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November 12, 2009

Mr. Todd Richardson (3HS32)  
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1650 Arch Street  
Philadelphia, Pennsylvania 19103

Subject: Final Trip Report for Jay-Cee Cleaners Site  
September 2009 Sampling Event  
EPA Contract No. EP-S3-05-02  
Technical Direction Document No. E43-026-09-07-022  
Document Tracking No. 0868

Dear Mr. Richardson:

Tetra Tech EM Inc. (Tetra Tech) is submitting the final trip report for the Jay-Cee Cleaners site summarizing residential well sampling activities conducted at the site in September 2009. If you have any questions regarding this report, please contact me by phone at (215) 651-4022 or via electronic mail at [jordan.vaughn@ttemi.com](mailto:jordan.vaughn@ttemi.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Vaughn'.

Jordan Vaughn  
Project Manager

Enclosures

cc: TDD File

**FINAL TRIP REPORT  
FOR THE  
JAY-CEE CLEANERS SITE  
SEPTEMBER 2009 SAMPLING EVENT  
NELSONIA, ACCOMACK COUNTY, VIRGINIA**

*Prepared for*

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*Submitted by*

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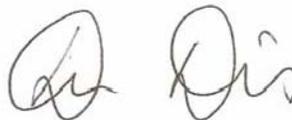
Prepared by



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Jordan Vaughn  
Environmental Scientist

Approved by



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Donna Davies  
START Backup Point of Contact

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## **1.0 INTRODUCTION**

Under Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. EP-S3-05-02, Technical Direction Document (TDD) No. E43-026-09-07-022, U.S. Environmental Protection Agency (EPA) Region 3 tasked Tetra Tech EM Inc. (Tetra Tech) to assist with assessment activities at the Jay-Cee Cleaners site (site) in Nelsonia, Accomack County, Virginia. The purpose of the investigation was to determine whether residential wells near the site have been impacted by hazardous substances released from the site.

This trip report provides site background information in Section 2.0, describes geology and hydrogeology of the site in Section 3.0, presents site activities in Section 4.0, summarizes analytical results in Section 5.0, and provides conclusions and recommendations in Section 6.0. References are provided after the text.

## **2.0 BACKGROUND**

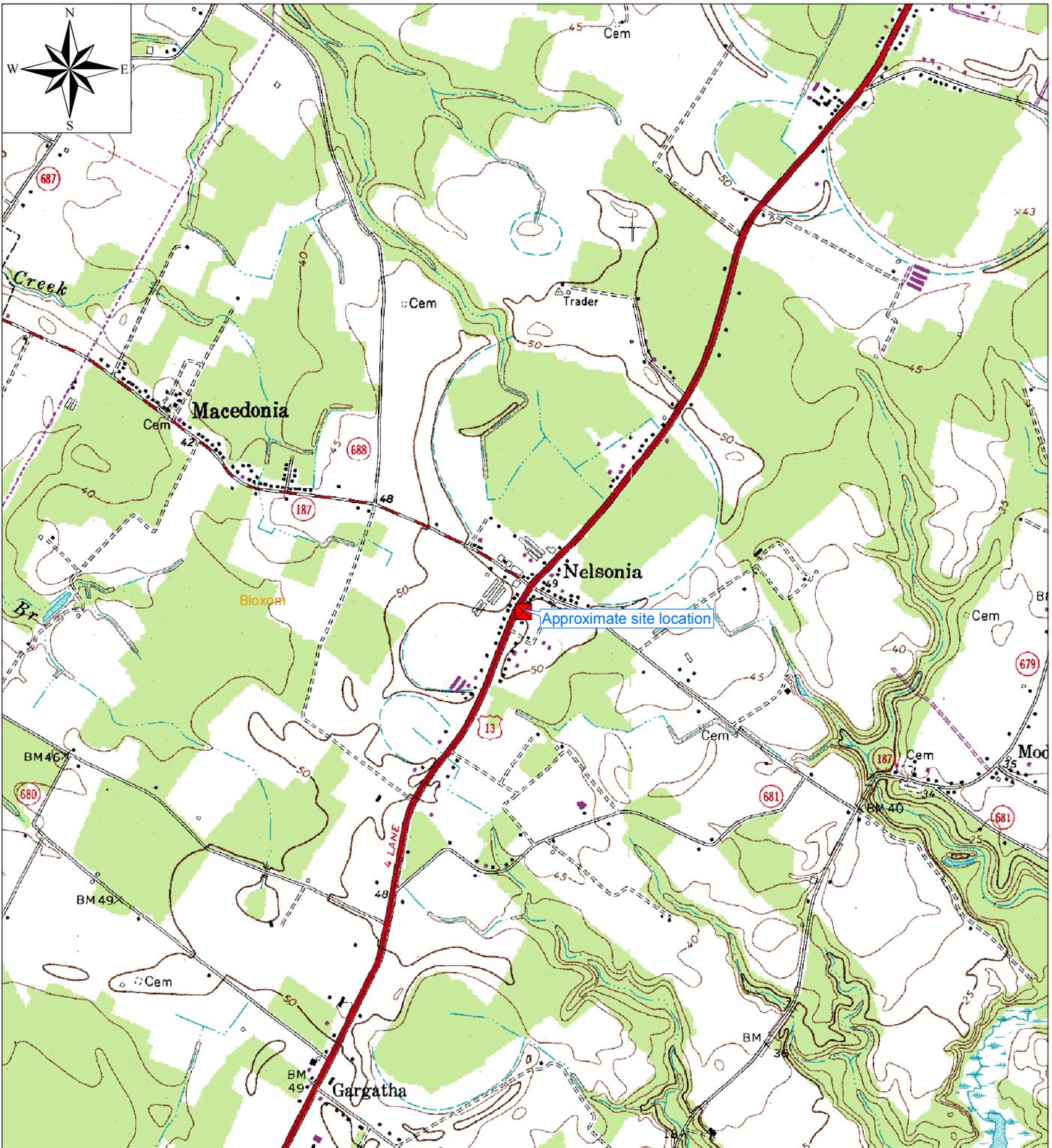
This section provides background information on the site, including its location, description, and history of site activities and investigations.

### **2.1 SITE LOCATION**

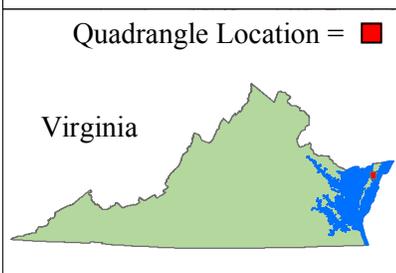
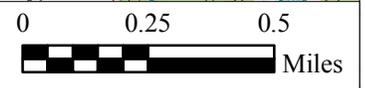
The site is located at 16163 Lankford Highway, approximately 300 feet south of the intersection of Lankford Highway (U.S. Route 13) and Nelsonia Road (State Road 187), in Nelsonia, Accomack County, Virginia, as shown in Figure 1, Site Location Map. The geographic coordinates of the approximate center of the site are 37.8186° north latitude and 75.5883° west longitude (U.S. Geological Survey [USGS] 1965).

