**DRAFT**

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# QUARTERLY GROUNDWATER MONITORING REPORT
# VULCAN-LOUISVILLE SMELTING SITE
# NORTH CHICAGO, LAKE COUNTY, ILLINOIS

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| DCE | Dichloroethene |
| EE/CA | Engineering Evaluation/ Cost Analysis |
| HASP | Health and Safety Plan |
| NA | Natural Attenuation |
| QAPP | Quality Assurance Project Plan |
| QA/QC | Quality Assurance/Quality Control |
| START | Superfund Technical Assessment and Response Team |
| OTIE | Oneida Total Integrated Enterprises |
| PCBs | Polychlorinated Biphenyls |
| TCE | Trichloroethylene |
| TDD | Technical Direction Document |
| TOC | Total Organic Carbon |
| U.S. EPA | U.S. Environmental Protection Agency |
| VC | Vinyl Chloride |
| VOCs | Volatile Organic Compounds |

# 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (U.S. EPA) has tasked Oneida Total Integrated Enterprises (OTIE) with the evaluation of the natural attenuation (NA) process in the groundwater plume at the Vulcan Louisville Smelting (Site) located in North Chicago, Illinois. OTIE was tasked to collect groundwater samples from existing monitoring wells, analyze the results, evaluate contaminants and daughter product concentrations, and determine the specifics of any natural attenuation, if prevalent at the Site. This work was performed under U.S. EPA Contract Number (No.) EP-S5-10-10 and Technical Direction Document (TDD) No. TO-02-12-06-1002.

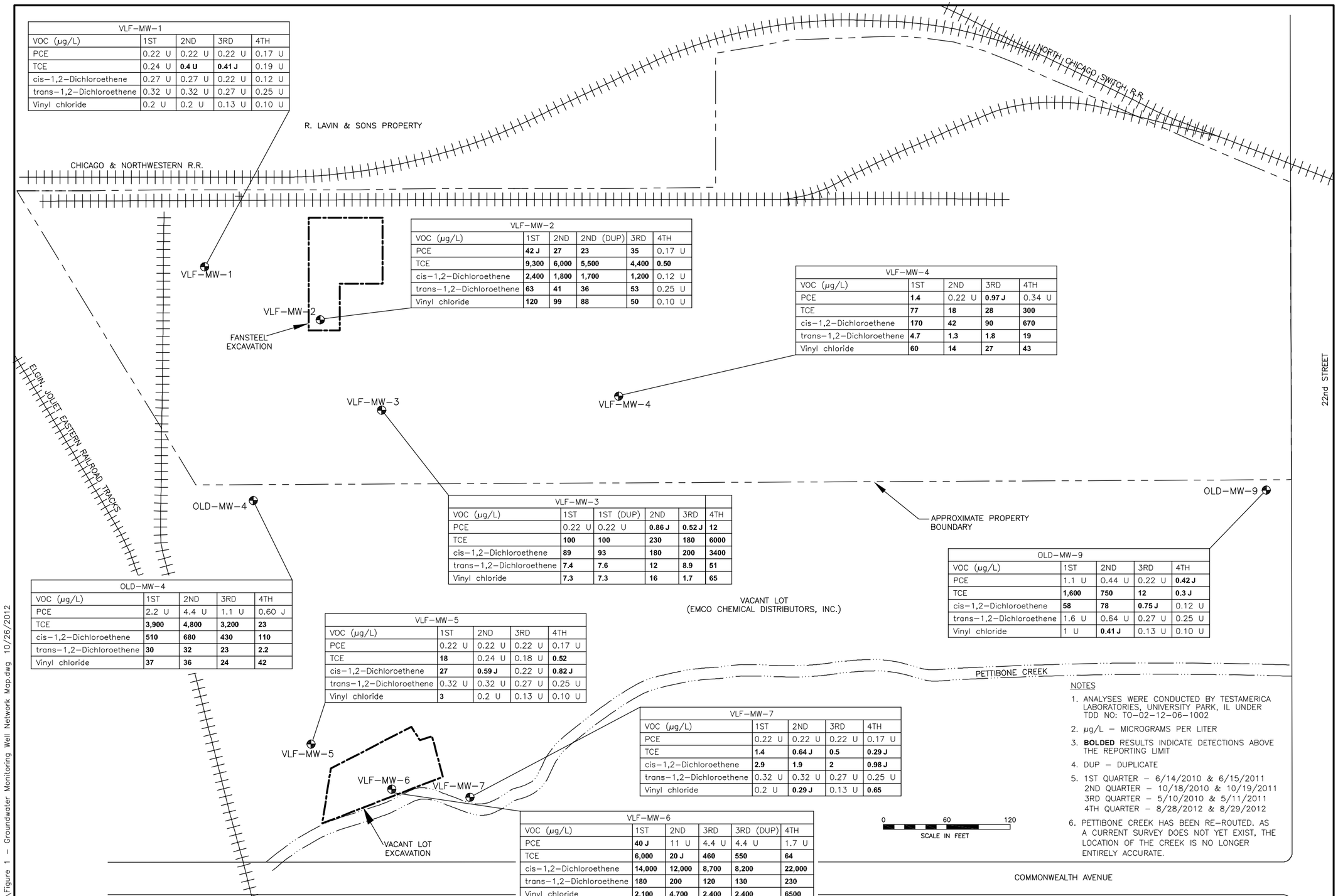
This report describes the sampling and analysis activities and sampling results associated with the groundwater monitoring wells at the Site.

## 2.0 SITE DESCRIPTION AND BACKGROUND

The Site is located at 1 Tantalum Place in North Chicago, Lake County, Illinois and is comprised of two parcels; the former Fansteel parcel to the east and the Vacant Lot parcel to the west of the Fansteel parcel. The Vacant Lot was originally bisected by Pettibone Creek (Creek), an intermittent stream. The Creek has been re-routed to allow for development of the Vacant Lot. A map of the project area showing the monitoring well network is presented in Figure 1. The Fansteel Engineering Evaluation/ Cost Analysis (EE/CA) investigation completed in 2005 by Penn Environmental & Remediation, Inc. identified elevated levels of cadmium, lead, trichloroethylene (TCE), tetrachloroethylene, also known as perchloroethylene (PCE), and vinyl chloride (VC) in soils and elevated levels of lead, cadmium, TCE, VC, and other volatile organic compounds (VOCs) in groundwater on the Fansteel property.

Past use and practices at the Vulcan Louisville Fansteel Site resulted in the contamination of the subsurface soils and shallow aquifer with PCE and TCE, in addition to other contaminants including lead and polychlorinated biphenyls (PCBs). Site groundwater flows in a southwesterly direction from the contaminant sources in the Fansteel parcel towards Vacant Lot and then towards Pettibone Creek. The U.S. EPA conducted a removal action on both parcels in November and December 2008 to mitigate the release of hazardous substances and to abate threats to human health and the environment. The U.S. EPA removal efforts have included soil excavation up to 15 feet below ground surface (bgs) in the Fansteel area and up to 6 feet bgs in the Vacant Lot area and disposal of TCE-contaminated soil in an U.S. EPA approved landfill. Post-removal samples were collected from the excavation floor in both areas to document the soil contamination remaining at the Site after completion of the removal action. Deeper soils with residual contamination exist in both areas and were not excavated because of groundwater infiltration issues. Removal activities were completed at the Site in December 2008. The removal areas are shown in Figure 1. The City of North Chicago has acquired the Fansteel parcel and a portion of the Vacant Lot parcel east of Pettibone Creek in order to foster redevelopment of the Site.

In order to address the TCE groundwater plumes existing in Fansteel and Vacant Lot areas, a quarterly groundwater monitoring program was initiated in the summer of 2010. Groundwater




| VLF-MW-1 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | 0.22 U | 0.22 U | 0.22 U | 0.17 U |
| TCE | 0.24 U | **0.4 U** | **0.41 J** | 0.19 U |
| cis-1,2-Dichloroethene | 0.27 U | 0.27 U | 0.22 U | 0.12 U |
| trans-1,2-Dichloroethene | 0.32 U | 0.32 U | 0.27 U | 0.25 U |
| Vinyl chloride | 0.2 U | 0.2 U | 0.13 U | 0.10 U |

| VLF-MW-2 | | | | | |
|---|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 2ND (DUP) | 3RD | 4TH |
| PCE | **42 J** | **27** | **23** | **35** | 0.17 U |
| TCE | **9,300** | **6,000** | **5,500** | **4,400** | **0.50** |
| cis-1,2-Dichloroethene | **2,400** | **1,800** | **1,700** | **1,200** | 0.12 U |
| trans-1,2-Dichloroethene | **63** | **41** | **36** | **53** | 0.25 U |
| Vinyl chloride | **120** | **99** | **88** | **50** | 0.10 U |

| VLF-MW-4 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | **1.4** | 0.22 U | **0.97 J** | 0.34 U |
| TCE | **77** | **18** | **28** | **300** |
| cis-1,2-Dichloroethene | **170** | **42** | **90** | **670** |
| trans-1,2-Dichloroethene | **4.7** | **1.3** | **1.8** | **19** |
| Vinyl chloride | **60** | **14** | **27** | **43** |

| VLF-MW-3 | | | | | |
|---|---|---|---|---|---|
| VOC (µg/L) | 1ST | 1ST (DUP) | 2ND | 3RD | 4TH |
| PCE | 0.22 U | 0.22 U | **0.86 J** | **0.52 J** | **12** |
| TCE | **100** | **100** | **230** | **180** | **6000** |
| cis-1,2-Dichloroethene | **89** | **93** | **180** | **200** | **3400** |
| trans-1,2-Dichloroethene | **7.4** | **7.6** | **12** | **8.9** | **51** |
| Vinyl chloride | **7.3** | **7.3** | **16** | **1.7** | **65** |

| OLD-MW-9 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | 1.1 U | 0.44 U | 0.22 U | **0.42 J** |
| TCE | **1,600** | **750** | **12** | **0.3 J** |
| cis-1,2-Dichloroethene | **58** | **78** | **0.75 J** | 0.12 U |
| trans-1,2-Dichloroethene | 1.6 U | 0.64 U | 0.27 U | 0.25 U |
| Vinyl chloride | 1 U | **0.41 J** | 0.13 U | 0.10 U |

| OLD-MW-4 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | 2.2 U | 4.4 U | 1.1 U | 0.60 J |
| TCE | **3,900** | **4,800** | **3,200** | **23** |
| cis-1,2-Dichloroethene | **510** | **680** | **430** | **110** |
| trans-1,2-Dichloroethene | **30** | **32** | **23** | **2.2** |
| Vinyl chloride | **37** | **36** | **24** | **42** |

| VLF-MW-5 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | 0.22 U | 0.22 U | 0.22 U | 0.17 U |
| TCE | **18** | 0.24 U | 0.18 U | **0.52** |
| cis-1,2-Dichloroethene | **27** | **0.59 J** | 0.22 U | **0.82 J** |
| trans-1,2-Dichloroethene | 0.32 U | 0.32 U | 0.27 U | 0.25 U |
| Vinyl chloride | **3** | 0.2 U | 0.13 U | 0.10 U |

| VLF-MW-7 | | | | |
|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 4TH |
| PCE | 0.22 U | 0.22 U | 0.22 U | 0.17 U |
| TCE | **1.4** | **0.64 J** | **0.5** | **0.29 J** |
| cis-1,2-Dichloroethene | **2.9** | **1.9** | **2** | **0.98 J** |
| trans-1,2-Dichloroethene | 0.32 U | 0.32 U | 0.27 U | 0.25 U |
| Vinyl chloride | 0.2 U | **0.29 J** | 0.13 U | **0.65** |

| VLF-MW-6 | | | | | |
|---|---|---|---|---|---|
| VOC (µg/L) | 1ST | 2ND | 3RD | 3RD (DUP) | 4TH |
| PCE | **40 J** | 11 U | 4.4 U | 4.4 U | 1.7 U |
| TCE | **6,000** | **20 J** | **460** | **550** | **64** |
| cis-1,2-Dichloroethene | **14,000** | **12,000** | **8,700** | **8,200** | **22,000** |
| trans-1,2-Dichloroethene | **180** | **200** | **120** | **130** | **230** |
| Vinyl chloride | **2,100** | **4,700** | **2,400** | **2,400** | **6500** |

