Sampling Report and Data Presentation

Vestal Chlorinated Solvents Site
Vestal, New York

Groundwater Sampling
1-3 February 2016

Prepared by: 5 MAY 2016

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Approved by: 5 May 2016

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1.0 SAMPLING EVENT SUMMARY

The Vestal Chlorinated Solvent Ground Water Monitoring Wells Site is in the Town of Vestal, Broome County, New York. It is located at 200 Stage Road, Town of Vestal, NY, in an industrial park on the southern bank of the Susquehanna River, between Route 17 and Vestal Pkwy East. The formerly housed circuit board manufacturer building on site is approximately 60,000 square foot, one story building. This building was abandoned in May 2002 and reoccupied in 2007. The building is currently being used for recycling electronic equipment.

From 1980 to 2002, Circuit boards were fabricated on site. During the manufacturing process, the facility utilized the chlorinated solvents 1,1,1-trichloroethane(TCA) and trichloroethene (TCE). During a series of subsurface investigations the Site was found to be the source of TCA and TCE contamination of groundwater and impacting Vestal Municipal Well Field. Chlorinated solvents were discovered in Well 1-1, and the well was taken out of service and pumped to the Susquehanna River. Well 1-1 was the main source of water for District 1 until 1980, when it was closed. After immediate actions to protect human health and the environment, and site investigations, EPA placed the site on the Superfund program's National Priorities List in September 1983.

Construction of the air stripping facility finished in 1990. The air stripping facility treated contaminated groundwater and discharged the treated effluent to the Susquehanna River as part of EPA's long-term response actions at the site. In October 2006, the New York Department of Environmental Conservation (NYSDEC) assumed responsibility for operation and maintenance of the facility.

Between May and June 2008 four groundwater monitoring well clusters were installed to the south side of the building and one cluster near the northeast corner of the building. These wells were named ERT-1 thru ERT-4. In July 2008 these wells and nine soil borings were sampled to depths of 20 feet bgs near the northeastern corner of the site building. The results of borings and sampling of the wells indicated the presence of both chlorinated VOCs and a floating product phase of hydrocarbons.

By 2010 nine additional shallow monitoring wells were installed near the northeast corner of the building to assess the occurrence and thickness of floating free product in the wells. These wells were named MW-A thru MW-I and are less than twenty feet in depth. Monitoring wells MW-A thru I are located to the North/East corner of the building in the out fields. These wells are flush mounted and extend to a depth of ~ 20 feet.

The EPA Region 2 Hazardous Waste Support Branch Superfund Support Team (HWSB SST) was asked to perform groundwater sampling of the nine shallow monitoring wells (MW-A thru MW-I) during the second quarter of 2016 for VOC & PCBs in both groundwater and in any floating free product that might be observed in the wells. All 9 monitoring wells were sampled in accordance with USEPA ERT*Groundwater Well Sampling Procedures*, SOP 2007, Revision 0.0. Apr 2001, which can be found as Appendix C of the UFP-QAPP for this event. MW-F was the only well in which floating free product (LNAPL) was observed, all other wells appear to have no LNAPL. All samples were processed thru the EPA Contract Laboratory Program and forwarded to KAP Technologies Inc, in The Woodlands, TX for analysis.

TABLE 1 HOPEWELL PRECISION MONITORING WELL SAMPLING QC FIELD DUPLICATE SAMPLE DATA (ug/L)		
ANALYTE NAME	MW-H RESULT	MW-J RESULT
1,1-Dichloroethene	3.0J	3.4J
Cis-1,2-Dichloroethene	42.0	51.0
Ethane, 1,2-dichloro-1,1,2-trifluoro	74.0NJ	82.0NJ
Trichloroethene	5.2	6.5
Methylene chloride	3.0J	4.1J
Vinyl Chloride	12.0	13
Unknown	11J	17J
QC FIELD RINSATE BLANK SAMPLE DATA (ug/L)		
ANALYTE NAME	RB-01 RESULT	
Aroclor-1260	0.031J	
QC FIELD TRIP BLANK SAMPLE DATA (ug/L)		
ANALYTE NAME	TB-01 RESULT	
Non-Detected		