### **2.2 SITE DESCRIPTION**

The site covers approximately 1.1 acres of land and contains an approximately 3,000-square-foot, single-story structure located at the center of the site (ECS Mid-Atlantic, LLC [ECS] 2007). A dry cleaning business operated on the site from approximately 1957 to 2003 (ECS 2007). A retail store operated from the on-site building in 2008 and 2009. The site is located



Source: Modified from USGS 7.5-Minute Series Topographic Quadrangle; Bloxom, Virginia, 1965, Photorevised 1978



**Jay-Cee Cleaners Site**  
 Nelsonia, Accomack County, Virginia

**Figure 1**  
 Site Location Map

TDD No. E43-026-09-07-022  
 EPA Contract No. EP-S3-05-02

Map created on November 3, 2009  
 by D. Call, Tetra Tech EM Inc.



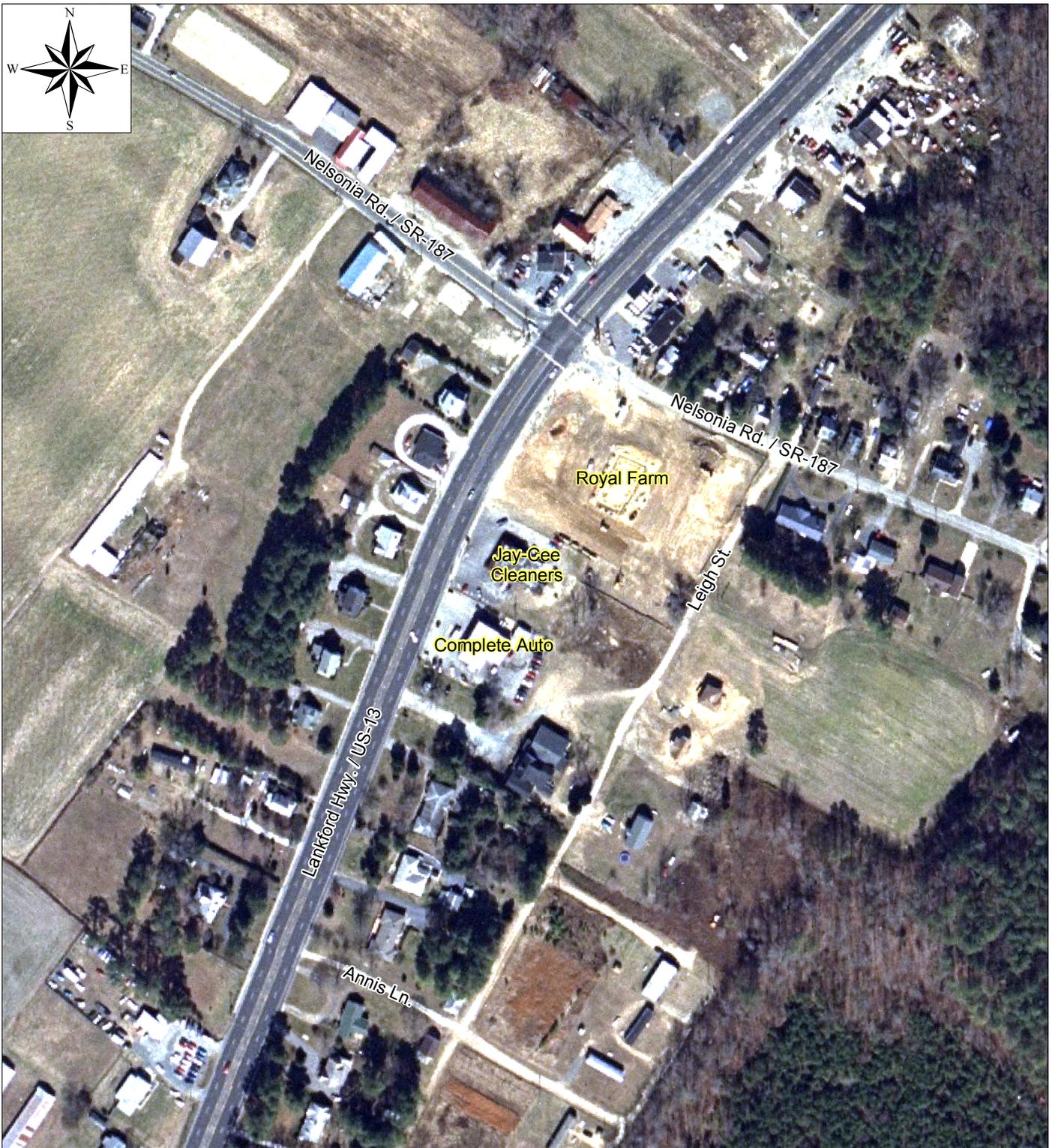
approximately 50 feet above mean sea level and slopes gently towards the southwest (USGS 1965).

The site is located in a mixed commercial and residential area. Nearby commercial properties include the Royal Farm convenience store and gas station located immediately northeast of the site, and Complete Auto vehicle maintenance and repair shop located immediately south of the site. Nearby residential properties are located along Lankford Highway (U.S. Route 13), Nelsonia Road (State Route 187), and Leigh Street. The surrounding area includes additional residential and agricultural properties and woodland areas. Figure 2, Site Layout Map, shows the location of Jay-Cee Cleaners, streets and roadways bordering the site, and nearby commercial properties (State of Virginia 2005).

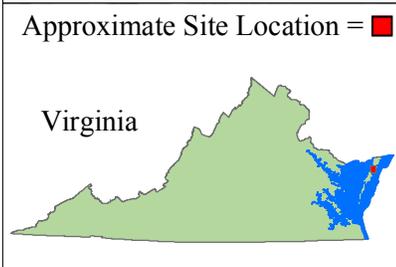
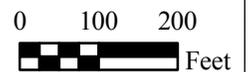
### **2.3 PREVIOUS SITE INVESTIGATIONS**

In April 2007, ECS completed a Phase II environmental site assessment (ESA) of the Jay-Cee Cleaners property. During the ESA, 11 soil borings were completed to maximum depths ranging from 4.0 and 8.0 feet below ground surface (bgs) at various locations of concern throughout the site. Soil samples were collected from three of the borings and analyzed for volatile organic compounds (VOC). Groundwater samples were collected from two of the borings and also analyzed for VOCs. No soil or groundwater samples were collected from the remaining borings. Soil sample analytical results showed elevated concentrations of tetrachloroethene (PCE) and several PCE-related compounds, including trichloroethene (TCE) and *cis*-1,2-dichloroethene (*cis*-1,2-DCE). The maximum concentrations of PCE, TCE, and *cis*-1,2-DCE found in the soil samples were 9,200,000 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ), 100,000  $\mu\text{g}/\text{kg}$ , and 36,000  $\mu\text{g}/\text{kg}$ , respectively. Groundwater sample results also showed elevated concentrations of PCE, TCE, and *cis*-1,2-DCE. Maximum concentrations of PCE, TCE, and *cis*-1,2-DCE found in groundwater samples were 100,000 micrograms per liter ( $\mu\text{g}/\text{L}$ ), 6,300  $\mu\text{g}/\text{L}$ , and 52,000  $\mu\text{g}/\text{L}$ , respectively.