NOTES

1. ANALYSES WERE CONDUCTED BY TESTAMERICA LABORATORIES, UNIVERSITY PARK, IL UNDER TDD NO: TO-02-12-06-1002
2. µg/L – MICROGRAMS PER LITER
3. **BOLDED** RESULTS INDICATE DETECTIONS ABOVE THE REPORTING LIMIT
4. DUP – DUPLICATE
5. 1ST QUARTER – 6/14/2010 & 6/15/2011
   2ND QUARTER – 10/18/2010 & 10/19/2011
   3RD QUARTER – 5/10/2010 & 5/11/2011
   4TH QUARTER – 8/28/2012 & 8/29/2012
6. PETTIBONE CREEK HAS BEEN RE-ROUTED. AS A CURRENT SURVEY DOES NOT YET EXIST, THE LOCATION OF THE CREEK IS NO LONGER ENTIRELY ACCURATE.

# FIGURE 1 - GROUNDWATER MONITORING WELL NETWORK MAP
## VULCAN LOUISVILLE SMELTING SITE
## LONG TERM GROUNDWATER MONITORING

LEGEND

| | |
|---|---|
| VLF-MW-1 | NEW GROUNDWATER MONITORING WELL |
| OLD-MW-4 | OLD GROUNDWATER MONITORING WELL |
| ——— - - ——— | APPROXIMATE PROPERTY BOUNDARY |
| —·—·—·— | AREA WHERE REMOVAL WAS COMPLETED IN 2008 |

G:\GIS_Workspace\Fansteel\Figure 1 – Groundwater Monitoring Well Network Map.dwg 10/26/2012

sampling has been conducted in June 2010, October 2010, May 2011, and August 2012. The goal of the quarterly groundwater monitoring program is to assess whether NA is occurring at the Site and the role of NA in the eventual degradation of the contaminants of concern in the groundwater.

The NA processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants. The commonly accepted, dominant process in NA has been the biologically-mediated sequential reductive dechlorination. The anaerobic reductive dechlorination involves the sequential removal of chlorine atoms and their replacement with hydrogen atoms by anaerobic bacteria. Sulfate-reducing bacteria and other anaerobes can reductively dechlorinate PCE and TCE to cis-dichlorothene (cis-DCE). However, only the unique bacterium *D.* ethenogenes can dechlorinate cis-DCE sequentially to VC and then completely to ethylene.

# 3.0 SITE PREPARATION

Prior to August 28-29, 2012 quarterly groundwater sampling activities, OTIE performed the following tasks:

- revised the Site-specific Quality Assurance Project Plan (QAPP)
- amended the Health and Safety Plan (HASP) to include quarterly groundwater sampling activities;
- scheduled personnel and vehicles;
- arranged access to property with the City of North Chicago consultant; and
- secured field equipment for sampling.

# 4.0 MONITORING WELL SAMPLING

The overall objective of quarterly sampling is to monitor post-removal groundwater quality and ascertain NA of the groundwater plume.

## 4.1 Water Level Measurements

Water levels were measured in the monitoring wells prior to field water quality measurement or sampling activities using a Solinst® water level indicator. Water level measurements were taken from 9 monitoring wells to establish Site-specific groundwater gradients. VLF-MW-2 is the source well for the Fansteel parcel. VLF-MW-1 is an upgradient well, and VLF-MW-3 and VLF-MW-4 are both down-gradient wells for the Fansteel parcel. VLF-MW-6 is the source well for the Vacant Lot, while VLF-MW-5 is the upgradient well and VLF-MW-7 is the down-gradient well. OLD-MW-9 and OLD-MW-4 both sit between the Fansteel parcel and the Vacant Lot.

## 4.2 Groundwater Sampling

Groundwater samples were collected from the source areas of Fansteel and Vacant lot, and from the down-gradient, upgradient and cross gradient wells following low-flow sampling method (EPA, 1996).

### 4.2.1 Purging and Sampling of Monitoring Wells

Low-flow pumping rates in the approximate range of 0.1 to 0.3 liters per minute (L/min) were used for purging all monitoring wells prior to collecting groundwater samples. Purged groundwater was directed through the Horiba U22®, a flow-through-cell equipped with a multi-parameter probe. Purging was continued until water quality parameters had stabilized as described in Table 4-1. Temperature, pH, specific conductance, oxygen reduction potential (ORP), dissolved oxygen (DO), and turbidity were recorded at 5 minute intervals during purging until parameters had stabilized. Parameters were considered “stabilized” when three consecutive readings within the criteria listed in Table 4-1 were recorded. In one instance, the monitoring well MW-9, dried out during purging prior to reaching stabilization. As a result, samples were collected as soon as the appropriate volume of

water was recharged within the well regardless of parameter stabilization as per the EPA low-flow sampling method (EPA, 1996).

After field parameters had stabilized, samples were collected into the appropriate containers. Volatile organic compound (VOC) samples were collected first, followed by metals and NA parameter samples. All metal samples were filtered before collection with a 0.45 micron filter.

**Table 4-1**
**Groundwater Parameter Stabilization Criteria**
**August 2012 Quarterly Groundwater Monitoring**
**Vulcan-Louisville Smelting Site**

| Measurement | Criteria |
|---|---|
| pH | ± 0.1 pH unit |
| Temperature | ± 10 percent |
| Conductivity | ± 3 percent |
| ORP | ± 10 millivolts (mV) |
| Dissolved oxygen | ± 10 percent |
| Turbidity | Target of 10 NTUs or less for metals samples, 50 NTUs or less for organics samples |

### 4.2.2 Sample Collection Order Used

1. VOCs
2. Metals
3. alkalinity, ethane, ethylene, chloride, nitrite, nitrate, dissolved methane, sulfate, and total organic carbon (TOC)

### 4.2.3 Sample Analysis

A total of nine wells (OLD-MW-4, OLD-MW-9, and VLS-MW-1 through VLS-MW-7) were sampled as part of this monitoring program. All samples were collected and analyzed for VOCs, metals and NA parameters using SW-846 methods and other EPA-approved methods. All samples were sent to Test America Laboratories located in University Park, Illinois for analysis requiring a normal turnaround time of 15-days for reporting the results. The number of samples

collected, analytical methods used and analytical results are included in Tables 5-1 and 5-2.

### 4.2.4 Disposal of Purged Water

All purged groundwater was containerized in a 55-gallon drum and is currently stored at the Site for later disposal. After the drum is ¾ full, a sample will be sent to a laboratory for disposal analysis. Based on the analytical results, the purged water will be disposed of as required following applicable regulations. The groundwater will be transported and disposed of by Veolia ES Technical Solutions at their facility in Menomonee Falls, Wisconsin.

## 5.0 ANALYTICAL RESULTS & CONCLUSIONS

A total of nine wells were sampled during the August 2012 quarterly groundwater monitoring event at Vulcan Louisville Smelting Site. Groundwater samples were collected from wells around the two areas where source removal was conducted in 2008 and from wells along the property line between Fansteel and Vacant Lot. Sample analytical results and water quality measurements are summarized and shown in Table 5-1 and Table 5-2, respectively. mg/L

**Fansteel Area**

Monitoring well VLF-MW2 is the source area well for the Fansteel area groundwater plume. In previous sampling events, high concentrations of TCE and its daughter compounds, cis- and trans-1, 2-DCE and VC were found in the source well. Analytical results from the August 2012 sampling event demonstrate a significant decrease in TCE, DCE, and VC concentrations in the Fansteel source area well VLF-MW-2. The most significant decrease for MW-2 was demonstrated in TCE concentration which decreased from 4,400 micrograms per liter (µg/L) in May 2011 to 0.50 µg/L in August 2012. DCE and VC were non-detect in MW-2 during the August 2012 sampling event. Down-gradient wells from the Fansteel source area, VLF-MW-3 and VLF-MW-4, demonstrate significant increases in TCE, DCE, and VC concentrations, while the upgradient well, VLF-MW-1, was non-detect for all VOCs. The most significant increases in MW-3 and MW-4 were demonstrated in TCE concentration which increased from 180 µg/L and 28 µg/L in May 2011, to 6,000 µg/L and 300 µg/L in August 2012, respectively. The concentrations of cis-1, 2-DCE in MW-3 increased from 200 µg/L in May 2011 to 3,400 µg/L in August 2012, while the concentrations of trans-1, 2-DCE only showed a slight increase from 8.9 µg/L to 51 µg/L. In MW-4, cis-1, 2-DCE concentrations increased from 90 µg/L in May 2011 to 670 µg/L in August 2012. Increases in trans-1, 2-DCE was also observed in MW-4, from 1.8 µg/L in May 2011 to 19 µg/L in August 2012. VC concentrations increased in MW-3 and MW-4 from 1.7 µg/L and 27 µg/L in May 2011, to 65 µg/L and 43 µg/L in August 2012, respectively. Higher concentrations of cis-1, 2-DCE compared to trans-1, 2-DCE in the Fansteel wells indicates degradation by microbial activity. The significant increases of TCE, DCE, and VC concentrations in the down-gradient wells may suggest that the plume has migrated; however, increased concentrations in both DCE and VC indicate that reductive dechlorination is occurring in the Fansteel area. There was also a slight increase in ethylene concentrations in the down-

gradient monitoring well VLF-MW-4, which is the ultimate desired product of reductive dechlorination.

Elevated levels of mercury were detected in monitoring wells VLF-MW-3 and VLF-MW-4. Mercury was never detected in groundwater samples collected from the Site prior to the August 2012 sampling event. There were no other elevated metal concentrations found in any of the wells within the Fansteel area of the Site during the August 2012 sampling event.

