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	EW-13A 9/14/2015 Water		EW-17B* 9/14 & 10/5/2015 Water		EW-17B DUP 9/14/2015 Water		PW-1A 9/14/2015 Water		PW-2 9/14/2015 Water	
Semivolatile Organic Compounds (µg/L)											
Benzaldehyde		10	U	10	U	10	U	10	U	10	U
Phenol	4,600,000	10	U	10	U	10	U	10	U	10	U
Bis(2-Chloroethyl)ether	1.4	380		190		180		500		320	
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		10	U	10	U	10	U	10	U	10	U
2,2-oxybis(1-Chloropropane)		10	U	10	U	10	U	10	U	10	U
Acetophenone		10	U	14		15		3.2	J	4.8	J
4-Methylphenol		10	U	10	U	10	U	10	U	10	U
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		5.0	U	2.4	J	2.3	J	5.0	U	5.0	U
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-Chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		5.0	U	18		19		5.0	U	5.0	U
4-Chloroaniline		1.0	J	10	U	10	U	14		10	U
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		10	U	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.0	U	1.9	J	2.0	J	5.0	U	5.0	U
Hexachlorocyclopentadiene		10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Biphenyl		1.4	J	5.0	U	5.0	U	5.0	U	5.0	U

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Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	EW-13A 9/14/2015 Water		EW-17B* 9/14 & 10/5/2015 Water		EW-17B DUP 9/14/2015 Water		PW-1A 9/14/2015 Water		PW-2 9/14/2015 Water	
Semivolatile Organic Compounds (μg/L) (Continued)											
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dimethylphthalate		5.0	U	1.1	J	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
4-Nitrophenol		10	U	10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Diethylphthalate		1.2	J	5.0	U	1.1	J	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		10	U	10	U	10	U	10	U	10	U
Pentachlorophenol		10	U	10	U	10	U	10	U	10	U
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		10	U	10	U	10	U	10	U	10	U

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Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	EW-13A 9/14/2015 Water		EW-17B* 9/14 & 10/5/2015 Water		EW-17B DUP 9/14/2015 Water		PW-1A 9/14/2015 Water		PW-2 9/14/2015 Water	
Semivolatile Organic Compounds (µg/L) (Continued)											
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3-Dichlorobenzidine		10	U	10	U	10	U	10	U	10	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U	4.2	J	4.2	J	5.0	U	5.0	U
Di-n-octyl phthalate		10	U	10	U	10	U	10	U	10	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dioxane		5.7	J-	18	J-	20	J-	3.4	J-	9.9	J-

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.

J This result or detection limit should be considered a quantitative estimate.

J- This result is considered a biased low quantitative estimate.

* The volatiles sample for this location was collected on 10/5/2015. The semi-volatiles sample was collected on 9/14/2015.

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Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/10/2015 Water		FD-02 9/10/2015 Water		FD-03 9/10/2015 Water		FD-03 DUP 9/10/2015 Water		INT-A 9/10/2015 Water		INT-B 9/10/2015 Water	
Volatile Organic Compounds (µg/L)													
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon disulfide		0.50	U	0.50	U	0.50	U	0.50	U	0.55	U	0.50	U
Methyl Acetate		0.50	U	0.81		0.75		0.65		0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
Methyl tert-butyl Ether		0.50	U	0.50	U	0.54		0.55		0.60		0.35	J
1,1-Dichloroethane		0.50	U	0.50	U	0.15	J	0.17	J	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.15	J	0.50	U	0.50	U	0.50	UJ	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	7.0		6.8		18		5.6	
1,2-Dichloroethane	99	1.9		0.95		0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

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SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/10/2015 Water		FD-02 9/10/2015 Water		FD-03 9/10/2015 Water		FD-03 DUP 9/10/2015 Water		INT-A 9/10/2015 Water		INT-B 9/10/2015 Water	
Volatile Organic Compounds (µg/L) (Continued)													
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	2.1	J	2.0	J	31		5.0	U
Toluene	200,000	0.50	U	0.50	U	0.50	U	0.50	U	2.1		0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.55		0.35	J	0.34	J	0.50	UJ	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.13	J	0.13	J	0.29	J	0.11	J
o-xylene		0.50	U	0.50	U	0.14	J	0.15	J	0.24	J	0.17	J
m,p-xylene		0.50	U	0.50	U	0.13	J	0.14	J	0.21	J	0.22	J
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.73		0.70		1.7		0.39	J
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
1,2-Dichlorobenzene		1.3		0.90		0.12	J	0.12	J	0.50	UJ	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ	0.50	U