Following completion and review of the ESA, the Virginia Department of Environmental Quality (VDEQ) was notified of the elevated VOC concentrations. VDEQ then notified EPA of the elevated concentrations. In September 2007, EPA tasked Tetra Tech with collecting residential



Source: Modified from USGS High Resolution State Orthoimagery for Southern Virginia, Commonwealth of Virginia, Virginia Department of Technology Planning, Geographic Network Division, 2002.



Jay-Cee Cleaners Site  
 Nelsonia, Accomack County, Virginia

**Figure 2**  
 Site Layout Map

TDD No. E43-026-09-07-022  
 EPA Contract No. EP-S3-05-02

Map created on November 3, 2009  
 by D. Call, Tetra Tech EM Inc.



well samples from nearby residences for VOC analysis. In October 2007, Tetra Tech collected residential well samples from seven residential properties located near the site. All samples were analyzed for VOCs. Analytical results indicated trace amounts of PCE and/or TCE in two of the residential wells. The maximum concentrations of PCE and TCE detected in the residential wells were 0.6 µg/L and 0.06 µg/L, respectively.

In April 2008, Tetra Tech collected a second round of groundwater samples from six of the seven properties sampled in 2007. The samples were analyzed for VOCs. PCE, TCE and *cis*-1,2-DCE were not detected in residential wells during the April 2008 sampling event. Also in April 2008, Tetra Tech collected 11 soil and 11 shallow groundwater samples from the site. The soil and shallow groundwater samples were analyzed for VOCs. Analytical results indicated that soil samples collected from monitoring points at the site contained VOCs, including PCE, TCE, and *cis*-1,2-DCE. The maximum concentrations of PCE, TCE, and *cis*-1,2-DCE detected in soil were 130,000 µg/kg, 50,000 µg/kg, and 5,100 µg/kg, respectively. Analytical results indicated that shallow groundwater samples collected from monitoring points contained VOCs including PCE, TCE, and *cis*-1,2-DCE. The maximum concentrations of PCE, TCE, and *cis*-1,2-DCE detected in shallow groundwater were 94,000 µg/L, 6,400 µg/L, and 5,000 µg/L, respectively.

In July 2008, Tetra Tech conducted a third round of groundwater sampling from all seven residential properties sampled in 2007. The samples were analyzed for VOCs. PCE was detected at trace amounts (0.30 µg/L) in one of the residential wells.

In February 2009, Tetra Tech conducted a fourth round of groundwater sampling and collected samples from three of the seven residential properties. The samples were analyzed for VOCs. PCE, TCE and *cis*-1,2-DCE were not detected in residential wells during the February 2009 sampling event.

### **3.0 SITE GEOLOGY AND HYDROGEOLOGY**

This section discusses the local geology and hydrogeology at the site.

### **3.1 GEOLOGY**

The site is located in the Coastal Plain physiographic province of Virginia (Bailey 1999). The Virginia Coastal Plain consists of a wedge of generally unconsolidated Jurassic and younger sediments increasing in thickness from less than 1 foot in the east where the Coastal Plain borders the Piedmont physiographic province, to more than 6,000 feet beneath the northeastern part of the Eastern Shore Peninsula (Meng and Harsh 1988). The sediments consist of Jurassic and Cretaceous clay, sand, and gravel overlain by a thin sequence of Tertiary marine sands overlain by Quaternary sand, mud, and gravel (Bailey 1999). In Virginia, the Coastal Plain is dissected by the Chesapeake Bay, which was created approximately 5,000 to 6,000 years ago when the lower course of the Susquehanna River was flooded by rising sea level (Hobbs 2004).

The site is directly underlain by Quaternary Columbia Group sediments (Cedarstrom 1957). The sediments can generally be characterized as unconsolidated fining-upwards depositional sequences of gravels, sands, and silts and clays (Meng and Harsh 1988). The sediments were deposited in fluvial-deltaic and estuarine settings similar to those that exist in the modern Chesapeake Bay and its tidal tributaries (Meng and Harsh 1988; Bailey 1999).

### **3.2 HYDROGEOLOGY**

Sediments of the Coastal Plain physiographic province are classified into a series of 19 hydrogeologic units designated as aquifers or confining zones (Meng and Harsh 1988, McFarland and Bruce 2006). The uppermost aquifer is the unconfined surficial aquifer (also called the Columbia aquifer), which is composed of unconsolidated interbedded gravels, sands, and silts and clays (Meng and Harsh 1988; McFarland and Bruce 2006). The surficial aquifer is moderately to widely utilized for private domestic wells (McFarland and Bruce 2006). The aquifer is principally recharged by precipitation infiltration. Because of the stratified nature of the sediments, horizontal hydraulic conductivity is generally greater than vertical hydraulic conductivity, and most of the unconfined groundwater flows relatively short distances before discharging to nearby streams and water bodies (McFarland and Bruce 2006). A small amount, however, reaches deeper, confined aquifers. In the area of the Jay-Cee Cleaners site, the surficial aquifer is underlain by the Yorktown confining zone (Meng and Harsh 1988; McFarland and Bruce 2006). It consists of finer-grained sediments and is generally tens of feet

thick (McFarland and Bruce 2006). The Yorktown confining zone is underlain by the Yorktown-Eastover aquifer, which is composed of thick to massively bedded shelly sands and lesser clay intervals (Meng and Harsh 1988; McFarland and Bruce 2006). The Yorktown-Eastover aquifer is used for both commercial and private domestic water supply wells.

Commercial well logs recorded in the vicinity of the site and described by Meng and Harsh indicate that the surficial aquifer near the site extends from ground surface to between 64 and 66 feet bgs (Meng and Harsh 1988). The well logs indicate that the Yorktown confining zone is between 60 and 74 feet thick (from between 64 and 66 feet bgs to between 124 and 140 feet bgs). The described wells are completed in the Yorktown-Eastover aquifer and, based on well total depths, indicate that the aquifer extends from the base of the Yorktown confining zone to greater than 340 feet bgs.