Aerobic conditions exist at the source area well within the Fansteel Area, except for down-gradient well VLF-MW-4, which has been strictly anaerobic. Whereas DCE and VC were previously formed by reductive dechlorination under anaerobic conditions, some of the wells are now aerobic, having ORPs of about +100 mV in the Fansteel Area. It is possible that current aerobic areas are the result of depletion of native electron donor. Aerobic processes that may be contributing to natural attenuation are co-metabolic aerobic degradation of low concentrations (< 3 mg/L of VC, DCE, and TCE) mediated by methane-using bacteria (methanotrophs) and ethylene-using bacteria (ethenotrophs).

**Vacant Lot**

Monitoring well VLF-MW6 is the source area well for the Vacant Lot groundwater plume. In previous sampling events, high concentrations of TCE and its daughter compounds, cis- and trans-1, 2-DCE and VC were found in the source well. In the Vacant Lot area, TCE concentrations were less than its daughter compounds in the source area well, VLF-MW-6, and the down-gradient well, VLF-MW7. TCE concentrations decreased in MW-6 from 550 µg/L in May 2011 to 64 µg/L in August 2012, while there was a significant increase in cis-1, 2-DCE from 8,200 µg/L to 22,000 µg/L. MW-6 also demonstrated an increase in trans-1, 2-DCE, although not as significant as cis-1, 2-DCE, from 130 µg/L to 230 µg/L. The concentration of VC increased from 2,400 µg/L in May 2011, to 6,500 µg/L in August 2012. Significant decreases in TCE concentration in combination with significant increases of DCE and VC concentrations indicate that reductive dechlorination is occurring within the Vacant Lot source area. Higher concentrations of cis-1, 2-DCE compared to trans-1, 2-DCE in the source well indicates degradation by microbial activity. Ethylene concentration within the Vacant Lot area source well was also slightly higher than previous sampling results, increasing from 14 µg/L in

May 2011, to 15 µg/L in August 2012. This also indicates reductive dechlorination. The analysis of groundwater samples from upgradient well VLF-MW-5 and down-gradient well VLF-MW-7 did not provide results that offered any conclusive information about the viability of NA. It should also be noted, that there were no elevated metal concentrations found in any of the wells within the Vacant Lot area of the Site during this sampling event.

Strict anaerobic conditions exist in the Vacant Lot source area well whereas aerobic conditions exist in the upgradient wells. DCE and VC are formed by reductive dechlorination under anaerobic conditions within the Vacant Lot source area, while the upgradient wells are demonstrating aerobic conditions, having ORPs of about +150 mV. As previously discussed, processes that may be contributing to natural attenuation are co-metabolic aerobic degradation of low concentrations of VC, DCE and TCE mediated by methanotrophs and ethenotrophs. Currently, these NA processes are only being observed within the Vacant Lot source area well.

**Conclusion**

Though it is evident that TCE has been degraded into its daughter products by microbial activity in Site groundwater, natural attenuation as a viable alternative at the Site is not conclusively determined with these sampling events. While reductive dechlorination is actively occurring, the existing Site conditions may not be sufficient to verify that source removal activities have contributed to natural dissipation of the groundwater plumes to acceptable levels with regard to background levels. Additionally, the degradation rates cannot be accurately extrapolated as the plume has seemed to shift and ethylene levels have not yet increased enough to demonstrate that TCE is degrading fully. Additional sampling is required in order to more fully answer these questions, and a microcosm study, although time consuming, may also be useful in providing key information, as it would allow for the sequential observation of the formation of chlorinated daughter products and ethylene in soil samples collected from the Site. Specifically, this type of study would provide information regarding the occurrence of biodegradation, specifically a biodegradation rate for the Site, and with this information, the degradation rate of TCE to daughter compounds and ultimately ethylene, could be extrapolated more accurately. A bio-stimulation/bio-augmentation pilot study may also be useful in determining the efficacy of natural attenuation, more specifically including subsurface injections of a mixture of zero-valent iron (ZVI) combined with nutrients. These injections hasten the process of natural attenuation by

providing an abiotic reaction with iron that immediately reduces TCE to its daughter compounds. Additionally, the nutrients support anaerobic bacterial growth which assists in creating a reducing environment which will reduce TCE and daughter compounds to VC and ethylene. These types of mixtures have the potential to remain on Site for many years after initial injection, prolonging their effects on the rate natural attenuation.

**Table 5-1**
**Quarterly Groundwater Analytical Results**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | VLF-MW-1 | | | | VLF-MW-2 | | | | | VLF-MW-3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Upgradient Well, Fansteel Area | | | | Source Well, Fansteel Area | | | | | Downgradient Well, Fansteel Area | | | | |
| Samp_No | VLF-MW-1 | VLF-MW-1 OCT2010 | VLF-MW-1-0511 | VLF-MW-1 | VLF-MW-2 | VLF-MW-2 OCT2010 | VLF-MW-2 DUP OCT2010 | VLF-MW-2-0511 | VLF-MW-2 | VLF-MW-3 | VLF-MW-3 | VLF-MW-3 OCT2010 | VLF-MW-3-0511 | VLF-MW-3 |
| SampleDate | 6/14/2010 | 10/19/2010 | 5/10/2011 | 8/29/2012 | 6/14/2010 | 10/18/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/14/2010 | 6/14/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample |
| **Alkalinity (mg/L)** | | | | | | | | | | | | | | |
| Alkalinity | **72** | **78** | **150** | **56** | **190** | **220** | NA | **210** | **310** | **238** | NA | **230** | **230** | **100** |
| **Anions (mg/L)** | | | | | | | | | | | | | | |
| Chloride | **390** | **450** | **400** | **170** | **220** | **230** | NA | **130** | **340** | **75** | NA | **85** | **94** | **250** |
| Nitrate as N | 0.26 U | 0.013 U | **0.72** | **0.90** | 0.013 U | 0.013 U | NA | 0.023 U | 0.028 U | **0.18** | NA | 0.013 U | **0.36** | 0.028 U |
| Nitrite as N | 0.56 U | 0.56 U | 0.23 U | 0.028 U | 0.56 U | 0.56 U | NA | 0.23 U | 0.28 U | 0.56 U | NA | 0.56 U | 0.23 U | 0.028 U |
| Sulfate | **410** | **570** | **590** | **130** | **120** | **150** | NA | **90** | **610** | **190** | NA | **190** | **190** | **230** |
| **Dissolved Metals (mg/L)** | | | | | | | | | | | | | | |
| Arsenic | **0.0065 J** | **0.0037 J** | 0.0025 U | 0.0024 U | **0.0061 J** | **0.0047 J** | **0.0053 J** | 0.0025 U | 0.0068 J | 0.0023 U | 0.0023 U | 0.0017 U | 0.0025 U | 0.0046 J |
| Barium | **0.06** | **0.063** | **0.047** | **0.068** | **0.038** | **0.051** | **0.051** | **0.029** | **0.040** | **0.068** | **0.07** | **0.067** | **0.061** | **0.048** |
| Cadmium | **0.00026 J** | **0.00027 J** | 0.00036 U | 0.00054 U | 0.00019 U | 0.00025 U | 0.00025 U | 0.00036 U | 0.0014 J | 0.00019 U | 0.00019 U | 0.00025 U | 0.00036 U | 0.00079 J |
| Chromium | 0.0014 U | 0.0014 U | 0.0015 U | 0.00096 U | **0.0079 J** | **0.0034 J** | **0.0036 J** | **0.0045 J** | 0.00096 U | 0.0014 U | 0.0014 U | 0.0014 U | 0.0015 U | 0.0049 J |
| Iron | 0.051 U | | | NA | 0.051 U | | | | NA | 0.051 U | | | | NA |
| Lead | **0.0066** | **0.0032 J** | **0.0022 J** | 0.0016 U | **0.034** | **0.03** | **0.03** | **0.022** | 0.0033 J | 0.0017 U | 0.0017 U | **0.0021 J** | 0.002 U | 0.0079 U |
| Mercury | 0.06 U | 0.051 U | 0.051 U | 0.070 U | 0.06 U | **0.056 J** | **0.11 J** | 0.051 U | 0.070 U | 0.06 U | 0.06 U | 0.051 U | 0.051 U | **0.20** |
| Selenium | **0.0038 J** | **0.0028 J** | 0.0025 U | 0.0027 U | **0.042** | **0.055** | **0.053** | **0.025** | 0.0027 J | 0.0028 U | 0.0028 U | 0.0024 U | 0.0025 U | **0.078** |
| Silver | 0.00086 U | 0.00086 U | 0.0025 U | **0.0011 J** | 0.00086 U | 0.00086 U | 0.00086 U | 0.00071 U | 0.0012 J | 0.00086 U | 0.00086 U | 0.00086 U | 0.00071 U | 0.0015 J |
| **RSK-175 (µg/L)** | | | | | | | | | | | | | | |
| Ethane | NA | NA | NA | 0.81 U | NA | 2 U | NA | 2 U | 0.81 U | NA | NA | 2 U | 2 U | 0.81 U |
| Ethene (Ethylene) | NA | NA | NA | 0.73 U | NA | 1.5 U | NA | 1.5 U | 0.73 U | NA | NA | 1.5 U | 1.5 U | 0.73 U |
| Methane | NA | NA | NA | **2.0** | NA | **15** | NA | **38** | **78** | NA | NA | **12** | **1.6 J** | **19** |
| **Total Organic Carbon (mg/L)** | | | | | | | | | | | | | | |
| TOC Dup | **7.4** | **5.7** | **4.8** | **1.6** | **40** | NA | NA | **25** | **3.6** | **3.0** | NA | NA | **3.0** | **54** |
| TOC Result 1 | **7.5** | **5.7** | **4.8** | **1.6** | **38** | NA | NA | **25** | **3.6** | **3.0** | NA | NA | **3.1** | **54** |
| TOC Result 2 | **7.2** | **5.8** | **4.8** | **1.6** | **41** | NA | NA | **25** | **3.6** | **3.0** | NA | NA | **2.9** | **55** |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | | | | | |
| Benzene | | 0.17 U | 0.12 U | 0.074 U | | 3.4 U | 3.4 U | 1.2 U | 0.074 U | | | 0.17 U | 0.12 U | 0.74 U |
| Toluene | | 0.19 U | 0.15 U | 0.11 U | | **7.7 J** | **6.6 J** | **9.8** | 0.11 U | | | 0.19 U | 0.15 U | **4.7 J** |
| Xylenes, Total | | 0.32 U | 0.3 U | 0.068 U | | 6.4 U | 6.4 U | 3 U | 0.068 U | | | 0.32 U | 0.3 U | 0.68 U |
| Ethylbenzene | | 0.18 U | 0.14 U | 0.13 U | | 3.6 U | 3.6 U | 1.4 U | 0.13 U | | | 0.18 U | 0.14 U | 1.3 U |
| Tetrachloroethene | 0.22 U | 0.22 U | 0.22 U | 0.17 U | **42 J** | **27** | **23** | **35** | 0.17 U | 0.22 U | 0.22 U | **0.86 J** | **0.52 J** | **12** |
| Trichloroethene | 0.24 U | **0.4 J** | **0.41 J** | 0.19 U | **9,300** | **6,000** | **5,500** | **4,400** | **0.50** | **100** | **100** | **230** | **180** | **6000** |
| cis-1,2-Dichloroethene | 0.27 U | 0.27 U | 0.22 U | 0.12 U | **2,400** | **1,800** | **1,700** | **1,200** | 0.12 U | **89** | **93** | **180** | **200** | **3400** |
| trans-1,2-Dichloroethene | 0.32 U | 0.32 U | 0.27 U | 0.25 U | **63** | **41** | **36** | **53** | 0.25 U | **7.4** | **7.6** | **12** | **8.9** | **51** |
| Vinyl chloride | 0.2 U | 0.2 U | 0.13 U | 0.10 U | **120** | **99** | **88** | **50** | 0.10 U | **7.3** | **7.3** | **16** | **1.7** | **65** |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007 & TO-02-12-06-1002
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