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SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/10/2015 Water		FD-02 9/10/2015 Water		FD-03 9/10/2015 Water		FD-03 DUP 9/10/2015 Water		INT-A 9/10/2015 Water		INT-B 9/10/2015 Water	
Semivolatile Organic Compounds (µg/L)													
Benzaldehyde		10	U	10	U	10	U	10	U	10	U	10	U
Phenol	4,600,000	10	U	10	U	10	U	10	U	10	U	10	U
Bis(2-Chloroethyl)ether	1.4	6.9	J	16		220		260		530		97	
2-Chlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol		10	U	10	U	10	U	10	U	10	U	10	U
2,2-oxybis(1-Chloropropane)		10	U	10	U	10	U	10	U	10	U	10	U
Acetophenone		10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol		1.1	J	10	U	10	U	10	U	10	U	10	U
N-Nitroso-di-n-propylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-Chloroethoxy)methane		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline		10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam		10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene		10	U	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Biphenyl		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix A
Lipari Landfill
2015 Annual Sampling Event
Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/10/2015 Water		FD-02 9/10/2015 Water		FD-03 9/10/2015 Water		FD-03 DUP 9/10/2015 Water		INT-A 9/10/2015 Water		INT-B 9/10/2015 Water	
Semivolatile Organic Compounds (μg/L) (Continued)													
2-Chloronaphthalene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dimethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline		10	U	10	U	10	U	10	U	10	U	10	U
Acenaphthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol		10	U	10	U	10	U	10	UJ	10	U	10	U
4-Nitrophenol		10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Diethylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline		10	U	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol		10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine		10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol		10	U	10	U	10	U	10	U	10	U	10	U
Phenanthrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbazole		10	U	10	U	10	U	10	U	10	U	10	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	FD-01 9/10/2015 Water		FD-02 9/10/2015 Water		FD-03 9/10/2015 Water		FD-03 DUP 9/10/2015 Water		INT-A 9/10/2015 Water		INT-B 9/10/2015 Water	
Semivolatile Organic Compounds (µg/L) (Continued)													
Di-n-butylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3-Dichlorobenzidine		10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-octyl phthalate		10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dioxane		2.0	UJ	2.0	UJ	14	J-	15	J-	24	J-	11	J-

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.

J This result or detection limit should be considered a quantitative estimate.

J- This result is considered a biased low quantitative estimate.

* The volatiles sample for this location was collected on 10/5/2015. The semi-volatiles sample was collected on 9/14/2015.

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB 091415 9/14/2015 DI Water		RB 100515 10/5/2015 DI Water		TB 091015 9/10/2015 DI Water		TB 091415 9/14/2015 DI Water		TB 100515 10/5/2015 DI Water	
Volatile Organic Compounds (µg/L)											
Dichlorodifluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl chloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane		0.50	U	0.50	UJ	0.50	U	0.50	U	0.50	UJ
Chloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon disulfide		0.16	J	0.50	U	0.50	U	0.50	U	0.50	U
Methyl Acetate		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylene chloride	1,600	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-butyl Ether		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	470	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Carbon tetrachloride		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	71	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	99	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

Appendix A
Lipari Landfill
2015 Annual Sampling Event
Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB 091415 9/14/2015 DI Water		RB 100515 10/5/2015 DI Water		TB 091015 9/10/2015 DI Water		TB 091415 9/14/2015 DI Water		TB 100515 10/5/2015 DI Water	
Volatile Organic Compounds (μg/L) (Continued)											
Methylcyclohexane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
4-Methyl-2-pentanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	200,000	0.33	J	0.46	J	0.50	U	0.50	U	0.50	U
trans-1,3-Dichloropropene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2-Trichloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Tetrachloroethene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	21,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Ethylbenzene	29,000	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
o-xylene		0.50	U	0.10	J	0.50	U	0.50	U	0.50	U
m,p-xylene		0.50	U	0.19	J	0.50	U	0.50	U	0.50	U
Styrene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Isopropylbenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