A domestic well log completed by Boggs Water & Sewage for a residence located approximately 500 feet from the site indicates that “top soil” and “sand” (likely belonging to the surficial aquifer) extend from ground surface to 60 feet bgs. The well log indicates that “sand clay” and “clay” (likely belonging to the Yorktown confining zone) extend from 60 to 215 feet bgs. The well is completed in “sand gravel shell” (likely the Yorktown-Eastover aquifer), which is described as extending from the base of the confining zone to greater than 235 feet bgs (the total depth of the well) (Boggs Water & Sewer 1999).

Shallow borings completed at the site as part of the April 2008 sampling event encountered surficial groundwater at between 6.40 and 11.13 feet bgs. Depth to water measurements collected from monitoring points during the April 2008 sampling event indicate that surficial groundwater flows to the southeast (Tetra Tech 2008a).

#### **4.0 SITE ACTIVITIES**

Tetra Tech conducted residential well sampling activities at the Jay-Cee Cleaners site in September 2009. This section describes residential well sampling activities and sample management procedures conducted as part of the sampling event. Tetra Tech documented site activities in accordance with Tetra Tech Standard Operating Procedure (SOP) No. 024,

“Recording of Notes in Field Logbook” (Tetra Tech 2008c). Field logbook notes are provided in Appendix A.

#### 4.1 RESIDENTIAL WELL SAMPLING

On September 9, 2009, Tetra Tech and EPA mobilized to the site to sample residential wells located on Lankford Highway, Nelsonia Road, and Lehigh Street near the Jay-Cee Cleaners site. Four of the seven residential wells (RW-01, RW-02, RW-05, RW-07) sampled during the October 2007 through February 2009 sampling events were resampled during this September 2009 sampling event. The remaining three properties were vacant and, therefore, prevented sample collection. Residential well sampling locations are shown in Figure 3, Sampling Location Map.

Tetra Tech collected a total of seven samples, including one duplicate sample, one trip blank, and one field blank. All residential well samples were collected from outside sources prior to any treatment systems. Tetra Tech purged all water systems Tech for a minimum of 15 minutes prior to sampling. Table 1 summarizes the samples collected during the September 2009 residential well sampling activities, including sample identifiers, laboratory identifiers, matrices, sampling dates and times, analyses, and additional comments.

**TABLE 1  
SEPTEMBER 2009 RESIDENTIAL WELL SAMPLING SUMMARY**

Sample Identifier	Laboratory Identifier	Sample Matrix	Sample Date	Collection Time	Analysis	Comments
JCC-TB	C07G8	Water	09/09/09	1440	VOC	Trip blank
JCC-RW-01	C07F8	Water	09/09/09	1009	VOC	
JCC-RW-02	C07F9	Water	09/09/09	1022	VOC	
JCC-RW-05	C07G2	Water	09/09/09	1028	VOC	
JCC-RW-07	C07G4	Water	09/09/09	1038	VOC	
JCC-RW-08	C07G5	Water	09/09/09	1011	VOC	Duplicate of JCC-RW-01
JCC-FB	C07F7	Water	09/09/09	1045	VOC	Field Blank

Notes:

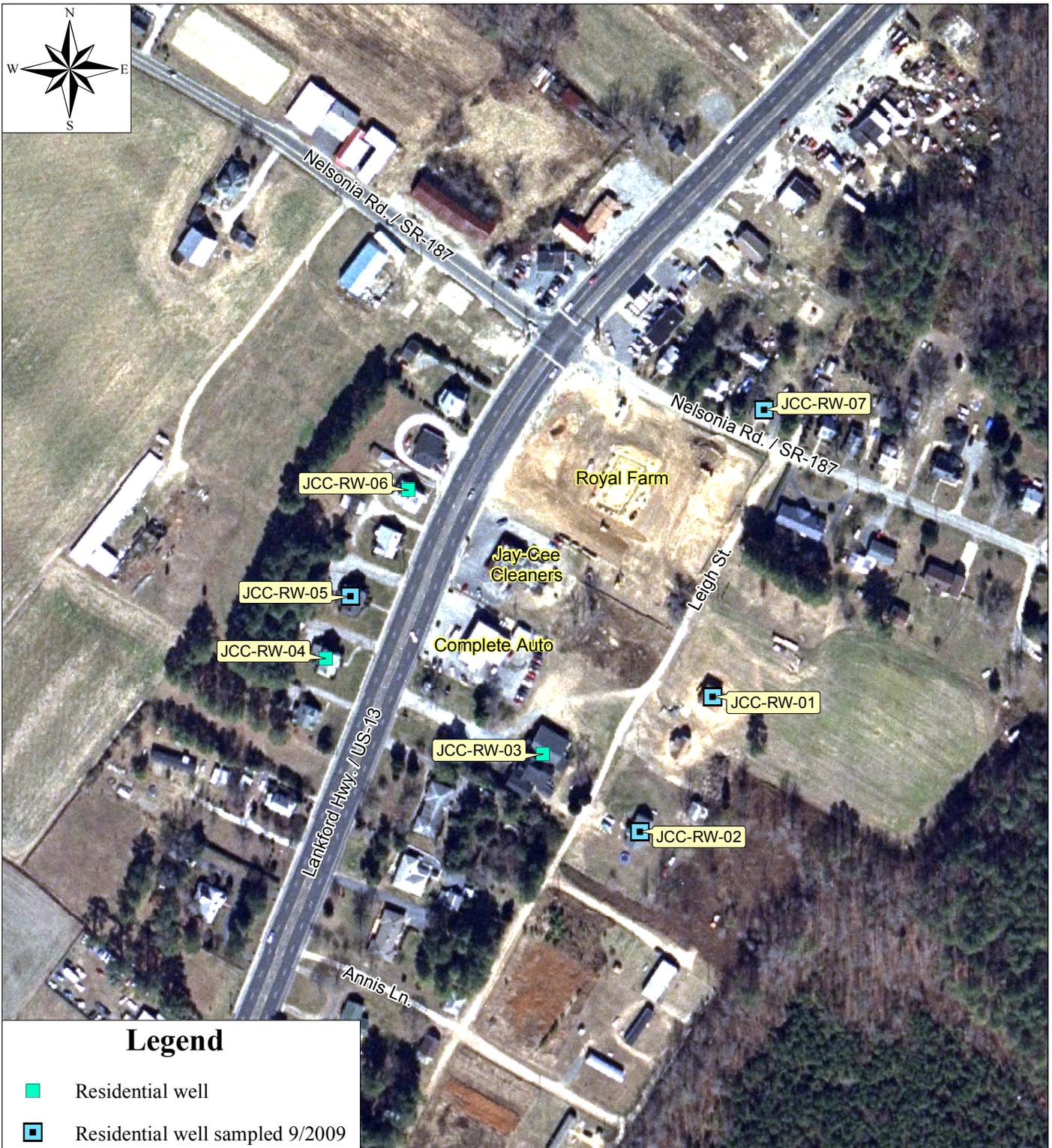
FB = Field blank

JCC = Jay-Cee Cleaners site

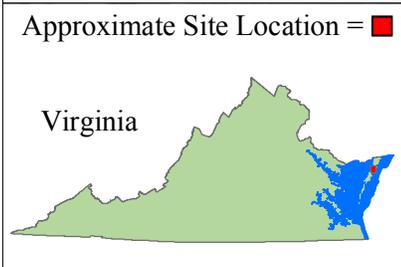
RW = Residential well

TB = Trip blank

VOC = Volatile organic compound



Source: Modified from USGS High Resolution State Orthoimagery for Southern Virginia, Commonwealth of Virginia, Virginia Department of Technology Planning, Geographic Network Division, 2002.