TABLE 2 CONTINUATION

CLP NUMBER	WELL NUMBER	PARAMETERS				Remarks
		CAS Number	Analyte	Result (ug/L)	Q	
BC338	MW-F	156-60-5	Trans-1,2-Dichloroethene	410		ST/FD
		79-01-6	Trichloroethene	1800		ST/FD
		75-01-4	Vinyl chloride	1600		ST/FD
		000526-73-8	Benzene, 1,2,3-trimethyl-	750	NJ	
		000611-14-3	Benzene, 1-ethyl-2-methyl-	320	NJ	
		000620-14-4	Benzene, 1-ethyl-3-methyl-	870	NJ	
		000535-77-3	Benzene, 1-rmethyl-3-(1-methylethyl)-	190	NJ	
		001074-43-7	Benzene, 1-rmethyl-3-propyl-	220	NJ	
BC339	MW-G	11096-82-5	Aroclor-1260	0.054	J	
		71-55-6	1,1,1-Trichloroethane	6.4		ST
		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.1	J	
		75-34-3	1,1-Dichloroethane	7.3		ST
		156-59-2	Cis-1,2-Dichloroethene	340		ST/FD
		75-09-2	Methylene chloride	3.1	J	
		79-01-6	Trichloroethene	35		ST/FD
		75-01-4	Vinyl chloride	74		ST/FD
		---	Unknown	6.4	J	
BC340	MW-H	75-34-3	1,1-Dichloroethane	3.0	J	
		156-59-2	Cis-1,2-Dichloroethene	42		ST
		75-09-2	Methylene chloride	3.0	J	
		79-01-6	Trichloroethene	5.2		ST/FD
		75-01-4	Vinyl chloride	12		ST/FD
		000354-23-4	Ethane, 1,2-dichloro-1,1,2-trifluoro-	74	NJ	
		---	Unknown	11	J	
BC241	MW-I	11096-82-5	Aroclor-1260	8.5		ST/FD
		71-55-6	1,1,1-Trichloroethane	740		ST/FD
		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	45	J	ST
		75-34-3	1,1-Dichloroethane	180		ST/FD
		75-35-4	1,1-Dichloroethene	130		ST/FD
		95-63-6	1,2,4-Trimethyl benzene	130		ST
		108-67-8	1,3,5-Trimethyl benzene	360		ST
		156-59-2	Cis-1,2-Dichloroethene	65000		ST/FD
		100-41-4	Ethylbenzene	29	J	ST
		179601-23-1	m,p-Xylene	73		ST
		95-47-6	o-Xylene	120		ST
		108-88-3	Toluene	170		ST
		156-60-5	Trans-1,2-Dichloroethene	59		ST
		79-01-6	Trichloroethene	7600		ST/FD
		75-01-4	Vinyl chloride	3200		ST/FD
		000526-73-8	Benzene, 1,2,3-trimethyl-	310	NJ	
		000611-14-3	Benzene, 1-ethyl-2-methyl-	350	NJ	
		000620-14-4	Benzene, 1-ethyl-3-methyl-	130	NJ	
		000535-77-3	Benzene, 1-methyl-3-(1-methylethyl)-	55	NJ	
		001074-43-7	Benzene, 1-methyl-3-propyl-	72	NJ	
		000099-87-6	Benzene, 1-methyl-4-(1-methylethyl)-	55	NJ	
		000103-65-1	Benzene, propyl-	50	NJ	
		---	Unknown	17	J	

Those analytes not listed above were not detected. Yellow highlighted numbers are those results that are above the standard, FD: Above Federal MCLs, ST: Above State Standard. Data Qualifier J=Estimated value; NJ=Presumptive evidence that the analyte is present with an estimated value.

TABLE 4
LNAPL (Non-Aqueous Phase)
ANALYTICAL RESULTS

CLP NUMBER	WELL NUMBER	PARAMETERS				Remarks
		CAS Number	Analyte	Result (ug/L)	Q	
B5TB1	MW-F	11096-82-5	Aroclor-1260	49000	J	ST/FD
		67-64-1	Acetone	430	J	
		71-55-6	1,1,1-Trichloroethane	53000		ST/FD
		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	580		ST
		87-61-6	1,2,3-Trichlorobenzene	360	J	ST
		120-82-1	1,2,4-Trichlorobenzene	850		ST/FD
		95-63-6	1,2,4-Trimethyl benzene	180000		ST
		108-67-8	1,3,5-Trimethyl benzene	340000		ST
		56-23-5	Carbon tetrachloride	6500		ST/FD
		156-59-2	Cis-1,2-Dichloroethene	27000		ST/FD
		100-41-4	Ethylbenzene	13000		ST/FD
		98-82-8	Isopropylbenzene	12000		
		108-87-2	Methylcyclohexane	7400		
		75-09-2	Methylene chloride	210	J	ST
		179601-23-1	m,p-Xylene	90000		ST/FD
		95-47-6	o-Xylene	53000		ST/FD
		108-88-3	Toluene	48000		ST/FD
		79-01-6	Trichloroethene	1500		ST/FD
		127-18-4	Tetrachloroethene	1300		ST/FD
		000526-73-8	Benzene, 1,2,3-trimethyl-	20000	NJ	
		000095-93-2	Benzene, 1,2,4,5-tetramethyl-	11000	NJ	
		000934-74-7	Benzene, 1-ethyl-3,5-methyl-	14000	NJ	
		000527-84-4	Benzene, 1-rmethyl-2-(1-methylethyl)-	17000	NJ	
		000535-77-3	Benzene, 1-rmethyl-3-(1-methylethyl)-	18000	NJ	
		001074-43-7	Benzene, 1-rmethyl-3-propyl-	20000	NJ	
		000135-01-3	Benzene,4-ethyl-1,2-dimethyl-	8700	NJ	
		000103-65-1	Benzene, propyl-	13000	NJ	
		000638-04-0	Cyclohexane, 1,3-dimethyl, cis-	13000	NJ	
		003728-56-1	1-Ethyl-4-methylcyclohexane	11000	NJ	
		000107-39-1	1-Pentene,2,4,4-trimethyl-	10000	NJ	
		---	Unknown-01	9400	J	
		---	Unknown-02	16000	J	
		---	Unknown-03	14000	J	
		---	Unknown-04	29000	J	
		---	Unknown-05	12000	J	
		---	Unknown-06	14000	J	
		---	Unknown-07	8000	J	
		---	Unknown-08	23000	J	
		---	Unknown-09	8400	J	
		---	Unknown-10	6400	J	
		---	Unknown-11	12000	J	
		---	Unknown-12	6700	J	