Appendix A
Lipari Landfill
2015 Annual Sampling Event
Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB 091415 9/14/2015 DI Water		RB 100515 10/5/2015 DI Water	TB 091015 9/10/2015 DI Water	TB 091415 9/14/2015 DI Water	TB 100515 10/5/2015 DI Water
Semivolatile Organic Compounds (µg/L)				Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Benzaldehyde		10	U				
Phenol	4,600,000	10	U				
Bis(2-Chloroethyl)ether	1.4	10	U				
2-Chlorophenol		5.0	U				
2-Methylphenol		10	U				
2,2-oxybis(1-Chloropropane)		10	U				
Acetophenone		10	U				
4-Methylphenol		10	U				
N-Nitroso-di-n-propylamine		5.0	U				
Hexachloroethane		5.0	U				
Nitrobenzene		5.0	U				
Isophorone		5.0	U				
2-Nitrophenol		5.0	U				
2,4-Dimethylphenol		5.0	U				
Bis(2-Chloroethoxy)methane		5.0	U				
2,4-Dichlorophenol		5.0	U				
Naphthalene		5.0	U				
4-Chloroaniline		10	UJ				
Hexachlorobutadiene		5.0	U				
Caprolactam		10	U				
4-Chloro-3-methylphenol		5.0	U				
2-Methylnaphthalene		5.0	U				
Hexachlorocyclopentadiene		10	UJ				
2,4,6-Trichlorophenol		5.0	U				
2,4,5-Trichlorophenol		5.0	U				
1,1-Biphenyl		5.0	U				

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Lipari Landfill
2015 Annual Sampling Event
Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB 091415 9/14/2015 DI Water		RB 100515 10/5/2015 DI Water	TB 091015 9/10/2015 DI Water	TB 091415 9/14/2015 DI Water	TB 100515 10/5/2015 DI Water
Semivolatile Organic Compounds (μg/L) (Continued)							
2-Chloronaphthalene		5.0	U				
2-Nitroaniline		5.0	U				
Dimethylphthalate		5.0	U				
2,6-Dinitrotoluene		5.0	U				
Acenaphthylene		5.0	U				
3-Nitroaniline		10	U				
Acenaphthene		5.0	U				
2,4-Dinitrophenol		10	UJ				
4-Nitrophenol		10	U				
Dibenzofuran		5.0	U				
2,4-Dinitrotoluene		5.0	U				
Diethylphthalate		5.0	U				
Fluorene		5.0	U				
4-Chlorophenyl-phenylether		5.0	U				
4-Nitroaniline		10	U				
4,6-Dinitro-2-methylphenol		10	U				
N-Nitrosodiphenylamine		5.0	U				
1,2,4,5-Tetrachlorobenzene		5.0	U				
4-Bromophenyl-phenylether		5.0	U				
Hexachlorobenzene		5.0	U				
Atrazine		10	U				
Pentachlorophenol		10	U				
Phenanthrene		5.0	U				
Anthracene		5.0	U				
Carbazole		10	U				

Appendix A
Lipari Landfill
2015 Annual Sampling Event
Volatile and Semivolatile Organic Compounds

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB 091415 9/14/2015 DI Water		RB 100515 10/5/2015 DI Water	TB 091015 9/10/2015 DI Water	TB 091415 9/14/2015 DI Water	TB 100515 10/5/2015 DI Water
Semivolatile Organic Compounds (µg/L) (Continued)							
Di-n-butylphthalate		5.0	U				
Fluoranthene		5.0	U				
Pyrene		5.0	U				
Butylbenzylphthalate		5.0	U				
3,3-Dichlorobenzidine		10	UJ				
Benzo(a)anthracene		5.0	U				
Chrysene		5.0	U				
Bis(2-ethylhexyl)phthalate		5.0	U				
Di-n-octyl phthalate		10	U				
Benzo(b)fluoranthene		5.0	U				
Benzo(k)fluoranthene		5.0	U				
Benzo(a)pyrene		5.0	U				
Indeno(1,2,3-cd)pyrene		5.0	U				
Dibenzo(a,h)anthracene		5.0	U				
Benzo(g,h,i)perylene		5.0	U				
2,3,4,6-Tetrachlorophenol		5.0	U				
1,4-Dioxane		2.0	UJ				

Qualifier Codes:

U This compound/analyte was not detected. The numerical value reported represents the sample detection limit for the compound/analyte.
J This result or detection limit should be considered a quantitative estimate.
J- This result is considered a biased low quantitative estimate.
* The volatiles sample for this location was collected on 10/5/2015. The semi-volatiles sample was collected on 9/14/2015.

Appendix A
Lipari Landfill
2015 Sampling Event - Metals and
Bis(2-chloroethyl)ether (BCEE) by Selected Ion Monitoring (SIM)

SAMPLE LOCATION:	**Contaminants of Concern - Remediation Goals**	**K-7**		**K-8**		**K-31**		**MWK-8**	
DATE COLLECTED:		**8/13/2015**		**8/18/2015**		**8/18/2015**		**8/13/2015**	
MATRIX:		**Water**		**Water**		**Water**		**Water**	
Metals (µg/L)									
Arsenic	16/ND	1.0	U	1.3		1.0	U	1.0	U
Chromium	180	0.59	J	0.53	J	1.2	J	7.8	
Lead	71/20/3.9	1.0	U	1.0	U	1.0	U	1.4	
Mercury	0.15	0.050	J	0.20	U	0.20	U	0.20	U
Nickel	4,600	1.8		1.8		4.6		23.1	
Selenium	5	5.0	U	5.0	U	5.0	U	5.0	U
Silver	3.4	1.0	U	0.077	J	1.0	U	1.0	U
Zinc	100	19.8		2.0	U	25.9		100	
BCEE-Selected Ion Monitoring (µg/L)									
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.112		0.0250	U	0.0499		0.0250	U