**Jay-Cee Cleaners Site**  
Nelsonia, Accomack County, Virginia

**Figure 3**  
Residential Well Location Map

TDD No. E43-026-09-07-022  
EPA Contract No. EP-S3-05-02

Map created on November 3, 2009  
by D. Call, Tetra Tech EM Inc.



## 4.2 SAMPLE MANAGEMENT

Samples were handled and packaged in accordance with the Tetra Tech SOP No. 019, “Packaging and Shipping Samples” (Tetra Tech 2009b) and with the Tetra Tech “Quality Assurance Project Plan (QAPP) for START” (Tetra Tech 2006). All shipping containers were properly labeled with EPA custody seals and were delivered with signed chain-of-custody forms and appropriate hazard warnings for laboratory personnel. Samples were shipped to Liberty Analytical Corporation (Liberty) in Cary, North Carolina under Contract Laboratory Program (CLP) Case No. 38950 for VOC analysis on September 9, 2009.

## 5.0 ANALYTICAL RESULTS

This section summarizes analytical results of the residential well samples collected during the Jay-Cee Cleaners site September 2009 sampling event.

All samples were analyzed by Liberty in Cary, North Carolina. Data were qualified as part of laboratory quality control. Tetra Tech compared the residential well sample analytical data to EPA maximum contaminant levels (MCL) established for public drinking water systems, EPA risk-based screening levels for tap water, and EPA emergency removal guidelines (ERG) for tap water (100 times the risk-based screening level) (EPA 2009a, 2009b). The PCE concentration detected in sample JCC-RW-01 was 0.11 µg/L, which equals the EPA risk-based screening level for tap water of 0.11 µg/L. However, the PCE concentration for JCC-RW-01 was qualified with a “J,” indicating that PCE is present but that the reported value may not be accurate or precise. The contract-required quantitation limit for PCE is 0.5 µg/L. No other samples had concentrations exceeding EPA risk-based screening level for tap water, and no samples had concentrations exceeding EPA MCLs or ERGs.

A summary of residential well analytical results from the September 2009 sampling event is provided as Appendix B. A copy of the validated laboratory analytical results is provided as an attachment to this report.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Tetra Tech collected residential well water samples from four residential properties located near the Jay-Cee Cleaners site. Samples were analyzed for VOCs. Analytical results indicated one residential well sample had PCE concentrations reported at the EPA risk-based screening level of 0.11 µg/L. No other sample collected during this event had concentrations exceeding EPA risk-based screening levels. No samples had concentrations exceeding EPA MCLs or ERGs.

Tetra Tech recommends continuing semi-annual monitoring of residential wells in order to evaluate the possible influence of seasonal fluctuations on VOC concentrations, determine the range of VOC fluctuations, and establish whether or not VOCs are migrating to new wells. Based on the historic presence of VOCs in the shallow soil and shallow groundwater related to the site, Tetra Tech also recommends (1) installing an intermediate monitoring point to determine the vertical extent of soil and groundwater contamination at the site, (2) removing contaminated soil at the site, and (3) collecting air samples from inside of the building at the site to evaluate the possible presence of interior VOC vapors. These recommendations were also outlined in the Jay-Cee Cleaners site final trip report summarizing the April 2008 sampling event (Tetra Tech 2008a).

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**APPENDIX A**  
**FIELD LOGBOOK NOTES**  
**(1 Page)**

Jay-Cee Cleaners

9/9/09

- 0910 START J. Vaughn on site. EPA already on site. H<sub>2</sub>S: acids, private prop.
- 0924 Begin purging RW-1
- 0933 Begin purging RW-2.
- 0938 RW-4 vacant.
- 0952 Begin purging RW-5.
- 0956 No one home at RW-6. Will not collect sample
- 1000 Begin purging RW-7.
- 1009 Collect JCC-RW-01
- 1011 Collect JCC-RW-08 duplicate of JCC-RW-01.
- 1022 Collect JCC-RW-02
- 1028 Collect JCC-RW-05
- 1038 Collect JCC-RW-07
- 1045 Collect JCC-FB Field blank.
- 1440 Collect JCC-TB Trip blank.

**APPENDIX B**  
**SEPTEMBER 2009 RESIDENTIAL WELL RESULTS**  
**(2 Pages)**

September 2009 Residential Well Results  
Jay-Cee Cleaners Site

Sampling Location :						JCC-RW-01	JCC-RW-02	JCC-RW-05	JCC-RW-07	JCC-RW-08	JCC-TB	JCC-FB							
Field QC :										Duplicate of JCC-RW-01	Trip blank	Field blank							
Matrix :						Water	Water	Water	Water	Water	Water	Water							
Units :						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L							
Date Sampled :						09/09/09	09/09/09	09/09/09	09/09/09	09/09/09	09/09/09	09/09/09							
Time Sampled :						10:09	10:22	10:28	10:38	10:11	14:40	10:45							
ANALYTE	CRQL	MCL	RBSL	C/N	ERG	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Acetone	5.0	NE	22,000	N	2,200,000		R		R		R		R		R	32	J	29	J
Benzene	5.0	5.0	0.41	C	41													0.11	J
Bromochloromethane	5.0	NE	NE		NE														
Bromodichloromethane	5.0	NE	1.1	C	110														
Bromoform	5.0	NE	8.5	C	850														
Bromomethane	5.0	NE	8.7	N	870														
2-Butanone	5.0	NE	NE		NE		R		R		R		R		R	3.2	J	3.0	J
Carbon disulfide	5.0	NE	1,000	N	100,000														
Carbon tetrachloride	5.0	5.0	0.2	C	20														
Chlorobenzene	5.0	100	91	N	9,100														
Chloroethane	5.0	NE	NE		NE														
Chloroform	5.0	NE	0.19	C	19														
Chloromethane	5.0	NE	1.8	C	180														
Cyclohexane	5.0	NE	13,000	N	130														
Dibromochloromethane	5.0	NE	0.80000	C	80.00														
1,2-Dibromo-3-chloropropane	10	0.2	0.00032	C	0.03														
1,2-Dibromoethane	5.0	0.05	0.0065	C	0.65														
1,2-Dichlorobenzene	5.0	600	370	N	37,000														
1,3-Dichlorobenzene	5.0	NE	NE		NE														
1,4-Dichlorobenzene	5.0	75	0.43	C	43														
Dichlorodifluoromethane	5.0	NE	390	N	39,000														
1,2-Dichloroethane	5.0	5.0	0.15	C	15														
1,1-Dichloroethene	5.0	7.0	340	N	34,000														
<i>trans</i> -1,2-Dichloroethene	5.0	NE	NE		NE														
<i>cis</i> -1,2-Dichloroethene	5.0	70	370	N	37,000														
1,2-Dichloropropane	5.0	5.0	0.39	C	39														
<i>cis</i> -1,3-Dichloropropene	5.0	NE	NE		NE														
<i>trans</i> -1,3-Dichloropropene	5.0	NE	NE		NE														
1,4-Dioxane	100	NE	6.1	C	610														
Ethylbenzene	5.0	700	1.5	C	150														
2-Hexanone	5.0	NE	NE		NE														
Isopropylbenzene	5.0	NE	NE		NE														
Methyl acetate	10	NE	37,000	N	3,700,000														
Methylcyclohexane	5.0	NE	6,300	N	630,000														
Methyl tertiary-butyl ether	5.0	NE	12	C	1,200														
Methylene chloride	5.0	5.0	4.8	C	480	0.15	B	0.14	B	0.17	B	0.19	B	0.23	B	0.17	B	0.19	B
4-Methyl-2-pentanone	5.0	NE	NE		NE														
Styrene	10	100	1,600	N	160,000														
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	NE	NE		NE														
1,1,2,2-Tetrachloroethane	5.0	NE	0.52	C	52														
Tetrachloroethene	5.0	5.0	0.11	C	11	0.11	J												