**Table 5-1**
**Quarterly Groundwater Analytical Results**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | VLF-MW-4 | | | | VLF-MW-5 | | | | VLF-MW-6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Downgradient well, Fansteel Area | | | | Upgradient Well, Vacant Lot Area | | | | Source well, Vacant Lot Area | | | | |
| Samp_No | VLF-MW-4 | VLF-MW-4 OCT2010 | VLF-MW-4-0511 | VLF-MW-4 | VLF-MW-5 | VLF-MW-5 OCT2010 | VLF-MW-5-0511 | | VLF-MW-6 | VLF-MW-6 OCT2010 | VLF-MW-6-0511 | VLF-MW-6-0511 | VLF-MW-6 |
| SampleDate | 6/14/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/14/2010 | 10/19/2010 | 5/9/2011 | 8/28/2012 | 6/14/2010 | 10/19/2010 | 5/9/2011 | 5/9/2011 | 8/28/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample |
| **Alkalinity (mg/L)** | | | | | | | | | | | | | |
| Alkalinity | **270** | **140** | **190** | **170** | **420** | **400** | **290** | **480** | **380** | **370** | **320** | NA | **440** |
| **Anions (mg/L)** | | | | | | | | | | | | | |
| Chloride | **130** | **140** | **150** | **150** | **3.8** | **5** | **4.9** | **11** | **56** | **51** | **53** | NA | **71** |
| Nitrate as N | 0.013 U | 0.013 U | 0.023 U | 0.028 U | **0.085 J** | **0.12** | **0.28** | **0.032 J** | 0.013 U | 0.013 U | **0.15** | NA | 0.028 U |
| Nitrite as N | 0.56 U | 0.56 U | 0.23 U | 0.028 U | 0.028 U | 0.028 U | 0.023 U | 0.028 U | 0.56 U | 0.56 U | 0.23 U | NA | 0.028 U |
| Sulfate | **430** | **310** | **460** | **330** | **43** | **44** | **56** | **240** | **31** | **8.8** | **41** | NA | **190** |
| **Dissolved Metals (mg/L)** | | | | | | | | | | | | | |
| Arsenic | **0.01** | **0.0088 J** | **0.0068 J** | 0.0088 J | 0.0023 U | 0.0017 U | 0.0025 U | 0.0024 U | 0.0023 U | 0.0017 U | 0.0025 U | 0.0025 U | 0.0024 U |
| Barium | **0.083** | **0.039** | **0.064** | **0.078** | **0.077** | **0.1** | **0.041** | **0.11** | **0.0956** | **0.11** | **0.096** | **0.098** | **0.11** |
| Cadmium | 0.00019 U | 0.00025 U | 0.00036 U | 0.00099 J | 0.00019 U | 0.00025 U | 0.00036 U | **0.00088 J** | 0.00019 U | 0.00025 U | 0.00036 U | 0.00036 U | 0.00054 U |
| Chromium | 0.0014 U | **0.0018 J** | **0.0024 J** | 0.0021 J | 0.0014 U | 0.0014 U | 0.0015 U | 0.00096 U | 0.0014 U | 0.0014 U | 0.0015 U | 0.0015 U | 0.00096 U |
| Iron | 0.051 U | | | NA | 0.051 U | | | | **1.03** | | | | |
| Lead | 0.0017 U | 0.0017 U | 0.002 U | 0.0079 U | 0.0017 U | **0.0022 J** | **0.0025 J** | 0.0016 U | 0.0017 U | 0.0017 U | **0.002 J** | **0.0027 J** | 0.0016 U |
| Mercury | **0.65** | **0.52** | **0.7** | **3.6** | 0.06 U | 0.051 U | 0.051 U | 0.070 U | 0.06 U | 0.051 U | 0.051 U | 0.051 U | 0.070 U |
| Selenium | **0.039** | **0.019** | **0.047** | **0.081** | 0.0028 U | 0.0024 U | **0.0035 J** | 0.0027 U | 0.0028 U | 0.0024 U | 0.0025 U | 0.0025 U | 0.0027 U |
| Silver | 0.00086 U | 0.00086 U | 0.00071 U | 0.0011 U | 0.00086 U | 0.00086 U | 0.00071 U | 0.0011 U | 0.00086 U | 0.00086 U | 0.00071 U | 0.00071 U | 0.0011 U |
| **RSK-175 (µg/L)** | | | | | | | | | | | | | |
| Ethane | NA | NA | NA | 0.81 U | NA | NA | NA | 0.81 U | NA | 2 U | 2 U | NA | 0.81 U |
| Ethene (Ethylene) | NA | NA | NA | 2.8 J | NA | NA | NA | 0.73 U | NA | **14** | **14** | NA | **15** |
| Methane | NA | NA | NA | **22** | NA | NA | NA | 0.45 U | NA | **60** | **87** | NA | **29** |
| **Total Organic Carbon (mg/L)** | | | | | | | | | | | | | |
| TOC Dup | **63** | **47** | **79** | **3.9** | **3.0** | **2.1** | **2.6** | **2.3** | **3.6** | **2.8** | **3.2** | NA | **4.2** |
| TOC Result 1 | **63** | **47** | **78** | **4.0** | **3.4** | **2.3** | **2.7** | **2.4** | **3.7** | **2.9** | **3.3** | NA | **4.3** |
| TOC Result 2 | **64** | **47** | **79** | **3.8** | **2.6** | **1.9** | **2.6** | **2.1** | **3.6** | **2.8** | **3.1** | NA | **4.0** |
| **Volatile Organic Compounds (** | | | | | | | | | | | | | |
| Benzene | | 0.17 U | **0.49 J** | 0.15 U | | 0.17 U | 0.12 U | 0.074 U | | 8.5 U | 2.4 U | 2.4 U | 0.74 U |
| Toluene | | **0.33 J** | **0.8** | 0.22 U | | 0.19 U | 0.15 U | 0.11 U | | 9.5 U | 3 U | 3 U | **2.8 J** |
| Xylenes, Total | | **0.55 J** | **3.3** | 0.14 U | | 0.32 U | 0.3 U | 0.068 U | | 16 U | 6 U | 6 U | 0.68 U |
| Ethylbenzene | | 0.18 U | **0.86** | 0.26 U | | 0.18 U | 0.14 U | 0.13 U | | 9 U | 2.8 U | 2.8 U | 1.3 U |
| Tetrachloroethene | **1.4** | 0.22 U | **0.97 J** | 0.34 U | 0.22 U | 0.22 U | 0.22 U | 0.17 U | **40 J** | 11 U | 4.4 U | 4.4 U | 1.7 U |
| Trichloroethene | **77** | **18** | **28** | **300** | **18** | 0.24 U | 0.18 U | **0.52** | **6,000** | **20 J** | **460** | **550** | **64** |
| cis-1,2-Dichloroethene | **170** | **42** | **90** | **670** | **27** | **0.59 J** | 0.22 U | **0.82 J** | **14,000** | **12,000** | **8,700** | **8,200** | **22,000** |
| trans-1,2-Dichloroethene | **4.7** | **1.3** | **1.8** | **19** | 0.32 U | 0.32 U | 0.27 U | 0.25 U | **180** | **200** | **120** | **130** | **230** |
| Vinyl chloride | **60** | **14** | **27** | **43** | **3** | 0.2 U | 0.13 U | 0.10 U | **2,100** | **4,700** | **2,400** | **2,400** | **6500** |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