SAMPLE LOCATION:	**Contaminants of Concern - Remediation Goals**	**V-5**		**FLD-02**		**V-6**		**V-6 DUP**	
DATE COLLECTED:		**8/13/2015**		**8/13/2015**		**8/19/2015**		**8/19/2015**	
MATRIX:		**Water**		**Water**		**Water**		**Water**	
Metals (µg/L)						Not Analyzed		Not Analyzed	
Arsenic	16/ND	1.0	U	1.0	U				
Chromium	180	43.0		30.0					
Lead	71/20/3.9	1.0	U	1.0	U				
Mercury	0.15	0.20	U	0.060	J				
Nickel	4,600	27.1	J	14.1					
Selenium	5	5.0	U	5.0	U				
Silver	3.4	0.079	J	0.070	J				
Zinc	100	6.5		6.1					
BCEE by Selected Ion Monitoring (µg/L)									
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.0250	U	0.0250	U	0.0250	U	0.0250	U

Qualifier Codes:
U - This compound/analyte was not detected. The numerical value reported represents the sample quantitation detection limit for the compound/analyte.
J - This result should be considered a quantitative estimate.

Appendix A
Lipari Landfill
2015 Sampling Event - Metals and
Bis(2-chloroethyl)ether (BCEE) by Selected Ion Monitoring (SIM)

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	V-7 8/19/2015 Water		SA-63B 8/17/2015 Water		SA-64B 8/17/2015 Water		SA-65B 8/17/2015 Water	
Metals (µg/L)		Not Analyzed							
Arsenic	16/ND			1.0	U	1.8		5.0	
Chromium	180			5.2		7.9		25.9	
Lead	71/20/3.9			1.7		6.4		8.7	
Mercury	0.15			0.050	J	0.090	J	0.20	U
Nickel	4,600			5.4		3.2		13.3	
Selenium	5			5.0	U	5.0	U	5.0	U
Silver	3.4			0.049	J	1.0	U	0.13	J
Zinc	100			76.7		121		128	
BCEE-Selected Ion Monitoring (µg/L)									
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.0250	U	0.0250	U	0.0250	U	0.0250	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SA-66B 8/17/2015 Water		SW-01 8/12/2015 Water		SW-05 9/9/2015 Water		SW-06 8/12/2015 Water	
Metals (µg/L)				Not Analyzed		Not Analyzed		Not Analyzed	
Arsenic	16/ND	2.0							
Chromium	180	7.9							
Lead	71/20/3.9	2.4							
Mercury	0.15	0.20	U						
Nickel	4,600	5.4							
Selenium	5	5.0	U						
Silver	3.4	1.0	U						
Zinc	100	32.8							
BCEE by Selected Ion Monitoring (µg/L)									
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.0250	U	0.0250	U	0.0250	U	0.0250	U

Qualifier Codes:

U - This compound/analyte was not detected. The numerical value reported represents the sample quantitation detection limit for the compound/analyte.

J - This result should be considered a quantitative estimate.

Appendix A
Lipari Landfill
2015 Sampling Event - Metals and
Bis(2-chloroethyl)ether (BCEE) by Selected Ion Monitoring (SIM)

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	SW-07 8/12/2015 Water		Peach Country 8/12/2015 Water		RB-01-081315 8/13/2015 DI Water		RB-01-081715 8/17/2015 DI Water	
Metals (µg/L)		Not Analyzed		Not Analyzed					
Arsenic	16/ND					1.0	U	1.0	U
Chromium	180					2.0	U	2.0	U
Lead	71/20/3.9					1.0	U	1.0	U
Mercury	0.15					0.20	U	0.030	J
Nickel	4,600					1.0	U	0.22	J
Selenium	5					5.0	U	5.0	U
Silver	3.4					1.0	U	1.0	U
Zinc	100					2.0	U	2.0	U
BCEE-Selected Ion Monitoring (µg/L)									
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.0250	U	0.0250	U	0.0250	U	0.0250	U

SAMPLE LOCATION: DATE COLLECTED: MATRIX:	Contaminants of Concern - Remediation Goals	RB-01-081815 8/18/2015 DI Water		RB-01-081915 8/19/2015 DI Water	
Metals (µg/L)				Not Analyzed	
Arsenic	16/ND	1.0	U		
Chromium	180	2.0	U		
Lead	71/20/3.9	1.0	U		
Mercury	0.15	0.20	U		
Nickel	4,600	1.0	U		
Selenium	5	5.0	U		
Silver	3.4	1.0	U		
Zinc	100	2.0	U		
BCEE by Selected Ion Monitoring (µg/L)					
Bis(2-Chloroethyl)ether (BCEE)	1.4	0.0250	U	0.0250	U

Qualifier Codes:

U - This compound/analyte was not detected. The numerical value reported represents the sample quantitation detection limit for the compound/analyte.