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From 1980 to 2002, Circuit boards were fabricated on site. In the manufacturing process the facility utilized the chlorinated solvents 1,1,1-trichloroethane(TCA) and trichloroethene (TCE). During a series of subsurface investigations the Site was found to be the source of TCA and TCE contamination of groundwater and impacting Vestal Municipal Well Field. Chlorinated solvents were discovered in Well 1-1, and the well was taken out of service and pumped to the Susquehanna River. Well 1-1 was the main source of water for District 1 until 1980, when it was closed. After immediate actions to protect human health and the environment, and site investigations, EPA placed the site on the Superfund program's National Priorities List in September 1983.

Construction of the air stripping facility finished in 1990. The air stripping facility treat contaminated groundwater and discharge the treated effluent to the Susquehanna River as part of EPA's long-term response actions at the site. In October 2006, the New York Department of Environmental Conservation (NYSDEC) assumed responsibility for operation and maintenance of the facility.

Between May and June 2008 four groundwater monitoring well clusters were installed to the south side of the building and one cluster near the northeast corner of the building. These wells were name ERT-1 thru. ERT-4. In July 2008 these wells were sampled and nine soil borings to a depths of 20 feet bgs near the northeastern corner of the site building. The results of borings and sampling of the wells indicated the presence of both chlorinated VOCs and a floating product phase of hydrocarbons.

By 2010 nine additional shallow monitoring wells were installed near the northeast corner of the building to assess the occurrence and thickness of floating free product in the wells. These wells were named MW-A thru. MW-I and are less than twenty feet in depth. Monitoring wells MW-A thru. I are located to the North/East corner of the building in the out fields. These wells are flash mounted and to a depth of ~ 20 feet.

The EPA Region 2 Hazardous Waste Support Branch Superfund Support Team (HWSB SST) was asked to perform groundwater sampling of the nine shallow monitoring wells (MW-A thru MW-I) during the second quarter of 2016 for VOC & PCBs in both groundwater and in any floating free product that might be in the wells. All 9 monitoring wells were sampled in accordance with USEPA ERT. *Groundwater Well Sampling Procedures*, SOP 2007, Revision 0.0. Apr 2001, which can be found as Appendices C of the UFP-QAPP for this event. MW-F was the only well in which floating free product (LNAPL) was observed, all other wells appear to have no LNAPL. All samples were forward to KAP Technologies Inc, in The Woodlands, TX for analysis.

TABLE 2
GROUNDWATER
ANALYTICAL RESULTS

CLP NUMBER	WELL NUMBER	PARAMETERS				Remarks
		CAS Number	Analyte	Result (ug/L)	Q	
BC333	MW-A	108-67-8	1,3,5-Trimethyl benzene	4.6	J	ST
		156-59-2	Cis-1,2-Dichloroethene	12	J	ST
		75-09-2	Methylene chloride	3.0	J	
		79-01-6	Trichloroethene	3.4	J	
		---	Unknown-01	5.4	J	
		---	Unknown-02	7.7	J	
BC334	MW-B	11096-82-5	Aroclor-1260	0.034	J	
		---	Unknown	6.6	J	
BC335	MW-C	108-67-8	1,3,5-Trimethyl benzene	3.0	J	
		156-59-2	Cis-1,2-Dichloroethene	13		ST
		000556-672	Cyclotetrasiloxane, octamethyl-	10	NJ	
		---	Unknown	12	J	
BC336	MW-D	11096-82-5	Aroclor-1260	0.071	J	
		95-63-6	1,2,4-Trimethyl benzene	19		ST
		108-67-8	1,3,5-Trimethyl benzene	49		ST
		100-41-4	Ethylbenzene	4.7	J	
		75-09-2	Methylene chloride	3.1	J	
		179601-23-1	m,p-Xylene	13		ST
		95-47-6	o-Xylene	13		ST
		000496-11-7	Indane	13	NJ	
		000526-73-8	Benzene, 1,2,3-trimethyl-	59	NJ	
		000611-14-3	Benzene, 1-ethyl-2-methyl-	26	NJ	
		000620-14-4	Benzene, 1-ethyl-3-methyl-	28	NJ	
		001074-17-5	Benzene, 1-rmethyl-2-propyl-	10	NJ	
		000556-67-2	Cyclotetrasiloxane, octamethyl-	10	NJ	
BC337	MW-E	156-59-2	Cis-1,2-Dichloroethene	4.1		
		000496-11-7	Indane	7.0	NJ	
		---	Unknown	7.0	J	
BC338	MW-F	11096-82-5	Aroclor-1260	0.11		ST
		71-55-6	1,1,1-Trichloroethane	2400		ST/FD
		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	230		ST
		75-34-3	1,1-Dichloroethane	530		ST/FD
		75-35-4	1,1-Dichloroethene	280		ST/FD
		95-63-6	1,2,4-Trimethyl benzene	360		ST
		108-67-8	1,3,5-Trimethyl benzene	860		ST
		156-59-2	Cis-1,2-Dichloroethene	43000		ST/FD
		100-41-4	Ethylbenzene	94		ST/FD
		98-82-8	Isopropylbenzene	30	J	
		179601-23-1	m,p-Xylene	420		ST
		95-47-6	o-Xylene	350		ST
		108-88-3	Toluene	880		ST