**Table 5-1**
**Quarterly Groundwater Analytical Results**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | VLF-MW-7 | | | | | OLD-MW-4 | | | | OLD-MW-9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Downgradient Well, Vacant Lot Area | | | | | Between Fansteel and Vacant Lot properties | | | | Between Fansteel and Vacant Lot properties | | | |
| Samp_No | VLF-MW-7 | VLF-MW-7 OCT2010 | VLF-MW-7-0511 | VLF-MW-7 | VLF-MW-10 | OLD-MW-4 | OLD-MW-4 OCT2010 | OLD-MW-4-0511 | OLD-MW-4 | OLD-MW-9 | OLD-MW-9 OCT2010 | OLD-MW-9-0511 | VLF-MW-9 |
| SampleDate | 6/14/2010 | 10/19/2010 | 5/9/2011 | 8/28/2012 | 8/28/2012 | 6/15/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/15/2010 | 10/19/2010 | 5/10/2011 | 8/28/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample |
| **Alkalinity (mg/L)** | | | | | | | | | | | | | |
| Alkalinity | **320** | **380** | **340** | **400** | **420** | **340** | **340** | **310** | **300** | **420** | **440** | **300** | **160** |
| **Anions (mg/L)** | | | | | | | | | | | | | |
| Chloride | **68** | **53** | **43** | **38** | **40** | **28** | **53** | **36** | **150** | **39** | **54** | **85** | **5.8** |
| Nitrate as N | **0.18** | 0.013 U | 0.023 U | 0.028 U | 0.028 U | 0.013 U | 0.013 U | 0.023 U | **0.028 J** | **0.094 J** | 0.013 U | **0.72** | **0.067 J** |
| Nitrite as N | 0.56 U | 0.56 U | 0.23 U | 0.028 U | 0.028 U | 0.028 U | 0.56 U | 0.23 U | 0.028 U | 0.56 U | 0.56 U | 0.23 U | 0.028 U |
| Sulfate | **97** | **470** | **440** | **530** | **450** | **120** | **120** | **120** | **230** | **80** | **100** | **55** | **74** |
| **Dissolved Metals (mg/L)** | | | | | | | | | | | | | |
| Arsenic | 0.0023 U | 0.0017 U | 0.0025 U | 0.0024 U | 0.0024 U | 0.0023 U | 0.0017 U | 0.0025 U | 0.0024 U | 0.0023 U | NA | 0.0025 U | 0.0024 U |
| Barium | **0.095** | **0.19** | **0.11** | **0.057** | **0.054** | **0.072** | **0.084** | **0.069** | **0.091** | **0.086** | NA | **0.11** | **0.014** |
| Cadmium | 0.00019 U | 0.00025 U | 0.00036 U | **0.00063 J** | **0.00065 J** | 0.00019 U | 0.00025 U | 0.00036 U | 0.00089 J | **0.0005 J** | NA | 0.00036 U | 0.00054 U |
| Chromium | **0.0018 J** | 0.0014 U | 0.0015 U | 0.00096 U | 0.00096 U | 0.0014 U | 0.0014 U | 0.0015 U | 0.00096 U | **0.0023 J** | NA | **0.003 J** | 0.00096 U |
| Iron | 0.051 U | | | | | **2.6** | | | NA | **0.14 J** | NA | | |
| Lead | 0.0017 U | 0.0017 U | 0.002 U | 0.0016 U | 0.0016 U | 0.0017 U | 0.0017 U | **0.0029 J** | 0.0016 U | 0.0017 U | NA | **0.0021 J** | 0.0016 U |
| Mercury | 0.06 U | 0.051 U | 0.051 U | 0.070 U | 0.070 U | 0.06 U | 0.051 U | 0.051 U | 0.070 U | 0.06 U | NA | 0.051 U | 0.07 U |
| Selenium | 0.0028 U | 0.0024 U | 0.0025 U | 0.0027 U | 0.0027 U | 0.0028 U | 0.0024 U | 0.0025 U | 0.0027 U | 0.0028 U | NA | **0.0029 J** | 0.0027 U |
| Silver | 0.00086 U | 0.00086 U | 0.00071 U | 0.0011 U | 0.0011 U | 0.00086 U | 0.00086 U | 0.00071 U | 0.0011 U | 0.00086 U | NA | **0.00084 J** | 0.0011 U |
| **RSK-175 (µg/L)** | | | | | | | | | | | | | |
| Ethane | NA | 2 U | 2 U | 0.81 U | 0.81 U | NA | NA | NA | 0.81 U | NA | NA | NA | 0.81 U |
| Ethene (Ethylene) | NA | 1.5 U | 1.5 U | 0.73 U | 0.73 U | NA | NA | NA | 1.6 J | NA | NA | NA | 0.73 U |
| Methane | NA | **1.9 J** | **8.9** | 0.45 U | **1.1 J** | NA | NA | NA | **290** | NA | NA | NA | **1.8 J** |
| **Total Organic Carbon (mg/L)** | | | | | | | | | | | | | |
| TOC Dup | **5.5** | **4.2** | **3.6** | **3.3** | **3.2** | **3.1** | **3.8** | **3.4** | **74** | **1.4** | **1.8** | **1.9** | **2.3** |
| TOC Result 1 | **5.6** | **4.4** | **3.7** | **3.5** | **3.3** | **3.1** | **4.0** | **3.5** | **74** | **1.5** | **2.2** | **2.1** | **2.4** |
| TOC Result 2 | **5.5** | **4.0** | **3.5** | **3.2** | **3.1** | **3.1** | **3.6** | **3.3** | **76** | **1.4** | **1.5** | **1.8** | **2.1** |
| **Volatile Organic Compounds (** | | | | | | | | | | | | | |
| Benzene | | 0.17 U | 0.12 U | 0.074 U | 0.074 U | | 3.4 U | 0.6 U | **0.64** | | 0.34 U | 0.12 U | 0.074 U |
| Toluene | | 0.19 U | 0.15 U | 0.11 U | 0.11 U | | 3.8 U | 0.75 U | **0.72** | | 0.38 U | 0.15 U | 0.11 U |
| Xylenes, Total | | 0.32 U | 0.3 U | 0.068 U | 0.068 U | | 6.4 U | 1.5 U | **2.3** | | 0.64 U | 0.3 U | 0.068 U |
| Ethylbenzene | | 0.18 U | 0.14 U | 0.13 U | 0.13 U | | 3.6 U | 0.7 U | 0.48 J | | 0.36 U | 0.14 U | 0.13 U |
| Tetrachloroethene | 0.22 U | 0.22 U | 0.22 U | 0.17 U | 0.17 U | 2.2 U | 4.4 U | 1.1 U | 0.60 J | 1.1 U | 0.44 U | 0.22 U | **0.42 J** |
| Trichloroethene | **1.4** | **0.64 J** | **0.5** | **0.46 J** | **0.29 J** | **3,900** | **4,800** | **3,200** | **23** | **1,600** | **750** | **12** | **0.3 J** |
| cis-1,2-Dichloroethene | **2.9** | **1.9** | **2** | **1.5** | **0.98 J** | **510** | **680** | **430** | **110** | **58** | **78** | **0.75 J** | 0.12 U |
| trans-1,2-Dichloroethene | 0.32 U | 0.32 U | 0.27 U | 0.25 U | 0.25 U | **30** | **32** | **23** | **2.2** | 1.6 U | 0.64 U | 0.27 U | 0.25 U |
| Vinyl chloride | 0.2 U | **0.29 J** | 0.13 U | **0.57** | **0.65** | **37** | **36** | **24** | **42** | 1 U | **0.41 J** | 0.13 U | 0.1 U |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

**Table 5-2**
**Water Quality Measurements**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | **VLF-MW-1** | | | | **VLF-MW-2** | | | | | **VLF-MW-3** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | **Upgradient Well, Fansteel Area** | | | | **Source Well, Fansteel Area** | | | | | **Downgradient Well, Fansteel Area** | | | | |
| Samp_No | VLF-MW-1 | VLF-MW-1 OCT2010 | VLF-MW-1-0511 | VLF-MW-1 | VLF-MW-2 | VLF-MW-2 OCT2010 | VLF-MW-2 DUP OCT2010 | VLF-MW-2-0511 | VLF-MW-2 | VLF-MW-3 | VLF-MW-3 | VLF-MW-3 OCT2010 | VLF-MW-3-0511 | VLF-MW-3 |
| SampleDate | 6/14/2010 | 10/19/2010 | 5/10/2011 | 8/29/2012 | 6/14/2010 | 10/18/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/14/2010 | 6/14/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample |
| **Water Quality Parameter** | | | | | | | | | | | | | | |
| DepthToWater (ft) | 7.75 | 7.75 | 5.95 | 17.7 | 6 | 7.05 | 7.05 | 6 | 9.4 | 6.9 | 6.9 | 8.3 | 7.5 | 9.8 |
| DepthToBottom (ft) | 21.2 | 21.2 | 21 | 17.9 | 15.8 | 15.7 | 15.7 | 15.85 | 23.6 | 16.2 | 16.2 | 16.6 | 18.7 | 18.4 |
| pH | 7.71 | 6.09 | 7.57 | 7.35 | 12.01 | 9.11 | 9.11 | 11.46 | 7.55 | 6.72 | 6.72 | 7.27 | 7.56 | 9.69 |
| Conductivity (mS/cm) | 2.1 | 2.07 | 2.57 | 0.001 | 1.77 | 1.86 | 1.86 | 1.68 | 0.001 | 0.79 | 0.79 | 1.21 | 1.17 | 0.001 |
| Turbidity (NTU) | 135 | 228 | 724 | 328 | 35.9 | 17.2 | 17.2 | 3.8 | 310 | 34.8 | 34.8 | 12.2 | 64.2 | 303 |
| Diss O2 (mg/L) | 2.05 | 2.51 | 0 | 8.91 | 0.5 | 0 | 0 | 0.87 | 8.01 | 4.3 | 4.3 | 0 | 0 | 8.7 |
| Temp (°C) | 12.12 | 17.05 | 10.97 | 25.59 | 13.5 | 17.7 | 17.7 | 8.77 | 28.17 | 12.96 | 12.96 | 17.1 | 9.09 | 26.99 |
| ORP (mV) | 137 | 118 | -83 | 113 | -98 | -99 | -99 | -48 | 22 | 126 | 126 | 22 | -153 | 93 |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007 & TO-02-12-06-1002
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

**Table 5-2**
**Water Quality Measurements**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | **VLF-MW-4** | | | | **VLF-MW-5** | | | | **VLF-MW-6** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | **Downgradient well, Fansteel Area** | | | | **Upgradient Well, Vacant Lot Area** | | | | **Source well, Vacant Lot Area** | | | | |
| Samp_No | VLF-MW-4 | VLF-MW-4 OCT2010 | VLF-MW-4-0511 | VLF-MW-4 | VLF-MW-5 | VLF-MW-5 OCT2010 | VLF-MW-5-0511 | VLF-MW-5 | VLF-MW-6 | VLF-MW-6 OCT2010 | VLF-MW-6-0511 | VLF-MW-6-0511 | VLF-MW-6 |
| SampleDate | 6/14/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/14/2010 | 10/19/2010 | 5/9/2011 | 8/28/2012 | 6/14/2010 | 10/19/2010 | 5/9/2011 | 5/9/2011 | 8/28/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample |
| **Water Quality Parameter** | | | | | | | | | | | | | |
| DepthToWater (ft) | 5.8 | 7.22 | 6 | 8.6 | 5.7 | 7.22 | 6 | 11.2 | 5 | 6.45 | 5.5 | 5.5 | 6.8 |
| DepthToBottom (ft) | 18.3 | 19 | 18.8 | 20.5 | 15.4 | 15.31 | 16.3 | 18.2 | 15.9 | 15.85 | 16.2 | 16.2 | 16 |
| pH | 12.14 | 11.03 | 11.28 | 11.65 | 6.8 | 7.53 | 7.37 | 6.43 | 9.31 | 8.77 | 6.94 | 6.94 | 6.98 |
| Conductivity (mS/cm) | 2.51 | 1.31 | 2.29 | 1.9 | 0.653 | 0.893 | 0.64 | 0.001 | 0.68 | 0.95 | 2.2 | 2.2 | 1.34 |
| Turbidity (NTU) | 135 | 15.1 | 29.1 | 3 | 51.8 | 85.2 | 22 | 299 | 84.6 | 8.1 | 0.95 | 0.95 | 474 |
| Diss O2 (mg/L) | 0.31 | 0 | 0.85 | 0.07 | 3.75 | 0.44 | 2.34 | 3.69 | 0 | 0 | 0.95 | 0.95 | 0.36 |
| Temp (°C) | 13.17 | 17.1 | 9.59 | 16.91 | 12.44 | 16.8 | 8.4 | 25.02 | 11.94 | 16.07 | 7.89 | 7.89 | 25.77 |
| ORP (mV) | -75 | -256 | -306 | -300 | 76 | 6 | 42 | 189 | -142 | -129 | -158 | -158 | -97 |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007 & TO-02-12-06-1002
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