J - This result should be considered a quantitative estimate.

Appendix B
Paired Wells Water Levels - 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well ID		TOC ELEV.	1/9/2014	1/15/2014	1/27/2014	3/11/2014	3/19/2014	4/1/2014	4/8/2014	4/18/2014	4/22/2014	5/1/2014	5/16/2014	5/14/2014
C-15	**inside**	141.42	107.54	107.12	107.12	107.12	107.69	108.10	106.70	107.66	107.40	107.07	107.22	107.34
CDB-4	outside	143.53	120.65	120.82	120.87	121.59	121.42	121.52	121.67	121.65	121.82	121.76	121.91	121.88
Paired Well Head Differences			-13.11	-13.70	-13.75	-14.47	-13.73	-13.42	-14.97	-13.99	-14.42	-14.69	-14.69	-14.54
C-100	**inside**	136.69	111.42	111.47	111.31	117.33	111.21	111.40	111.18	111.30	111.30	111.30	111.30	111.30
C-101	outside	136.13	121.14	121.37	121.38	122.03	121.91	122.09	122.18	122.20	122.30	122.60	122.40	122.40
Paired Well Head Differences			-9.72	-9.90	-10.07	-4.70	-10.70	-10.69	-11.00	-10.90	-11.00	-11.30	-11.10	-11.10
C-102	**inside**	130.08	110.87	110.91	110.74	110.77	110.67	110.85	110.65	110.80	110.80	110.70	110.70	110.80
C-101	outside	136.13	121.14	121.37	121.38	122.03	121.91	122.09	122.18	122.20	122.30	122.60	122.40	122.40
Paired Well Head Differences			-10.27	-10.46	-10.64	-11.26	-11.24	-11.24	-11.53	-11.40	-11.50	-11.90	-11.70	-11.60
C-17	**inside**	130.93	107.19	107.07	107.09	107.32	107.77	108.07	107.80	107.06	107.26	106.70	106.59	106.59
C-16	outside	124.09	110.15	110.14	110.17	110.14	109.81	110.22	110.12	110.12	110.13	110.01	109.96	110.09
Paired Well Head Differences			-2.96	-3.07	-3.08	-2.82	-2.04	-2.15	-2.32	-3.06	-2.87	-3.31	-3.37	-3.50
E-22A	**inside**	127.00	106.99	107.24	107.74	107.63	107.15	106.91	108.25	106.86	107.78	107.68	107.18	107.05
C-63	outside	124.75	100.49	100.81	100.90	100.81	100.14	100.72	101.32	101.18	101.37	101.07	101.06	101.02
Paired Well Head Differences			6.50	6.43	6.84	6.82	7.01	6.19	6.93	5.68	6.41	6.61	6.12	6.03
C-21	**inside**	122.93	106.23	106.05	106.67	106.09	106.67	106.90	105.97	106.21	106.18	105.68	105.74	105.80
C-22A	outside	118.70	100.77	100.91	100.94	101.79	101.86	101.71	101.96	102.03	102.02	102.25	102.34	102.36
Paired Well Head Differences			5.46	5.14	5.73	4.30	4.81	5.19	4.01	4.18	4.16	3.43	3.40	3.44
C-23	**inside**	123.30	106.09	106.04	106.33	106.04	106.42	106.82	106.31	106.35	106.41	105.91	106.03	106.06
C-56	outside	122.52	99.62	99.76	99.85	100.39	100.21	100.33	100.57	100.46	100.47	100.37	101.08	100.70
Paired Well Head Differences			6.47	6.28	6.48	5.65	6.21	6.49	5.74	5.89	5.94	5.54	4.95	5.36
C-10A	**inside**	124.25	106.15	106.03	106.20	106.15	106.35	106.72	106.21	106.15	106.24	105.71	105.80	105.77
C46	outside	119.07	107.87	107.98	107.71	107.79	107.80	108.39	107.98	107.86	107.87	108.22	108.09	107.82
Paired Well Head Differences			-1.72	-1.95	-1.51	-1.64	-1.45	-1.67	-1.77	-1.71	-1.63	-2.51	-2.29	-2.05
C-25A	**inside**	124.55	106.41	106.64	106.79	107.14	106.79	107.14	106.33	106.35	106.41	105.90	105.97	105.97
C-26A	outside	123.61	113.27	113.11	112.86	113.44	113.45	114.12	113.69	113.61	113.63	114.65	113.76	113.72
Paired Well Head Differences			-6.86	-6.47	-6.07	-6.30	-6.66	-6.98	-7.36	-7.26	-7.22	-8.75	-7.79	-7.75