Those analytes not listed above were not detected. Yellow highlighted numbers are those results that are above the standard, FD: Above Federal MCLs, ST: Above State Standard. Data Qualifier J=Estimated value; NJ=Presumptive evidence that the analyte is present with an estimated value.

TABLE 3
LNAPL (Aqueous Phase)
ANALYTICAL RESULTS

CLP NUMBER	WELL NUMBER	PARAMETERS				Remarks
		CAS Number	Analyte	Result (ug/L)	Q	
BC328	MW-F	11096-82-5	Aroclor-1260	7.4		ST
		71-55-6	1,1,1-Trichloroethane	2400		ST/FD
		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	180		ST
		75-34-3	1,1-Dichloroethane	210		ST/FD
		75-35-4	1,1-Dichloroethene	110		ST/FD
		95-63-6	1,2,4-Trimethyl benzene	860		ST
		108-67-8	1,3,5-Trimethyl benzene	2000		ST
		156-59-2	Cis-1,2-Dichloroethene	65000		ST/FD
		100-41-4	Ethylbenzene	170		ST/FD
		108-87-2	Methylcyclohexane	76		
		179601-23-1	m,p-Xylene	760		ST
		95-47-6	o-Xylene	570		ST
		108-88-3	Toluene	940		ST
		156-60-5	Trans-1,2-Dichloroethene	50		ST
		79-01-6	Trichloroethene	170		ST/FD
		75-01-4	Vinyl chloride	580		ST/FD
		127-18-4	Tetrachloroethene	14	J	ST/FD
		00591-21-9	1,3-Dimethylcyclohexane, cAndt	160	NJ	
		000526-73-8	Benzene, 1,2,3-trimethyl-	330	NJ	
		000933-98-2	Benzene, 1-ethyl-2,3-di-methylethyl-	140	NJ	
		000874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	150	NJ	
		000934-74-7	Benzene, 1-ethyl-3,5-methyl-	200	NJ	
		000620-14-4	Benzene, 1-ethyl-3-methyl-	350	NJ	
		000625-14-4	Benzene, 1-ethyl-3-methyl-	250	NJ	
		000527-84-4	Benzene, 1-rmethyl-2-(1-methylethyl)-	140	NJ	
		000535-77-3	Benzene, 1-rmethyl-3-(1-methylethyl)-	160	NJ	
		001074-43-7	Benzene, 1-rmethyl-3-propyl-	240	NJ	
		002870-04-4	Benzene, 2-ethyl-1,3-dimethyleethyl-	190	NJ	
		001678-82-6	Cyclohexane, 1-methyl-4-(1-methylethyl)-	170	NJ	
		002847-72-5	Decane, 4-methyl-	300	NJ	
		000112-40-3	Dodecane	160	NJ	
		005911-04-6	Nonane, 3-methyl-	270	NJ	
		001120-21-4	Undecane	390	NJ	
		---	Unknown-01	340	J	
		---	Unknown-02	120	J	
		---	Unknown-03	130	J	
		---	Unknown-04	120	J	
		---	Unknown-05	130	J	
		---	Unknown-06	200	J	
		---	Unknown-07	120	J	
		---	Unknown-08	190	J	

Those analytes not listed above were not detected. Yellow highlighted numbers are those results that are above the standard, FD: Above Federal MCLs, ST: Above State Standard. Data Qualifier J=Estimated value; NJ=Presumptive evidence that the analyte is present with an estimated value.

APPENDIX A

Vestal Chlorinated Solvents Site

Quality Assurance Project Plan

UNIFORM FEDERAL POLICY
QUALITY ASSURANCE PROJECT PLAN
FOR

Vestal Chlorinated Solvents Site
Vestal, New York

December 2015

REVISION 0

Document Control Number: Vestal_GW_QAPP_12-2015.doc

Prepared by:

4/14/2016

Michael A. Mercado — Date
Project Manager
EPA/DESA/HWSB/SST

Approved by:

Adly Michael 4/14/2016

Adly Michael — Date
QA Officer
EPA/DESA/HWSB/HWSS

List of Appendices

APPENDIX A: UFP QAPP Worksheets

APPENDIX B: Site Maps

APPENDIX C: USEPA ERT. *Groundwater Well Sampling Procedures*, SOP 2007, Revision 0.0. Apr 2001

APPENDIX D: Hazardous Waste Support Branch, US EPA DESA. *Trace Volatile Data Validation*, SOP HW-34A, Revision 0. July 2015.