**Table 5-2**
**Water Quality Measurements**
**Vulcan Louisville Fansteel Site**
**North Chicago, Lake County, Illinois**

| Well ID | **VLF-MW-7** | | | | | **OLD-MW-4** | | | | **OLD-MW-9** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | **Downgradient Well, Vacant Lot Area** | | | | | **Between Fansteel and Vacant Lot properties** | | | | **Between Fansteel and Vacant Lot properties** | | | |
| Samp_No | VLF-MW-7 | VLF-MW-7 OCT2010 | VLF-MW-7-0511 | VLF-MW-7 | VLF-MW-10 | OLD-MW-4 | OLD-MW-4 OCT2010 | OLD-MW-4-0511 | OLD-MW-4 | OLD-MW-9 | OLD-MW-9 OCT2010 | OLD-MW-9-0511 | VLF-MW-9 |
| SampleDate | 6/14/2010 | 10/19/2010 | 5/9/2011 | 8/28/2012 | 8/28/2012 | 6/15/2010 | 10/18/2010 | 5/9/2011 | 8/29/2012 | 6/15/2010 | 10/19/2010 | 5/10/2011 | 8/28/2012 |
| Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| SampleType | Field Sample | Field Sample | Field Sample | Field Sample | Field Duplicate | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample | Field Sample |
| **Water Quality Parameter** | | | | | | | | | | | | | |
| DepthToWater (ft) | 10.6 | 5.34 | 3.7 | 6.8 | 6.8 | 5.7 | 8.27 | 11 | 11.3 | 9.5 | 11 | 10 | 22 |
| DepthToBottom (ft) | 15.2 | 15.15 | 15.3 | 17.85 | 17.85 | 19.4 | 19.6 | 20 | 19.15 | 19.6 | 19.71 | 19.6 | 25.6 |
| pH | 7.74 | 8.2 | 7.66 | 7.09 | 7.09 | 8.05 | 8.53 | 6.79 | 8.15 | 7.25 | 7.28 | NC | 6.87 |
| Conductivity (mS/cm) | 0.698 | 1.7 | 1.68 | 0.002 | 0.002 | 0.716 | 1.1 | 1.05 | 0.002 | 0.67 | 1.17 | NC | 0.321 |
| Turbidity (NTU) | 65 | 9.9 | 56.3 | 314 | 314 | 129 | 25.2 | 8.3 | 297 | 74.4 | 53.3 | NC | 356 |
| Diss O2 (mg/L) | 7.89 | 0 | 0 | 8.85 | 8.85 | 0 | 0.8 | 1 | 9 | 0.3 | 0 | NC | 8.82 |
| Temp (°C) | 11.21 | 16.3 | 8.91 | 26.49 | 26.49 | 11.47 | 15.45 | 10.49 | 23.34 | 12.95 | 16.6 | NC | 26.84 |
| ORP (mV) | 31 | -64 | -73 | -79 | -79 | -82 | -95 | -53 | 146 | -10 | 19 | NC | 82 |

Notes:
Analyses were conducted by TestAmerica Laboratories, University Park, IL under TDD No: TO-05-11-03-0007 & TO-02-12-06-1002
µg/L – micrograms per liter
mg/L – milligrams per liter
**Bolded** results indicate detections above the reporting limit
NA - Not Analyzed
NC - Not collected

# APPENDIX A

Validated Analytical Data Package

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-6 | Lab Sample ID: 500-49692-1

Matrix: Water | Lab File ID: 49692-1B.D

Analysis Method: 8260B | Date Collected: 08/28/2012 10:41

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 09:19

Soil Aliquot Vol: | Dilution Factor: 10

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.74 | U | 5.0 | 0.74 |
| 156-60-5 | trans-1,2-Dichloroethene | 230 | | 10 | 2.5 |
| 100-41-4 | Ethylbenzene | 1.3 | U | 5.0 | 1.3 |
| 79-01-6 | Trichloroethene | 64 | | 5.0 | 1.9 |
| 127-18-4 | Tetrachloroethene | 1.7 | U | 10 | 1.7 |
| 108-88-3 | Toluene | 2.8 | J | 5.0 | 1.1 |
| 1330-20-7 | Xylenes, Total | 0.68 | U | 10 | 0.68 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 114 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 95 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 97 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 99 | | 74-123 |

9-27-12

FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-6 DL | Lab Sample ID: 500-49692-1 DL

Matrix: Water | Lab File ID: 49692-1A.D

Analysis Method: 8260B | Date Collected: 08/28/2012 10:41

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 08:33

Soil Aliquot Vol: | Dilution Factor: 500

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 22000 | | 500 | 60 |
| 75-01-4 | Vinyl chloride | 6500 | | 250 | 50 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 112 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 93 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 95 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 98 | | 74-123 |

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FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-5 | Lab Sample ID: 500-49692-2

Matrix: Water | Lab File ID: 49692-2.D

Analysis Method: 8260B | Date Collected: 08/28/2012 13:59

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 01:59

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.82 | J | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.52 | | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 127 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 106 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 104 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 116 | | 74-123 |

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FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-7 | Lab Sample ID: 500-49692-3

Matrix: Water | Lab File ID: 49692-3.D

Analysis Method: 8260B | Date Collected: 08/28/2012 11:47

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 02:23

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 1.5 | | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.46 | J | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.57 | | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 121 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 98 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 98 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 108 | | 74-123 |

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FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-10 | Lab Sample ID: 500-49692-4

Matrix: Water | Lab File ID: 49692-4.D

Analysis Method: 8260B | Date Collected: 08/28/2012 11:47

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 02:48

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.98 | J | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.29 | J | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.65 | | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 123 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 101 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 99 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 112 | | 74-123 |

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FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-9 | Lab Sample ID: 500-49692-5

Matrix: Water | Lab File ID: 49692-5.D

Analysis Method: 8260B | Date Collected: 08/28/2012 15:39

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 03:12

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.12 | U | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.30 | J | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.42 | J | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 119 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 99 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 97 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 109 | | 74-123 |

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FORM I 8260B

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-BLANK | Lab Sample ID: 500-49692-6

Matrix: Water | Lab File ID: 49692-6.D

Analysis Method: 8260B | Date Collected: 08/28/2012 16:30

Sample wt/vol: 5(mL) | Date Analyzed: 08/31/2012 03:37

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161257 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.12 | U | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.19 | U | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 118 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 98 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 97 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 109 | | 74-123 |

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-6 Lab Sample ID: 500-49692-1

Matrix: Water Lab File ID: 10se121529-r021.d

Analysis Method: RSK-175 Date Collected: 08/28/2012 10:41

Sample wt/vol: 18(mL) Date Analyzed: 09/10/2012 15:49

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 44721 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 29 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethene | 15 | | 3.0 | 0.73 |



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FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-5 | Lab Sample ID: 500-49692-2

Matrix: Water | Lab File ID: 10se121529-r031.d

Analysis Method: RSK-175 | Date Collected: 08/28/2012 13:59

Sample wt/vol: 18(mL) | Date Analyzed: 09/10/2012 15:54

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 44721 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 0.45 | U | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethene | 0.73 | U | 3.0 | 0.73 |

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-7 Lab Sample ID: 500-49692-3

Matrix: Water Lab File ID: 10se121529-r041.d

Analysis Method: RSK-175 Date Collected: 08/28/2012 11:47

Sample wt/vol: 18(mL) Date Analyzed: 09/10/2012 16:00

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 44721 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 0.45 | U | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethene | 0.73 | U | 3.0 | 0.73 |



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FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington
Job No.: 500-49692-1
SDG No.:
Client Sample ID: VLF-MW-10
Lab Sample ID: 500-49692-4
Matrix: Water
Lab File ID: 11se120939-r011.d
Analysis Method: RSK-175
Date Collected: 08/28/2012 11:47
Sample wt/vol: 18(mL)
Date Analyzed: 09/11/2012 09:56
Soil Aliquot Vol:
Dilution Factor: 1
Soil Extract Vol.:
GC Column: RT-U-Plot ID: 0.53(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 44721
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 1.1 | J | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethene | 0.73 | U | 3.0 | 0.73 |



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FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington | Job No.: 500-49692-1

SDG No.:

Client Sample ID: VLF-MW-9 | Lab Sample ID: 500-49692-5

Matrix: Water | Lab File ID: 10se121529-r061.d

Analysis Method: RSK-175 | Date Collected: 08/28/2012 15:39

Sample wt/vol: 18(mL) | Date Analyzed: 09/10/2012 16:10

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 44721 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 1.8 | J | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethene | 0.73 | U | 3.0 | 0.73 |



9-27-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-6
Lab Sample ID: 500-49692-1
Lab Name: TestAmerica Chicago
Job No.: 500-49692-1
SDG ID.:
Matrix: Water
Date Sampled: 08/28/2012 10:41
Reporting Basis: WET
Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 71 | 5.0 | 1.2 | mg/L | | | 25 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 190 | 5.0 | 2.0 | mg/L | | | 25 | 300.0 |
| | Alkalinity | 440 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 4.3 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 4.0 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 4.2 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-27-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-5
Lab Sample ID: 500-49692-2
Lab Name: TestAmerica Chicago
Job No.: 500-49692-1
SDG ID.:
Matrix: Water
Date Sampled: 08/28/2012 13:59
Reporting Basis: WET
Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 11 | 2.0 | 0.46 | mg/L | | | 10 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.032 | 0.10 | 0.028 | mg/L | J | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 240 | 10 | 3.9 | mg/L | | | 50 | 300.0 |
| | Alkalinity | 480 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 2.4 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 2.1 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 2.3 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-27-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-7
Lab Sample ID: 500-49692-3
Lab Name: TestAmerica Chicago
Job No.: 500-49692-1
SDG ID.:
Matrix: Water
Date Sampled: 08/28/2012 11:47
Reporting Basis: WET
Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 38 | 2.0 | 0.46 | mg/L | | | 10 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 530 | 20 | 7.8 | mg/L | | | 100 | 300.0 |
| | Alkalinity | 400 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 3.5 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 3.2 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 3.3 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-27-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-10
Lab Sample ID: 500-49692-4
Lab Name: TestAmerica Chicago
Job No.: 500-49692-1
SDG ID.:
Matrix: Water
Date Sampled: 08/28/2012 11:47
Reporting Basis: WET
Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 40 | 2.0 | 0.46 | mg/L | | | 10 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 450 | 20 | 7.8 | mg/L | | | 100 | 300.0 |
| | Alkalinity | 420 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 3.3 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 3.1 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 3.2 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-27-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-9
Lab Sample ID: 500-49692-5
Lab Name: TestAmerica Chicago
Job No.: 500-49692-1
SDG ID.:
Matrix: Water
Date Sampled: 08/28/2012 15:39
Reporting Basis: WET
Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 5.8 | 0.20 | 0.046 | mg/L | | | 1 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.067 | 0.10 | 0.028 | mg/L | J | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 74 | 2.0 | 0.78 | mg/L | | | 10 | 300.0 |
| | Alkalinity | 160 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 2.4 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 2.1 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 2.3 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-27-12

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

(optional)
Report To
Contact: Jessica Lepore
Company: OTIE
Address: 100 W. Monroe St
Address: Suite 300
Phone: (312) 220-7000 ext 26
Fax:
E-Mail: JLepore@otie.com

(optional)
Bill To
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#

## Chain of Custody Record

Lab Job #: 500-49692
Chain of Custody Number:
Page 1 of 1
Temperature °C of Cooler: 2.1

Client: OTIE
Client Project #: 2010107 - 2007
Project Name: Vulcan - Louisville
Project Location/State: North Chicago, IL
Lab Project #:
Sampler: Elisa Walker / Jessica Lepore
Lab PM: D. Ingersoll