Well ID		TOC ELEV.	5/21/2014	5/27/2014	6/3/2014	6/10/2014	6/17/2014	7/17/2014	7/24/2014	7/29/2014	8/7/2014	8/14/2014	8/27/2014	9/3/2014
C-15	**inside**	141.42	107.09	107.12	107.31	107.25	104.35	106.30	107.07	107.07	107.31	105.52	105.58	106.43
CDB-4	outside	143.53	121.87	121.79	121.71	121.59	121.67	121.47	121.36	121.28	121.14	121.17	120.89	120.96
Paired Well Head Differences			-14.78	-14.67	-14.40	-14.34	-17.32	-15.17	-14.29	-14.21	-13.83	-15.65	-15.31	-14.53
C-100	**inside**	136.69	111.30	111.30	111.30	111.30	111.20	111.20	111.30	111.20	111.20	111.20	111.20	111.20
C-101	outside	136.13	122.40	122.30	122.30	122.10	122.30	122.00	121.90	121.80	121.70	121.80	121.40	121.30
Paired Well Head Differences			-11.10	-11.00	-11.00	-10.80	-11.10	-10.80	-10.60	-10.60	-10.50	-10.60	-10.20	-10.10
C-102	**inside**	130.08	110.70	110.70	110.70	110.70	110.50	110.60	110.60	110.60	110.50	110.50	110.50	110.50
C-101	outside	136.13	122.40	122.30	122.30	122.10	122.30	122.00	121.90	121.80	121.70	121.80	121.40	121.30
Paired Well Head Differences			-11.70	-11.60	-11.60	-11.40	-11.80	-11.40	-11.30	-11.20	-11.20	-11.30	-10.90	-10.80
C-17	**inside**	130.93	106.66	106.64	107.12	107.14	104.36	106.67	106.08	106.23	107.10	107.74	106.09	107.79
C-16	outside	124.09	110.06	109.98	110.00	109.96	109.65	109.84	109.84	109.78	109.74	109.66	109.78	109.74
Paired Well Head Differences			-3.40	-3.34	-2.88	-2.82	-5.29	-3.17	-3.76	-3.55	-2.64	-1.92	-3.69	-1.95
E-22A	**inside**	127.00	107.47	107.41	107.66	107.46	107.38	107.38	107.82	107.93	107.21	108.13	107.57	106.99
C-63	outside	124.75	100.98	100.67	101.40	100.95	101.13	100.67	100.66	100.48	100.44	100.58	100.52	100.69
Paired Well Head Differences			6.49	6.74	6.26	6.51	6.25	6.71	7.16	7.45	6.77	7.55	7.05	6.30
C-21	**inside**	122.93	105.74	105.70	105.80	105.58	103.82	105.05	105.12	105.01	104.59	104.02	104.78	104.57
C-22A	outside	118.70	102.18	102.09	101.78	101.61	101.76	101.32	101.18	101.07	100.85	100.76	100.60	100.51
Paired Well Head Differences			3.56	3.61	4.02	3.97	2.06	3.73	3.94	3.94	3.74	3.26	4.18	4.06
C-23	**inside**	123.30	105.99	105.95	106.14	105.88	104.18	105.22	105.32	105.13	104.95	104.28	104.93	104.68
C-56	outside	122.52	100.54	100.42	100.27	100.12	100.53	99.88	99.75	99.65	99.45	99.36	99.30	99.24
Paired Well Head Differences			5.45	5.53	5.87	5.76	3.65	5.34	5.57	5.48	5.50	4.92	5.63	5.44
C-10A	**inside**	124.25	105.82	105.80	105.89	105.67	104.39	105.27	105.18	105.18	104.75	104.34	104.89	104.72
C46	outside	119.07	107.77	107.72	107.72	107.69	108.06	107.64	107.57	107.60	107.78	107.82	107.57	107.62
Paired Well Head Differences			-1.95	-1.92	-1.83	-2.02	-3.67	-2.37	-2.39	-2.42	-3.03	-3.48	-2.68	-2.90
C-25A	**inside**	124.55	105.96	105.95	106.07	105.80	104.21	105.35	105.29	105.27	104.82	104.38	105.03	105.03
C-26A	outside	123.61	113.93	113.51	113.86	113.41	113.77	113.36	113.22	113.23	113.35	113.66	113.09	113.24
Paired Well Head Differences			-7.97	-7.56	-7.79	-7.61	-9.56	-8.01	-7.93	-7.96	-8.53	-9.28	-8.06	-8.21