APPENDIX E: Hazardous Waste Support Branch, US EPA DESA. *Polychlorinated Biphenyl (PCB) Aroclor Data Validation*, SOP HW-37A, Revision 0. June 2015.

REFERENCE 1: US Environmental Protection Agency (US EPA). Contract Laboratory Program Statement of Work for Organic Superfund Methods Multi-Media, Multi-Concentration SOM02.3. Sept 2015. http://www2.epa.gov/clp/epa-contract-laboratory-program-statement-work-organic-superfund-methods-multi-media-multi-0

2.0 PROJECT ORGANIZATION

2.1 Personnel

The following list of key personnel and their corresponding responsibilities. Due to the work breakdown structure of the project, an organization list is provided instead of a concise organization chart.

PROJECT PERSONNEL	RESPONSIBILITY
Michael A. Mercado, Project Officer DESA/HWSB Superfund Support Team	Project Management/ Sampling Operations/Field Support
Robert Finke, Chemist DESA/HWSB Superfund Support Team	Sampling Operations/ Field Support
Mark Denno, Environmental Scientist DESA/HWSB Superfund Support Team	Sampling Operations/ Field Support
Rachael Graham, Environmental Scientist DESA/HWSB Superfund Support Team	Sampling Operations/ Field Support
Adly Michael, Project Quality Assurance Officer DESA/HWSB/HWSS	Report QA
U.S. EPA CLP Laboratory	Laboratory Analysis
	Laboratory QC
	Data Processing Activities
DESA/HWSB Hazardous Waste Support Section	Data Quality Review
Not Applicable	Performance Auditing
Not Applicable	Systems Auditing
DESA/Hazardous Waste Support Branch	Overall QA
Sharon Trocher, RPM ERRD/NYRB/ENYRS	Overall Site Manager

3.0 PROJECT QUALITY OBJECTIVES

3.1 Data Usability

Overall project objectives include:

EPA will collect samples from nine on-site wells: MW-A, MW-B, MW-C, MW-D, MW-E, MW-F, MW-G, MW-H, and MW-I.

Analysis for Polychlorinated biphenyl (PCB) and Volatile Organic Compounds (VOCs) to assess the levels of contamination in the wells.

To determine if groundwater is being impacted by PCBs and determine the level of VOC contamination in the groundwater northeast of the site building at 200 Stage Road, Vestal, New York.

4.2 Schedule

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	EPA/DESA/SST	12/15/2015	12/23/2015	QAPP	12/23/2015
Preparation of Health and Safety Plan	EPA/DESA/SST	12/24/2015	12/24/2015	HASP	12/24/2015
Procurement of Equipment	EPA/DESA/SST	12/28/2015	12/29/2015	N/A	1/07/2016
Laboratory Request	EPA/DESA/SST	12/21/2015	12/22/2015	Lab Request Form	12/23/2015
Field Reconnaissance/Access	EPA/DESA/SST	2/01/2016	2/02/2016	N/A	N/A
Collection of Field Samples	EPA/DESA/SST	2/01/2016	2/05/2016	N/A	N/A
Validation of Laboratory Results	EPA/DESA/HWSS	2/08/2016	3/20/2016	Validated data Packages	3/21/2016
Data Evaluation/ Preparation of Final Report	EPA/DESA/SST	3/23/2016	4/22/2016	Final Report	4/23/2016

5.0 SAMPLING

5.1 Sample Rationale

EPA will collect eighteen (18) groundwater samples and three (3) QC samples (1 rinsate per decon activity, 1 MS per 20 sample; 1 field duplicate associated with each parameter). The aqueous samples will be analyzed by an EPA CLP Laboratory.

5.1.2 Site Access

The Site PRM will be responsible for providing site access to the Team.

5.1.3 Field Planning

Prior to each field mobilization, each team member will review all project plans and participate in a field planning meeting. The meeting will be conducted by the EPA HWSB/SST Project Lead and attended by all field staff. The meeting objective is to allow team members to become familiar with the site history, special project requirements, and other items listed below.

names of contractor/subcontractor personnel, and other site-specific observations including any deviations from protocol.

Sample labels will be securely affixed to the sample container and include only the sample identification number as per protocol. Once sealed, samples will be placed in waterproof High Density Polyethylene (HDPE) coolers. The coolers will be packed with sufficient wet ice to cool the samples to 4EC along with non-combustible absorbent cushioning material to minimize the possibility of container breakage and movement during shipment. All samples will be packaged and shipped in accordance with USEPA, Department of Transportation (DOT), and International Air Transport Association (IATA) procedures.