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

| Lab ID | MS/MSD | Sample ID | Sampling Date | Sampling Time | # of Containers | Matrix | RCRA Metals + Hg (Preservative: $HNO_3$) | VOCs (Preservative: HCl) | Anions (Preservative: None) | TOC (Preservative: $H_2SO_4$) | Alkalinity (Preservative: None) | RSK-175 (Preservative: HCl) | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | VLF-MW-10 | 8/28/12 | 10:41 | 11 | Aq | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 2 | | VLF-MW-5 | " " " | 13:59 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | There are |
| 3 | | VLF-MW-7 | " " " | 11:47 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | additional |
| 4 | | VLF-MW-10 Dup | " " " | 11:47 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | samples to |
| 5 | | VLF-MW-9 | " " " | 15:39 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | be shipped on |
| 6 | | VLF-BLNK | " " " | 16:30 | 3 | " | | 3 | | | | | | | | 8/29/12 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days ___ 10 Days ✓ 15 Days _____ Other
Requested Due Date _____

Sample Disposal
☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months (A fee may be assessed if samples are retained longer than 1 month)

| Relinquished By | Company | Date | Time | Received By | Company | Date | Time |
|---|---|---|---|---|---|---|---|
| [signature] | OTIE | 8/28/12 | 1725 | [signature] | TA | 8/29/12 | 1030 |
| | | | | | | | |
| | | | | | | | |

Lab Courier:
Shipped: FX
Hand Delivered:

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
MS – Miscellaneous
OL – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
WI – Wipe
DW – Drinking Water
O – Other
Aq – Aqueous

Client Comments

Lab Comments:

9-27-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-6 Lab Sample ID: 500-49692-1

Lab Name: TestAmerica Chicago Job No.: 500-49692-1

SDG ID.:

Matrix: Water Date Sampled: 08/28/2012 10:41

Reporting Basis: WET Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.11 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00054 | 0.0020 | 0.00054 | mg/L | U | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-27-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-5 | Lab Sample ID: 500-49692-2

Lab Name: TestAmerica Chicago | Job No.: 500-49692-1

SDG ID.:

Matrix: Water | Date Sampled: 08/28/2012 13:59

Reporting Basis: WET | Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.11 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00088 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

Aug-27-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-7

Lab Sample ID: 500-49692-3

Lab Name: TestAmerica Chicago

Job No.: 500-49692-1

SDG ID.:

Matrix: Water

Date Sampled: 08/28/2012 11:47

Reporting Basis: WET

Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.057 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00063 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-27-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-10 Lab Sample ID: 500-49692-4

Lab Name: TestAmerica Chicago Job No.: 500-49692-1

SDG ID.:

Matrix: Water Date Sampled: 08/28/2012 11:47

Reporting Basis: WET Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.054 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00065 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-27-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-9 Lab Sample ID: 500-49692-5

Lab Name: TestAmerica Chicago Job No.: 500-49692-1

SDG ID.:

Matrix: Water Date Sampled: 08/28/2012 15:39

Reporting Basis: WET Date Received: 08/29/2012 10:30

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.014 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00054 | 0.0020 | 0.00054 | mg/L | U | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-27-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG No.:
Client Sample ID: VLF-MW-1
Lab Sample ID: 500-49730-1
Matrix: Water
Lab File ID: 49730-01.D
Analysis Method: 8260B
Date Collected: 08/29/2012 10:12
Sample wt/vol: 5(mL)
Date Analyzed: 09/05/2012 10:45
Soil Aliquot Vol:
Dilution Factor: 1
Soil Extract Vol.:
GC Column: DB624 ID: 0.2(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 161618
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.12 | U | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.19 | U | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 93 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 109 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 94 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 92 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG No.:
Client Sample ID: VLF-MW-2
Lab Sample ID: 500-49730-2
Matrix: Water
Lab File ID: 49730-02.D
Analysis Method: 8260B
Date Collected: 08/29/2012 12:03
Sample wt/vol: 5(mL)
Date Analyzed: 09/05/2012 11:10
Soil Aliquot Vol:
Dilution Factor: 1
Soil Extract Vol.:
GC Column: DB624 ID: 0.2(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 161618
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.12 | U | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.50 | | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 94 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 106 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 94 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 91 | | 74-123 |

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG No.:
Client Sample ID: VLF-MW-3
Lab Sample ID: 500-49730-3
Matrix: Water
Lab File ID: 49730-03.D
Analysis Method: 8260B
Date Collected: 08/29/2012 14:19
Sample wt/vol: 5(mL)
Date Analyzed: 09/06/2012 10:39
Soil Aliquot Vol:
Dilution Factor: 10
Soil Extract Vol.:
GC Column: DB624 ID: 0.2(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 161772
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.74 | U | 5.0 | 0.74 |
| 156-60-5 | trans-1,2-Dichloroethene | 51 | | 10 | 2.5 |
| 100-41-4 | Ethylbenzene | 1.3 | U | 5.0 | 1.3 |
| 127-18-4 | Tetrachloroethene | 12 | | 10 | 1.7 |
| 108-88-3 | Toluene | 4.7 | J | 5.0 | 1.1 |
| 75-01-4 | Vinyl chloride | 65 | | 5.0 | 1.0 |
| 1330-20-7 | Xylenes, Total | 0.68 | U | 10 | 0.68 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 100 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 102 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 95 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 93 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-3 DL | Lab Sample ID: 500-49730-3 DL

Matrix: Water | Lab File ID: 49730-03.D

Analysis Method: 8260B | Date Collected: 08/29/2012 14:19

Sample wt/vol: 5(mL) | Date Analyzed: 09/05/2012 11:34

Soil Aliquot Vol: | Dilution Factor: 200

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161618 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 3400 | | 200 | 24 |
| 79-01-6 | Trichloroethene | 6000 | | 100 | 38 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 96 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 103 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 93 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 89 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG No.:

Client Sample ID: OLD-MW-4 | Lab Sample ID: 500-49730-4

Matrix: Water | Lab File ID: 49730-04.D

Analysis Method: 8260B | Date Collected: 08/29/2012 16:55

Sample wt/vol: 5(mL) | Date Analyzed: 09/05/2012 12:22

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161618 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.64 | | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 2.2 | | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 110 | | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.48 | J | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 23 | | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.60 | J | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.72 | | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 42 | | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 2.3 | | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 96 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 102 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 97 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 89 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-4 | Lab Sample ID: 500-49730-5

Matrix: Water | Lab File ID: 49730-05.D

Analysis Method: 8260B | Date Collected: 08/29/2012 18:00

Sample wt/vol: 5(mL) | Date Analyzed: 09/05/2012 12:47

Soil Aliquot Vol: | Dilution Factor: 2

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161618 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.15 | U | 1.0 | 0.15 |
| 156-60-5 | trans-1,2-Dichloroethene | 19 | | 2.0 | 0.50 |
| 100-41-4 | Ethylbenzene | 0.26 | U | 1.0 | 0.26 |
| 79-01-6 | Trichloroethene | 300 | | 1.0 | 0.38 |
| 127-18-4 | Tetrachloroethene | 0.34 | U | 2.0 | 0.34 |
| 108-88-3 | Toluene | 0.22 | U | 1.0 | 0.22 |
| 75-01-4 | Vinyl chloride | 43 | | 1.0 | 0.20 |
| 1330-20-7 | Xylenes, Total | 0.14 | U | 2.0 | 0.14 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 98 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 101 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 95 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 93 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-4 DL | Lab Sample ID: 500-49730-5 DL

Matrix: Water | Lab File ID: 49730-05a.D

Analysis Method: 8260B | Date Collected: 08/29/2012 18:00

Sample wt/vol: 5(mL) | Date Analyzed: 09/05/2012 13:11

Soil Aliquot Vol: | Dilution Factor: 20

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161618 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 670 | | 20 | 2.4 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 99 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 101 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 94 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 90 | | 74-123 |



9-28-12

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-BLNK2 | Lab Sample ID: 500-49730-6

Matrix: Water | Lab File ID: 49730-06.D

Analysis Method: 8260B | Date Collected: 08/29/2012 13:11

Sample wt/vol: 5(mL) | Date Analyzed: 09/05/2012 13:36

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: DB624 ID: 0.2(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 161618 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.074 | U | 0.50 | 0.074 |
| 156-60-5 | trans-1,2-Dichloroethene | 0.25 | U | 1.0 | 0.25 |
| 156-59-2 | cis-1,2-Dichloroethene | 0.12 | U | 1.0 | 0.12 |
| 100-41-4 | Ethylbenzene | 0.13 | U | 0.50 | 0.13 |
| 79-01-6 | Trichloroethene | 0.19 | U | 0.50 | 0.19 |
| 127-18-4 | Tetrachloroethene | 0.17 | U | 1.0 | 0.17 |
| 108-88-3 | Toluene | 0.11 | U | 0.50 | 0.11 |
| 75-01-4 | Vinyl chloride | 0.10 | U | 0.50 | 0.10 |
| 1330-20-7 | Xylenes, Total | 0.068 | U | 1.0 | 0.068 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| 17060-07-0 | 1,2-Dichloroethane-d4 (Surr) | 95 | | 75-131 |
| 2037-26-5 | Toluene-d8 (Surr) | 100 | | 80-120 |
| 460-00-4 | 4-Bromofluorobenzene (Surr) | 89 | | 79-120 |
| 1868-53-7 | Dibromofluoromethane | 91 | | 74-123 |

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-1 | Lab Sample ID: 500-49730-1

Matrix: Water | Lab File ID: 10se121529-r071.d

Analysis Method: RSK-175 | Date Collected: 08/29/2012 10:12

Sample wt/vol: 18(mL) | Date Analyzed: 09/10/2012 16:16

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 44721 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 2.0 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethylene | 0.73 | U | 3.0 | 0.73 |



9-28-12

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington | Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-2 | Lab Sample ID: 500-49730-2

Matrix: Water | Lab File ID: 10se121529-r081.d

Analysis Method: RSK-175 | Date Collected: 08/29/2012 12:03

Sample wt/vol: 18(mL) | Date Analyzed: 09/10/2012 16:21

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 44721 | Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 78 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethylene | 0.73 | U | 3.0 | 0.73 |



Aug-28-12

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington Job No.: 500-49730-1

SDG No.:

Client Sample ID: VLF-MW-3 Lab Sample ID: 500-49730-3

Matrix: Water Lab File ID: 10se121529-r091.d

Analysis Method: RSK-175 Date Collected: 08/29/2012 14:19

Sample wt/vol: 18(mL) Date Analyzed: 09/10/2012 16:25

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RT-U-Plot ID: 0.53(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 44721 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 19 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethylene | 0.73 | U | 3.0 | 0.73 |



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FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington
Job No.: 500-49730-1
SDG No.:
Client Sample ID: OLD-MW-4
Lab Sample ID: 500-49730-4
Matrix: Water
Lab File ID: 10se121529-r101.d
Analysis Method: RSK-175
Date Collected: 08/29/2012 16:55
Sample wt/vol: 18(mL)
Date Analyzed: 09/10/2012 16:31
Soil Aliquot Vol:
Dilution Factor: 1
Soil Extract Vol.:
GC Column: RT-U-Plot ID: 0.53(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 44721
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 290 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethylene | 1.6 | J | 3.0 | 0.73 |