TOC ELEV. = top of casing elevation

maximum head difference

Appendix B
Paired Wells Water Levels - 2014
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well ID		TOC ELEV.	9/12/2014	9/17/2014	9/23/2014	9/30/2014	10/8/2014	10/17/2014	10/24/2014	11/4/2014	11/12/2014	11/20/2014	12/1/2014	12/11/2014	12/30/2014
C-15	**inside**	141.42	108.24	106.18	106.49	105.88	106.28	105.98	106.31	106.51	105.92	106.06	106.63	106.18	106.51
CDB-4	outside	143.53	120.83	120.75	120.66	120.57	120.34	120.45	120.40	120.28	120.23	120.26	120.34	120.70	121.00
Paired Well Head Differences			-12.59	-14.57	-14.17	-14.69	-14.06	-14.47	-14.09	-13.77	-14.31	-14.20	-13.71	-14.52	-14.49
C-100	**inside**	136.69	111.30	111.20	111.20	111.20	110.89	111.20	111.20	111.20	110.74	110.74	110.77	110.67	110.79
C-101	outside	136.13	121.10	121.00	120.90	120.90	120.88	120.80	120.70	120.50	120.40	120.50	120.60	110.00	121.30
Paired Well Head Differences			-9.80	-9.80	-9.70	-9.70	-9.99	-9.60	-9.50	-9.30	-9.66	-9.76	-9.83	0.67	-10.51
C-102	**inside**	130.08	110.70	110.50	110.60	110.50	110.32	110.50	110.50	110.50	110.50	110.50	110.50	110.40	110.50
C-101	outside	136.13	121.10	121.00	120.90	120.90	120.88	120.80	120.70	120.50	120.40	120.50	120.60	110.00	121.30
Paired Well Head Differences			-10.40	-10.50	-10.30	-10.40	-10.56	-10.30	-10.20	-10.00	-9.90	-10.00	-10.10	0.40	-10.80
C-17	**inside**	130.93	108.17	107.94	107.77	107.79	107.70	107.69	107.42	107.31	107.33	107.34	107.47	107.51	107.14
C-16	outside	124.09	110.09	109.79	109.83	109.63	109.72	109.66	109.65	109.73	109.72	109.69	109.63	109.59	109.70
Paired Well Head Differences			-1.92	-1.85	-2.06	-1.84	-2.02	-1.97	-2.23	-2.42	-2.39	-2.35	-2.16	-2.08	-2.56
E-22A	**inside**	127.00	107.28	107.23	107.78	107.74	107.68	107.73	107.69	107.53	107.08	107.80	107.68	107.68	107.55
C-63	outside	124.75	100.66	100.57	100.52	100.76	100.29	100.86	100.83	100.90	100.97	100.97	100.97	101.26	101.21
Paired Well Head Differences			6.62	6.66	7.26	6.98	7.39	6.87	6.86	6.63	6.11	6.83	6.71	6.42	6.34
C-21	**inside**	122.93	106.85	104.60	105.20	104.55	104.85	104.41	104.80	104.93	104.94	105.09	105.05	105.02	105.28
C-22A	outside	118.70	100.39	100.54	100.24	100.54	100.10	100.05	99.93	99.91	99.93	99.97	100.41	100.43	101.18
Paired Well Head Differences			6.46	4.06	4.96	4.01	4.75	4.36	4.87	5.02	5.01	5.12	4.64	4.59	4.10
C-23	**inside**	123.30	106.62	105.33	105.23	104.70	104.85	104.61	104.93	104.96	104.96	105.15	105.02	104.92	105.21
C-56	outside	122.52	99.33	99.50	99.28	99.41	98.74	99.13	99.01	99.02	98.99	99.01	99.45	99.64	100.09
Paired Well Head Differences			7.29	5.83	5.95	5.29	6.11	5.48	5.92	5.94	5.97	6.14	5.57	5.28	5.12
C-10A	**inside**	124.25	106.33	105.20	105.25	104.74	104.93	104.60	104.81	104.92	104.98	105.18	105.02	105.05	105.26
C46	outside	119.07	107.56	107.55	107.51	107.67	107.53	107.66	107.61	107.64	107.63	107.81	107.87	107.89	107.93
Paired Well Head Differences			-1.23	-2.35	-2.26	-2.93	-2.60	-3.06	-2.80	-2.72	-2.65	-2.63	-2.85	-2.84	-2.67
C-25A	**inside**	124.55	106.94	105.28	105.38	104.81	105.05	104.68	104.94	105.10	105.08	105.33	105.19	105.18	105.40
C-26A	outside	123.61	113.00	112.97	112.88	113.03	112.91	112.95	113.05	113.01	112.94	112.88	113.15	113.14	112.34
Paired Well Head Differences			-6.06	-7.69	-7.50	-8.22	-7.86	-8.27	-8.11	-7.91	-7.86	-7.55	-7.96	-7.96	-6.94