The Traffic Report & Chain of Custody Records will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept for each individual who has signed it. The chain-of-custody records will include, at a minimum, sample identification number, number of samples collected, sample collection date and time, sample type, sample matrix, sample container type, sample analysis requested, sample preservation, and the name(s) and signature(s) of samplers and all individuals who have had custody.

7.2 Project Documentation

The following project personnel will receive copies of the approved QAPP and any subsequent revisions.

Project Personnel	Title
Sharon Trocher, ERRD	Remedial Project Manager
Michael A. Mercado DESA/HWSB	Project Officer
Adly Michael DESA/HWSB	Quality Assurance Officer

7.2 Reports to Management

The data collected as a result of sampling activities; will be organized, analyzed and summarized in a final project report that will be submitted to Facilities according to the Project Schedule in section 4.2 of the QAPP summary. The report will be prepared by the project officer or project quality assurance officer and include appropriate data quality assessment.

8.0 ASSESSMENT

8.1 Assessment Findings

Procedures are provided for project personnel to make changes, take corrective actions and document the process through Corrective Action Request Forms. Corrective action can occur during field activities, laboratory analysis, data validation, and data assessment.

QAPP APPENDIX A
QAPP WORKSHEETS

CROSSWALK

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives			
2.1 Title and Approval Page	- Title and Approval Page	Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	TOC Approval Page	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	Approval Page	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications - Special Personnel Training Requirements	2	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	1	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria	3	11 12
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations	1 2	13

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records - Analytical Services - Data Management SOPs	6	29 30
Assessment/Oversight			
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments - Audit Checklists - Assessment Findings and Corrective - Action Responses	8	31 32
4.2 QA Management Reports	- QA Management Reports		33
4.3 Final Project Report	- Final Report(s)		33
Data Review			
5.1 Overview		9	NA
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process - Validation (Steps IIa and IIb) Process - Validation (Steps IIa and IIb) Summary - Usability Assessment	9	34 35 36 37

QAPP Worksheet #2
QAPP Identifying Information

Site Name/Project Name: Vestal Chlorinated Solvent Site
Site Location: Vestal, NY
Site Spill ID: 38
Operable Unit: 02
Title: Quality Assurance Project Plan
Revision Number: 0
Revision Date: December 2015

1. **Identify guidance used to prepare QAPP:** Uniform Federal Policy for Quality Assurance Project Plans

2. **Identify regulatory program:** EPA Region 2

3. **Identify approval entity:** EPA Region 2

4. **Indicate whether the QAPP is a generic or a *project-specific* QAPP. (circle one)**

5. **List dates of scoping sessions that were held:** N/A

6. **List dates and titles of QAPP documents written for previous site work, if applicable:** N/A

7. **List organizational partners (stakeholders) and connection with lead organization:** N/A

8. **List data users:** EPA Region 2 (see Wkst #4 for individuals)

9. **If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:** N/A

10. **Document Control Number:** Vestal _GW_QAPP_12-2015.doc

QAPP Worksheet #4
Project Personnel Sign-Off Sheet

Organization: EPA Region 2

Project Personnel	Title	Telephone Number	Organization	Signature & Date
Sharon Trocher	Remedial Project Manager	(212) 637-4261	EPA Region 2	
Adly Michael	QA Officer	(732) 906-6161	EPA Region 2	
Michael A. Mercado	Project Manager	(732) 906-6808	EPA Region 2	
Robert Finke	Field Support	(732) 906-6802	EPA Region 2	
Mark Denno	Field Support	(732) 321-6708	EPA Region 2	
Rachael Graham	Field Support	(732) 321-4438	EPA Region 2	

QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Sampling request	EPA RPM	Sharon Trocher	(212) 637-4261	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Point of Contact with RPM	Sampling Project Manager	Michael A. Mercado	(732) 906-6808	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic) while in the field – communication with the RPM who ultimately makes decisions regarding the project.
Laboratory request	Non-RAS RSCC	Christina Leung	(732) 906-6995	Completes Task Order and requests laboratory
Adjustments to QAPP	Quality Assurance Officer	Adly Michael	(732) 906-6161	QAPP approval dialogue

QAPP Worksheet #8
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
All Field Activities	40-hour OSHA Annual 8-hour refresher	40-hour EPA; 8-hour training and on-site safety briefings	Various	All field team members	HWSB/SST staff	On-site and office records
Sample Collection	Trained in EPA CERCLA QA, sampling methods, sample shipping procedures	Office and on-site training	Various	All field team members	HWSB/SST staff	EPA Region 2 in Edison, NJ and on-site
Sample Analysis	Trained in EPA CLP Laboratory Procedures	On-site training	Various	CLP Laboratory analytical personnel	CLP Laboratory staff	CLP laboratory
Data Validation	CLP and non-RAS data validation	EPA	Various	EPA reviewers	Data Validators	EPA Region 2 in Edison, NJ
Data Review and Assessment	None- review performed by experienced analytical personnel	CLP Laboratory	Various	Laboratory Data Management	Section Chief; Laboratory QAO; Respective Section leaders	CLP Laboratory