FORM I
GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Burlington
Job No.: 500-49730-1
SDG No.:
Client Sample ID: VLF-MW-4
Lab Sample ID: 500-49730-5
Matrix: Water
Lab File ID: 10se121529-r111.d
Analysis Method: RSK-175
Date Collected: 08/29/2012 18:00
Sample wt/vol: 18(mL)
Date Analyzed: 09/10/2012 16:36
Soil Aliquot Vol:
Dilution Factor: 1
Soil Extract Vol.:
GC Column: RT-U-Plot ID: 0.53(mm)
% Moisture:
Level: (low/med) Low
Analysis Batch No.: 44721
Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | RL | MDL |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 22 | | 2.0 | 0.45 |
| 74-84-0 | Ethane | 0.81 | U | 4.0 | 0.81 |
| 74-85-1 | Ethylene | 2.8 | J | 3.0 | 0.73 |



AH 9-28-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-1
Lab Sample ID: 500-49730-1
Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG ID.:
Matrix: Water
Date Sampled: 08/29/2012 10:12
Reporting Basis: WET
Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.068 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00054 | 0.0020 | 0.00054 | mg/L | U | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | J | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-28-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-2 Lab Sample ID: 500-49730-2

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 12:03

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0068 | 0.010 | 0.0024 | mg/L | J | | 1 | 6010B |
| 7440-39-3 | Barium | 0.040 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.0014 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0033 | 0.0050 | 0.0016 | mg/L | J | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | J | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0012 | 0.0050 | 0.0011 | mg/L | J | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-28-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-3 Lab Sample ID: 500-49730-3

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 14:19

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0046 | 0.010 | 0.0024 | mg/L | J | | 1 | 6010B |
| 7440-39-3 | Barium | 0.048 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00079 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.0049 | 0.010 | 0.00096 | mg/L | J | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0079 | 0.025 | 0.0079 | mg/L | U | | 5 | 6010B |
| 7782-49-2 | Selenium | 0.078 | 0.010 | 0.0027 | mg/L | | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0015 | 0.0050 | 0.0011 | mg/L | J | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.20 | 0.20 | 0.070 | ug/L | | | 1 | 7470A |

9-28-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: OLD-MW-4 Lab Sample ID: 500-49730-4

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 16:55

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0024 | 0.010 | 0.0024 | mg/L | U | | 1 | 6010B |
| 7440-39-3 | Barium | 0.091 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00089 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.00096 | 0.010 | 0.00096 | mg/L | U | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0016 | 0.0050 | 0.0016 | mg/L | U | | 1 | 6010B |
| 7782-49-2 | Selenium | 0.0027 | 0.010 | 0.0027 | mg/L | U | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 0.070 | 0.20 | 0.070 | ug/L | U | | 1 | 7470A |

9-28-12

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VLF-MW-4 Lab Sample ID: 500-49730-5

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 18:00

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | 0.0088 | 0.010 | 0.0024 | mg/L | J | | 1 | 6010B |
| 7440-39-3 | Barium | 0.078 | 0.010 | 0.00044 | mg/L | | | 1 | 6010B |
| 7440-43-9 | Cadmium | 0.00099 | 0.0020 | 0.00054 | mg/L | J | | 1 | 6010B |
| 7440-47-3 | Chromium | 0.0021 | 0.010 | 0.00096 | mg/L | J | | 1 | 6010B |
| 7439-92-1 | Lead | 0.0079 | 0.025 | 0.0079 | mg/L | U | | 5 | 6010B |
| 7782-49-2 | Selenium | 0.081 | 0.010 | 0.0027 | mg/L | | | 1 | 6010B |
| 7440-22-4 | Silver | 0.0011 | 0.0050 | 0.0011 | mg/L | U | | 1 | 6010B |
| 7439-97-6 | Mercury | 3.6 | 0.20 | 0.070 | ug/L | | | 1 | 7470A |

9-28-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-1 Lab Sample ID: 500-49730-1

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 10:12

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 170 | 10 | 2.3 | mg/L | | | 50 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.90 | 0.10 | 0.028 | mg/L | | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 130 | 4.0 | 1.6 | mg/L | | | 20 | 300.0 |
| | Alkalinity | 56 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 1.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 1.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 1.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

5-28-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-2 | Lab Sample ID: 500-49730-2

Lab Name: TestAmerica Chicago | Job No.: 500-49730-1

SDG ID.:

Matrix: Water | Date Sampled: 08/29/2012 12:03

Reporting Basis: WET | Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 340 | 20 | 4.6 | mg/L | | | 100 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.28 | 1.0 | 0.28 | mg/L | U | | 10 | 300.0 |
| 14808-79-8 | Sulfate | 610 | 20 | 7.8 | mg/L | | | 100 | 300.0 |
| | Alkalinity | 310 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 3.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 3.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 3.6 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

9-28-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-3
Lab Sample ID: 500-49730-3
Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG ID.:
Matrix: Water
Date Sampled: 08/29/2012 14:19
Reporting Basis: WET
Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 250 | 10 | 2.3 | mg/L | | | 50 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 230 | 10 | 3.9 | mg/L | | | 50 | 300.0 |
| | Alkalinity | 100 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 54 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |
| | TOC Result 2 | 55 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |
| 7440-44-0 | TOC Dup | 54 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |

AHG-28-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: OLD-MW-4 Lab Sample ID: 500-49730-4

Lab Name: TestAmerica Chicago Job No.: 500-49730-1

SDG ID.:

Matrix: Water Date Sampled: 08/29/2012 16:55

Reporting Basis: WET Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 150 | 5.0 | 1.2 | mg/L | | | 25 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | J | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 230 | 10 | 3.9 | mg/L | | | 50 | 300.0 |
| | Alkalinity | 300 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 74 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |
| | TOC Result 2 | 76 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |
| 7440-44-0 | TOC Dup | 75 | 2.0 | 0.76 | mg/L | | | 2 | SM 5310C |

9-28-12

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: VLF-MW-4
Lab Sample ID: 500-49730-5
Lab Name: TestAmerica Chicago
Job No.: 500-49730-1
SDG ID.:
Matrix: Water
Date Sampled: 08/29/2012 18:00
Reporting Basis: WET
Date Received: 08/30/2012 10:15

| CAS No. | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 150 | 10 | 2.3 | mg/L | | | 50 | 300.0 |
| 14797-55-8 | Nitrate as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14797-65-0 | Nitrite as N | 0.028 | 0.10 | 0.028 | mg/L | U | | 1 | 300.0 |
| 14808-79-8 | Sulfate | 330 | 10 | 3.9 | mg/L | | | 50 | 300.0 |
| | Alkalinity | 170 | 5.0 | 1.2 | mg/L | | | 1 | SM 2320B |
| | TOC Result 1 | 4.0 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| | TOC Result 2 | 3.8 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |
| 7440-44-0 | TOC Dup | 3.9 | 1.0 | 0.38 | mg/L | | | 1 | SM 5310C |

5-28-12

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

# Chain of Custody Record

Lab Job #: 500-49730

Chain of Custody Number:

Page 1 of 1

Temperature °C of Cooler: 4.8

(optional)

Report To
Contact: Jessica Lepre
Company: OTIE
Address: 100 W. Monroe St
Address: Suite 300
Phone: (312)220-7000 ext. 26
Fax:
E-Mail: JLepre@otie.com

(optional)

Bill To
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#

Client: OTIE
Client Project #: 2010101 / 2007
Project Name: Vulcan-Louisville
Project Location/State: North Chicago, IL
Lab Project #:
Sampler: Elisa Walker / Jessica Lepre
Lab PM: D. Ingerson

| Lab ID | MS/MSD | Sample ID | Sampling Date | Sampling Time | # of Containers | Matrix | RCRA Metals + Hg (HNO3) | VOCs (HCl) | Anions (None) | TOC ($H_2SO_4$) | Alkalinity (None) | RSK-175 (HCl) | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | VLF-MW-1 | 8/29/12 | 1012 | 11 | Aq | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 2 | | VLF-MW-2 | " " | 1203 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 3 | | VLF-MW-3 | " " | 1419 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 4 | | OLD-MW-4 | " " | 1655 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 5 | | VLF-MW-4 | " " | 1800 | 11 | " | 1 | 3 | 1 | 2 | 1 | 3 | | | | |
| 6 | | VLF-BLNK2 | " " | 1311 | | " | | | | | | | | | | |

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days ___ 10 Days ✓ 15 Days ___ Other
Requested Due Date ___

Sample Disposal
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ___ Months (A fee may be assessed if samples are retained longer than 1 month)

| Relinquished By | Company | Date | Time | Received By | Company | Date | Time |
|---|---|---|---|---|---|---|---|
| [signature] | OTIE | 8/29/12 | 1859 | Sherri Scott | TA-Chi | 8/30/12 | 1015 |
| | | | | | | | |
| | | | | | | | |

Lab Courier:
Shipped: FedEx
Hand Delivered:

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
MS – Miscellaneous
OL – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
WI – Wipe
DW – Drinking Water
O – Other
Aq – Aqueous

Client Comments

Lab Comments:

9-28-12

**TestAmerica Chicago**
2417 Bond Street
University Park, IL 60484
Phone (708) 534-5200 Fax (708) 534-5211

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

**Client Information (Sub Contract Lab)**

Client Contact: Shipping/Receiving
Company: TestAmerica Laboratories, Inc.
Address: 30 Community Drive, Suite 11,
City: South Burlington
State, Zip: VT, 05403
Phone: 802-660-1990(Tel)
Email:
Project Name: Vulcan Louisville Fansteel
Site:

Sampler:
Phone:
Due Date Requested: 9/18/2012
TAT Requested (days):
PO #:
WO #:
Project #: 50004270
SSOW#:

Lab PM: Ingersoll, Donna L
E-Mail: donna.ingersoll@testamericainc.com
Carrier Tracking No(s):
COC No: 500-23889.1
Page: Page 1 of 1
Job #: 500-49730-1

**Analysis Requested**

**Preservation Codes:**
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | RSK_176 | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| VLF-MW-1 (500-49730-1) | 8/29/12 | 10:12 Central | | Water | | | X | 3 | |
| VLF-MW-2 (500-49730-2) | 8/29/12 | 12:03 Central | | Water | | | X | 3 | |
| VLF-MW-3 (500-49730-3) | 8/29/12 | 14:19 Central | | Water | | | X | 3 | |
| OLD-MW-4 (500-49730-4) | 8/29/12 | 16:55 Central | | Water | | | X | 3 | |
| VLF-MW-4 (500-49730-5) | 8/29/12 | 18:00 Central | | Water | | | X | 3 | |

*Possible Hazard Identification*
*Unconfirmed*

*Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
|---|---|---|---|---|---|
| [signature] | 8/30/12 1600 | TA-CHI | Steph Buchan | 8/31/12 1025 | TABUR |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

9-28-12



09/20/2012