September 2009 Residential Well Results  
Jay-Cee Cleaners Site

Sampling Location :						JCC-RW-01	JCC-RW-02	JCC-RW-05	JCC-RW-07	JCC-RW-08	JCC-TB	JCC-FB					
Field QC :										Duplicate of JCC-RW-01	Trip blank	Field blank					
Matrix :						Water	Water	Water	Water	Water	Water	Water					
Units :						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					
Date Sampled :						09/09/09	09/09/09	09/09/09	09/09/09	09/09/09	09/09/09	09/09/09					
Time Sampled :						10:09	10:22	10:28	10:38	10:11	14:40	10:45					
ANALYTE	CRQL	MCL	RBSL	C/N	ERG	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Toluene	5.0	1000	2,300	N	230,000									0.36	J	0.38	J
1,2,3-Trichlorobenzene	5.0	NE	NE		NE												
1,2,4-Trichlorobenzene	5.0	70	19	C	1,900												
1,1,1-Trichloroethane	5.0	200	9,100	N	910,000												
1,1,2-Trichloroethane	5.0	5.0	0.24	C	24												
Trichloroethene	5.0	5.0	1.7	C	170												
Trichlorofluoromethane	5.0	NE	1,300	N	130,000												
Vinyl chloride	5.0	2.0	0.016	C	1.6												
m-Xylene/p-Xylene*	10	10000	200	N	20,000									0.14	J	0.15	J
o-Xylene*	10	10000	200	N	20,000												

Notes:

Blank cell indicates analyte was not detected.

**Bold text indicates concentration at or above RBSL**

\* = MCL and RBSL are for total xylenes.

µg/L = Micrograms per liter

B = Not detected substantially above the level reported in laboratory or field blanks

C/N = Carcinogenic or noncarcinogenic contaminants; EPA Region 3 recommends clean-up levels for carcinogenic contaminants at 10 times less than listed RBSL.

CRQL = Contract-required quantitation limit

EPA = U.S. Environmental Protection Agency

ERG = Emergency removal guideline concentration

J = Analyte present; reported value may not be accurate or precise.

MCL = Maximum contaminant level

NE = Not established

Q = Analytical data qualifier

QC = Quality control

R = Unusable result; analyte may or may not be present.

RBSL = Risk-based screening level established for tap water

**ATTACHMENT  
VALIDATED ANALYTICAL RESULTS**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
ENVIRONMENTAL SCIENCE CENTER  
701 MAPES ROAD  
FORT MEADE, MARYLAND 20755-5350

DATE : October 1, 2009

SUBJECT: Region III Data QA Review

FROM : Colleen Walling *Colleen K. Walling*  
Region III ESAT PO (3EA20)

TO : Todd Richardson  
Regional Program Manager (3HS32)

Attached is the organic validation report for the Jay-CEE Cleaners site (CASE #: 38950 SDG#: C07F7) completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2743.

Attachment

cc: Joshua Cope (TETRA TECH EMI)

TO File##: 0021 TDF# 09082

OFFICE OF ANALYTICAL SERVICES AND QUALITY ASSURANCE



Lockheed Martin Enterprise Solutions & Services  
ESAT Region 3  
US EPA Environmental Science Center  
701 Mapes Road Ft. Meade, MD 20755-530  
Telephone 410-305-3037 Facsimile 410-305-3597

**DATE:** September 30, 2009

**SUBJECT:** Level M2 Organic Data Validation for Case 38950  
SDG: C07F7  
Site: Jay-Cee Cleaners

**FROM:** Shilpa Udani   
Organic Data Reviewer

Mahboobeh Mecanic<sup>SM</sup>  
Senior Oversight Chemist

**TO:** Colleen Walling  
ESAT Region 3 Project Officer

## OVERVIEW

Case 38950, Sample Delivery Group (SDG) C07F7, consisted of seven (7) aqueous samples submitted to Liberty Analytical Company (LIBRTY) for trace volatile analyses. The sample set included one (1) trip blank, one (1) field blank and one (1) field duplicate pair. Samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) SOM01.2 through the Routine Analytical Services (RAS) program.

## SUMMARY

Data were validated according to Region 3 Innovative Approaches for Validation of Organic Data, Level M2. This level of review includes assessment of all Quality Assurance/Quality Control (QA/QC) data and review of chromatograms, but excludes review of raw data and sample spectra. Areas that may impact data usability are listed below.

## MAJOR PROBLEM

- Relative Response Factors (RRFs) were less than 0.05 for acetone and 2-butanone in the initial and continuing calibrations. The "L" qualifiers for the associated positive results for these compounds were superseded by "J" on the Data Summary Forms (DSFs). Quantitation limits for these compounds in affected samples were rejected and qualified "R" on the DSFs.

**MINOR PROBLEM**

- Several compounds failed precision criteria [Percent Differences (%Ds)] in the continuing calibrations. The associated positive results were qualified “J” on the DSFs. Precision did not exceed 50% criteria; therefore, quantitation limits were not qualified.