QAPP Worksheet #10
Problem Definition

SITE NAME, LOCATION & BRIEF DESCRIPTION

The Vestal Chlorinated Solvent Ground Water Monitoring Wells Site is in the Town of Vestal, Broome County, New York. It is located at 200 Stage Road, Town of Vestal, NY, in an industrial park on the southern bank of the Susquehanna River, between Route 17 and Vestal Pkwy East. The formerly housed circuit board manufacturer building on site is approximately 60,000 square foot, one story building. This building was abandoned in May 2002 and reoccupied in 2007. The building is currently being used for recycling electronic equipments. Monitoring wells MW-A thru. I are located to the North/East corner of the building in the out fields. These wells are flash mounted and to a depth of ~ 20 feet.

SITE HISTORY

From 1980 to 2002, Circuit boards were fabricated on site. In the manufacturing process the facility utilized the chlorinated solvents 1,1,1-trichloroethane(TCA) and trichloroethene (TCE). During a series of subsurface investigations the Site was found to be the source of TCA and TCE contamination of groundwater and impacting Vestal Municipal Well Field. Chlorinated solvents were discovered in Well 1-1, and the well was taken out of service and pumped to the Susquehanna River. Well 1-1 was the main source of water for District 1 until 1980, when it was closed. After immediate actions to protect human health and the environment, and site investigations, EPA placed the site on the Superfund program's National Priorities List in September 1983.

Construction of the air stripping facility finished in 1990. The air stripping facility treat contaminated groundwater and discharge the treated effluent to the Susquehanna River as part of EPA's long-term response actions at the site. In October 2006, the New York Department of Environmental Conservation (NYSDEC) assumed responsibility for operation and maintenance of the facility.

Between May and June 2008 four groundwater monitoring well clusters were installed to the south side of the building and one cluster near the northeast corner of the building. These wells were name ERT-1 thru. ERT-4. In July 2008 these wells were sampled and nine soil borings to a depths of 20 feet bgs near the northeastern corner of the site building. The results of borings and sampling of the wells indicated the presence of both chlorinated VOCs and a floating product phase of hydrocarbons.

By 2010 nine additional shallow monitoring wells were installed near the northeast corner of the building to assess the occurrence and thickness of floating free product in the wells. These wells were named MW-1 thru. MW-I and are less than twenty feet in depth.

QAPP Worksheet #11
Project Quality Objectives/Systematic Planning Process Statements

Overall project objectives include:

- Derive observable trends from the data
- Investigate concentrations of TCL VOCs and TCL PCBs

Who will use the data?

- Data will be used by EPA Region 2 ERRD.

What will the data be used for?

- The primary use of data from the event will be utilized to capture the current level of analytes in the ground water at the Vestal Chlorinated Solvent OU2 Site to determine the Cleanup level needed.

What types of data are needed?

- Analysis of the groundwater samples and floating free product for TCL VOCs plus 1,2,4 & 1,3,5-Trimehtylbenzene with reporting limit of 5 ppbs and TCL PCBs with reporting limit of 0.1 ppb.

How "good" do the data need to be in order to support the environmental decision?

Fixed-lab derived definitive data is required to meet project objectives. The quantitation limits for the samples are specified on Worksheet #15. All definitive laboratory analyses will be performed by a CLP laboratory. Worksheets #12 and #28 show the measurement performance criteria that are needed for the quality indicators. Worksheet #20 shows the quality control (QC) samples required. All data analyzed by the CLP Laboratory will be validated by DESA HWSB Staff.

How much data are needed?

9 groundwater samples and floating free product will be collected along with the required QA/QC in according to the USEPA ERT. *Groundwater Well Sampling Procedures*, SOP 2007, Revision 0.0. Apr 2001.

One matrix spike/matrix spike duplicate sample and one field duplicate sample will be collected per 20 samples. One aqueous rinsate blank will be collected per decontamination event.

QAPP Worksheet #12
Measurement Performance Criteria Table

Matrix	Aqueous
Analytical Group	TCL Volatile Organics + 1,2,4 & 1,3,5-Trimehtylbenzene
Concentration Level	Low (ug/L)

Sampling Procedure[1]	**Analytical Method/SOP**[2]	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)**
ERT SOP-2007	SOM02.3 MA# 2577.0 & 2576.0	Precision (field)	Project-Specific %RPD	Field Duplicate	S & A
		Cross Contamination (field)	No analyte > CRQL*	Field Blank	S & A
		Precision (laboratory)	Project-Specific %RPD; List compound specific RPD	Field Duplicate; MS/MSD**	S & A; A
		Accuracy (laboratory)	List compound specific %R	***DMCs; MS/MSD**	A

*Reference USEPA Region 2 Low/Medium Volatile Data Validation SOP most recent revision http://www.epa.gov/region2/qa/documents.htm
****Optional** MS/MSD – Reference CLP SOM02.3, Exhibit D, Table 6 for Criteria
*****Deuterated Monitoring Compounds (DMCs) – Reference CLP SOM02.3, Exhibit D, Table 5 for Criteria

QAPP Worksheet #14
Summary of Project Tasks

Sampling Tasks: 9 groundwater samples along with up to 9 floating free product will be collected according to the USEPA ERT. *Groundwater Well Sampling Procedures*, SOP 2007, Revision 0.0. Apr 2001, which can be found as Appendices D. This method requires the following water quality parameter data: turbidity, pH, depth to water temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential. One matrix spike/matrix spike duplicate sample and one field duplicate sample will be collected per 20 samples. One aqueous rinsate blank will be collected per decontamination event.