TOC ELEV. = top of casing elevation

maximum head difference

Appendix B
Paired Wells Water Levels - 2015
Lipari Landfill Superfund Site
Gloucester County, New Jersey

Well ID		TOC ELEV.	1/30/15	3/17/15	4/29/15	5/14/15	6/10/15	7/30/15	8/25/15	9/16/15	10/22/15	11/16/15	12/14/15
C-15	**inside**	141.42	105.53	108.65	105.92	106.63	104.68	108.47	108.22	108.09	108.05	107.85	105.48
CDB-4	outside	141.27	121.22	121.31	121.43	121.32	120.97	120.93	121.04	120.79	120.36	120.64	120.48
Paired Well Head Differences			-15.69	-12.66	-15.51	-14.69	-16.29	-12.46	-12.82	-12.70	-12.31	-12.79	-15.00
C-100	**inside**	136.69	110.64	111.03	110.67	110.74	110.44	111.07	111.01	110.98	110.98	110.93	110.11
C-101	outside	136.13	121.67	121.83	121.91	121.78	121.54	121.45	121.10	120.80	120.92	120.70	120.50
Paired Well Head Differences			-11.03	-10.80	-11.24	-11.04	-11.10	-10.38	-10.09	-9.82	-9.94	-9.77	-10.39
C-102	**inside**	130.08	110.12	110.50	110.13	110.19	109.90	110.55	111.00	110.70	110.46	110.42	109.33
C-101	outside	136.13	121.67	121.83	121.91	121.78	121.54	121.45	121.10	120.80	120.92	120.70	120.50
Paired Well Head Differences			-11.55	-11.33	-11.78	-11.59	-11.64	-10.90	-10.10	-10.10	-10.46	-10.28	-11.17
C-17	**inside**	130.93	106.43	108.09	105.99	106.05	105.58	108.91	109.09	108.88	108.60	108.34	108.34
C-16	outside	124.09	109.55	109.98	109.58	109.56	109.37	110.03	110.46	110.51	109.91	109.84	108.62
Paired Well Head Differences			-3.12	-1.89	-3.59	-3.51	-3.79	-1.12	-1.37	-1.63	-1.31	-1.50	-0.28
C-17	**inside**	130.93	106.43	108.09	105.99	106.05	105.58	108.91	109.09	108.88	108.60	108.34	108.34
C-63	outside	124.75	101.01	101.04	100.87	100.54	100.49	100.80	100.28	100.14	100.34	100.50	99.81
Paired Well Head Differences			5.42	7.05	5.12	5.51	5.09	8.11	8.81	8.74	8.26	7.84	8.53
C-23	**inside**	123.30	105.06	106.87	105.18	105.27	104.33	107.10	107.21	107.26	107.30	107.84	107.18
C-56	outside	122.52	100.31	100.53	100.55	100.23	99.75	99.52	99.53	99.23	99.19	99.01	99.33
Paired Well Head Differences			4.75	6.34	4.63	5.04	4.58	7.58	7.68	8.03	8.11	8.83	7.85
C-25A	**inside**	124.55	105.21	107.21	105.29	105.43	104.53	107.57	107.58	107.58	107.66	107.62	105.82
C-46	outside	119.07	108.06	108.40	107.95	107.70	107.74	107.66	107.92	107.83	107.62	107.94	107.84
Paired Well Head Differences			-2.85	-1.19	-2.66	-2.27	-3.21	-0.09	-0.34	-0.25	0.04	-0.32	-2.02
C-25A	**inside**	124.55	105.21	107.21	105.29	105.43	104.53	107.57	107.58	107.58	107.66	107.62	105.82
C-26A	outside	123.61	113.55	113.98	113.56	113.36	114.04	113.19	113.07	113.04	112.92	113.16	112.99
Paired Well Head Differences			-8.34	-6.77	-8.27	-7.93	-9.51	-5.62	-5.49	-5.46	-5.26	-5.54	-7.17

TOC ELEV. = top of casing elevation

maximum head difference