**NOTES**

- Methylene chloride was detected at a concentration of 0.30 J ug/L in the analyses of the storage blank (VHBLKZH) associated with this case. All samples, which had concentrations of this common laboratory contaminant less than ten times (<10X) the blank concentration have been qualified “B” on the DSFs.
- Reported results in trace volatile field duplicate pair, samples C07F8/C07G5, were comparable.
- No Tentatively Identified Compounds (TICs) were detected in any of the samples in this data set.
- Compounds detected below Contract Required Quantitation Limits (CRQLs) were qualified “J” on the DSFs unless superseded by “B”.

All data for Case 38950, SDG C07F7, were reviewed in accordance with national functional guideline Innovative Approaches for Validation of Organic Data (Level M2), June 1995.

**ATTACHMENTS**

Appendix A	Glossary of Data Qualifier Terms
Appendix B	Data Summary Form
Appendix C	Chain-of-Custody Records
Appendix D	Laboratory Case Narrative
Appendix E	Tentatively Identified Compounds (TICs)

DCN: 38950 – C07F7

## **Appendix A**

### **Glossary of Data Qualifiers**

## GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

### CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

NO CODE = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unusable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

### CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

### OTHER CODES

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

Q = No analytical result.

## **Appendix B**

### **Data Summary Forms**



DATA SUMMARY FORM: Trace Volatiles

Case #: 38950

SDG : C07F7

Site :

JAY-CEE CLEANERS

Lab. :

LIBRTY

Sample Number :		C07F7	C07F8	C07F9	C07G2	C07G4					
Sampling Location :		JCC-FB	JCC-RW-01	JCC-RW-02	JCC-RW-05	JCC-RW-07					
Field QC :		Field Blank	Dup. of C07G5								
Matrix :		Water	Water	Water	Water	Water					
Units :		ug/L	ug/L	ug/L	ug/L	ug/L					
Date Sampled :		9/9/2009	9/9/2009	9/9/2009	9/9/2009	9/9/2009					
Time Sampled :		10:45	10:09	10:22	10:28	10:38					
pH :		1	1	1	1	1					
Dilution Factor :		1.0	1.0	1.0	1.0	1.0					
Trace Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
*Tetrachloroethene	0.50			0.11	J						
2-Hexanone	5.0										
Dibromochloromethane	0.50										
1,2-Dibromoethane	0.50										
*Chlorobenzene	0.50										
*Ethylbenzene	0.50										
o-Xylene	0.50										
m,p-Xylene	0.50	0.15	J								
*Styrene	0.50										
Bromoform	0.50										
Isopropylbenzene	0.50										
1,1,2,2-Tetrachloroethane	0.50										
*1,3-Dichlorobenzene	0.50										
*1,4-Dichlorobenzene	0.50										
1,2-Dichlorobenzene	0.50										
1,2-Dibromo-3-chloropropane	0.50										
1,2,4-Trichlorobenzene	0.50										
1,2,3-Trichlorobenzene	0.50										

CRQL = Contract Required Quantitation Limit

\*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor)

Revised 09/99



DATA SUMMARY FORM: Trace Volatiles

Case #: 38950

SDG : C07F7

Site :

JAY-CEE CLEANERS

Lab. :

LIBRTY

Sample Number :		C07G5		C07G6							
Sampling Location :		JCC-RW-08		JCC-TB							
Field QC :		Dup. of C07F8		Trip Blank							
Matrix :		Water		Water							
Units :		ug/L		ug/L							
Date Sampled :		9/9/2009		9/9/2009							
Time Sampled :		10:11		14:40							
pH :		1		1							
Dilution Factor :		1.0		1.0							
Trace Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
*Tetrachloroethene	0.50										
2-Hexanone	5.0										
Dibromochloromethane	0.50										
1,2-Dibromoethane	0.50										
*Chlorobenzene	0.50										
*Ethylbenzene	0.50										
o-Xylene	0.50										
m,p-Xylene	0.50			0.14	J						
*Styrene	0.50										
Bromoform	0.50										
Isopropylbenzene	0.50										
1,1,2,2-Tetrachloroethane	0.50										
*1,3-Dichlorobenzene	0.50										
*1,4-Dichlorobenzene	0.50										
1,2-Dichlorobenzene	0.50										
1,2-Dibromo-3-chloropropane	0.50										
1,2,4-Trichlorobenzene	0.50										
1,2,3-Trichlorobenzene	0.50										

CRQL = Contract Required Quantitation Limit

\*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor)

Revised 09/99

## **Appendix C**

### **Chain of Custody (COC) Records**



**USEPA Contract Laboratory Program  
Organic Traffic Report & Chain of Custody Record**

Case No: 38950

DAS No:

R

Region: Project Code: Account Code: CERCLIS ID: Spill ID: Site Name/State: Project Leader: Action: Sampling Co:	3 CT4675 VAN000306600 AJR Jay-Cee - Sept 2009/VA Jordan Vaughn Tetra Tech	Date Shipped: 9/9/2009 Carrier Name: FedEx Airbill: 8698 6864 6928 Shipped to: Liberty Analytical Corporation 501 Madison Avenue Cary NC 27513 (919) 379-4100	<b>Chain of Custody Record</b>	
		Sampler Signature:	Received By	(Date / Time)
				(Date / Time)

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNOVER	PRESERVATIVE/ Bottles	TAG No./	STATION LOCATION	SAMPLE COLLECT DATETIME	INORGANIC SAMPLE No.	QC Type
C07F7	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325281 (HCL), JCC3325282 (HCL), JCC3325283 (HCL) (3)		JCC-FB	S: 9/9/2009 10:45		Field blank
C07F8	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325284 (HCL), JCC3325285 (HCL), JCC3325286 (HCL) (3)		JCC-RW-01	S: 9/9/2009 10:09		-
C07F9	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325287 (HCL), JCC3325288 (HCL), JCC3325289 (HCL) (3)		JCC-RW-02	S: 9/9/2009 10:22		-
C07G2	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325296 (HCL), JCC3325297 (HCL), JCC3325298 (HCL) (3)		JCC-RW-05	S: 9/9/2009 10:28		-
C07G4	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325302 (HCL), JCC3325303 (HCL), JCC3325304 (HCL) (3)		JCC-RW-07	S: 9/9/2009 10:38		-
C07G5	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325305 (HCL), JCC3325306 (HCL), JCC3325307 (HCL) (3)		JCC-RW-08	S: 9/9/2009 10:11		Duplicate of JCC-RW-01
C07G6	Potable Well/ Jordan Vaughn	L/G	VOC Water (14)	JCC3325308 (HCL), JCC3325309 (HCL), JCC3325310 (HCL) (3)		JCC-TB	S: 9/9/2009 14:40		Trip Blank

Shipment for Case Complete Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: VOC Water = VOC Water - SOM01.Z	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

875 8-28-09

# U.S. EPA Region III Analytical Request Form

Revision 10.06

ASQAB USE ONLY	
RASH#	CT4675
DASH#	Analytical/EAT
NSF#	14

38950

Date: 8/26/09	Site Activity: RS Removal Assessment	
Site Name: JayCee Cleaners	Street Address: 16163 Lankford Highway	
City: Nelsonia, Accomack Co.	State: VA	Latitude: 37.8186° N
Program: Superfund	Acct. #: 2009 T03N302DC6CA3JRRS00	Longitude: 75.5883° W
Site ID:	Spill ID: A3JR	CERCLIS #: VAN000306600
Site Specific QA Plan Submitted: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	Title: START3 QAPP	Operable Unit:
EPA Project Leader: Todd Richardson	Phone#: 215-814-5264	Date Approved: November 2006
Request Preparer: JOSHUA COPE	Phone#:	E-mail: Richardson.Todd@epamail.epa.gov
Site Leader: Jordan Vaughn	Phone#: 610-364-2141	E-mail: Joshua.cope@ttemi.com
Contractor: Tetra Tech EM Inc.	EPA CO/PO: Jeff Fang/Karen Wodarczyk	E-mail: jordan.vaughn@ttemi.com
#Samples 10	Matrix: potable water	Method: CLP SOM01.2
#Samples	Matrix:	Method:
Ship Date From: 9/7/09	Ship Date To: 9/10/09	Inorg. Validation Level
Unvalidated Data Requested: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	If Yes, TAT Needed: <input checked="" type="checkbox"/> 14days <input type="checkbox"/> 7days <input type="checkbox"/> 48hrs <input type="checkbox"/> 24hrs <input type="checkbox"/> Other (Specify)	
Validated Data Package Due: <input type="checkbox"/> 42 days <input checked="" type="checkbox"/> 30 days <input type="checkbox"/> 21days <input type="checkbox"/> 14 days <input type="checkbox"/> Other (Specify)		14/16
Electronic Data Deliverables Required: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (EDDs will be provided in Region 3 EDD Format)		
Special Instructions: See attached for DLs needed.		

## **Appendix D**

### Laboratory Case Narrative

# CompuChem

A division of Liberty Analytical Corporation  
501 Madison Avenue  
Cary, N.C. 27513  
Tel: 919/379-4100 Fax: 919/379-4050

**SDG NARRATIVE**  
**CASE # 38950**  
**SDG # C07F7**  
**SOW # SOM01.2**  
**CONTRACT # EPW05028**

**SAMPLE IDENTIFICATIONS: C07F7, C07F8, C07F9, C07G2, C07G4, C07G5 and C07G6**

The 7 aqueous samples listed above were received intact, refrigerated at 1.8°C, in sealed shipping containers, on September 10, 2009, with proper documentation. All samples listed above were scheduled for the requested analysis of the volatile fraction only. The samples were prepared and analyzed following the current EPA Contract Laboratory Program (CLP) Multi-Media, Multi-Concentration Statement of Work (SOW), and Document SOM01.2. All pertinent Quality Assurance Notices are included in the narrative section.

## **Volatiles**

Analysis holding time requirements were met for all of the samples in this SDG.

The pH values for these samples were equal to 1.

There were volatile Project/Target Compound List (TCL) analytes identified above the Contract Required Quantitation Limit (CRQL) in two of these seven samples.

No Tentatively Identified Compounds (TICs) were found in any of these samples.

No Total Alkanes were found in any of these samples.

All of the deuterated monitoring compounds (DMCs) met recovery criteria with no more than three DMCs failing, except for those previously mentioned.

In a response to a Statement of Work Interpretation, the Organic Contract Laboratory Program Office stated that if the Mass Spectral Interpretation Specialist determines a TIC to be a laboratory artifact (including artifacts from the DMC solution), there is no need to report it. However, all TICs not reported due to a Mass Spectral Interpretation Specialist's assessment should be noted in the SDG Narrative. There are laboratory artifacts (including artifacts from the DMC solution) not reported on the Forms 1J. Their approximate retention time is as follows:

9.98 min. Laboratory artifact

11.5 min. Laboratory artifact

These peaks are present in the standards, blanks, and samples.

Manual integrations were performed on one or more of the process files associated with this SDG including, VSTD0.5IT, VSTD001IT, VSTD005IT and VSTD010IT. There is no Form VII in the deliverables package for the batch analyzed on instrument 90 on 9/14/09 associated with the BFB injected at 1203. This batch included an initial calibration and the relevant relative response factors are all displayed on the appropriate Form VI. The initial calibration met all acceptance criteria and therefore samples could be analyzed without having to inject a continuing calibration verification standard.

All bromofluorobenzene (BFB) abundance criteria were met for tunes associated to this SDG.

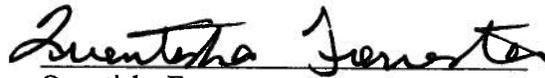
All QC criteria were met for all initial and continuing calibration standards associated to this SDG.

The associated method blank and the storage blank met all quality control criteria.

No matrix spike/matrix spike duplicate (MS/MSD) samples were requested for the volatile fraction with this SDG.

As per the SOW, an example calculation is attached for Vinyl Chloride-d<sub>3</sub> in sample C07F7.

I certify that this Sample Data Package complies with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy Sample Data Package and in the Electronic Data Deliverable has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.



Quentisha Forrester

Analyst II

September 16, 2009

**CASE:** 38950  
**SDG:** C07F7

### Example Calculation for the Volatile Fraction

#### RRF Calculation

$$RRF = (A_x * C_{is}) / (A_{is} * C_x)$$

Where:  $A_x$ =Area of the characteristic ion (EICP) for the compound to be measured  
 $A_{is}$ =Area of the characteristic ion (EICP) for the specific internal standard  
 $C_{is}$ =Concentration of the internal standard  
 $C_x$ =Concentration of the compound to be measured

Example: Vinyl chloride-d3 from VSTD005IT

$A_x$ = 57995  
 $A_{is}$ = 275060  
 $C_{is}$ = 125  
 $C_x$ = 125  
  
 $RRF$ = 0.211

**Mean RRF from ICAL 0.240**

#### Concentration Calculation

$$\text{Concentration}(\mu\text{g/L}) = (A_x * I_s * D_f) / (A_{is} * RRF * V_o)$$

Where:  $A_x$ =Area of the characteristic ion (EICP) for the compound to be measured  
 $A_{is}$ =Area of the characteristic ion (EICP) for the specific internal standard  
 $I_s$ =Amount of the internal standard added, in nanograms  
Mean RRF=Relative response factor from the Initial calibration standard  
 $V_o$ =Total volume of water purged, in milliliters  
 $D_f$ =Dilution factor

Example: Vinyl chloride-d<sub>3</sub> from C07F7

$A_x$ = 63406  
 $A_{is}$ = 244237  
 $I_s$ = 125  
Mean RRF= 0.240  
 $V_o$ = 25  
 $D_f$ = 1

Concentration( $\mu\text{g/L}$ )= 5