Analysis Tasks: Samples collected from each monitoring well will be definitively analyzed for TCL VOCs plus 1,2,4 & 1,3,5-Trimehtylbenzene & TCL PCBs according to the CLP Statement of Work (SOW) for Multi-Media, Multi-Concentration Organic Analysis (SOM02.3 MA# 2577.0, 2576.0, 2578.0 & 2548.1), the link to which can be found as Reference 1. Samples will also be screened for pH, oxidation reduction potential, specific conductance, temperature, and DO.

Quality Control Tasks: Groundwater samples will have the following QC samples analyzed: field duplicates, matrix spikes, VOC trip blank, and rinsate blank as defined in the method. Rinsate blank samples will be collected on decontaminated equipment at a rate of one rinsate sample per day per decon event, not to exceed one/day. See worksheet #20 for the field quality control sample summary table.

Data Management Tasks: The data collected for the sampling activities will be organized, analyzed, and summarized in a final project report that will be submitted to the RPM according to the Project Schedule. The report will be prepared by the project lead and include appropriate data quality assessment. Standard methods and references will be used as guidelines for data reduction and reporting.

Data management tasks include data receipt, checking, uploading, usability evaluations, and the preparation of reports, tables, and figures. The sample handling and custody requirements, including SCRIBE logs and generation of sample paperwork, sample labels, is discussed in worksheets #26 and #27. Data tables that compare the results of the various sampling efforts will be prepared and evaluated. Data tables that illustrate statistical trends from tests performed on the data will be prepared. Figures that illustrate monotonic changes will be prepared.

Data management will utilize personal computers, local area networks, and electronic communications to support the software.

Assessment/Audit Tasks: No performance audit of field operations is anticipated at this time. If conducted, performance and systems audits will be in accordance with the U.S. EPA Region 2, SST SOP #1: *Performing Oversight of CERCLA Field Operations*, Revision 0, April 2000.

QAPP Worksheet #15
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: TCL VOCs
Concentration Level: Low

Analyte	CAS Number	Analytical Method – SOM02.3 2576.0 & 2577.0 Low Quantitation Limits (ug/L)	EPA RSLs – MCL (ug/L)	EPA RMLs – MCL (ug/L)	NYDEC Ground Water Quality Standards (ug/L)
Dichlorodifluoromethane	75-71-8	0.5			*
Chloromethane (Methyl Chloride)	74-87-3	0.5			*
Vinyl Chloride	75-01-4	0.5	2	2	2
Bromomethane	74-83-9	0.5			*
Chloroethane	75-00-3	0.5			*
Trichlorofluoromethane	75-69-4	0.5			*
1,1-Dichloroethene	75-35-4	0.5	7	7	*
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.5			*
Acetone (2-Propanone)	67-64-1	5			*
Carbon Disulfide	75-15-0	0.5			60
Methyl Acetate	79-20-9	0.5			
Methylene Chloride	75-09-2	0.5	5	5	*
trans-1,2-Dichloroethene	156-60-5	0.5	70	70	*
Methyl tert-Butyl Ether	1634-04-4	0.5			
1,1-Dichloroethane	75-34-3	0.5			*
cis-1,2-Dichloroethene	156-59-2	0.5	70	70	*
2-Butanone (Methyl Ethyl Ketone)	78-93-3	5			*
Bromochloromethane	74-97-5	0.5			*
Chloroform	67-66-3	0.5	80	80	7
1,1,1-Trichloroethane	71-55-6	0.5	200	200	*
Cyclohexane	110-82-7	0.5			*
Carbon Tetrachloride	56-23-5	0.5	5	5	5
Benzene	71-43-2	0.5	5	5	1
1,2-Dichloroethane	107-06-2	0.5	5	5	0.6
Trichloroethene	79-01-6	0.5	5	5	5
Methylcyclohexane	108-87-2	0.5			
1,2-Dichloropropane	78-87-5	0.5	5	5	
Bromodichloromethane	75-27-4	0.5	80	80	
cis-1,3-Dichloropropene	10061-01-5	0.5			
4-Methyl-2-Pentanone	108-10-1	5			
Toluene	108-88-3	0.5	1000	1000	*
trans-1,3-Dichloropropene	10061-02-6	0.5			0.4
1,1,2-Trichloroethane	79-00-5	0.5	5	5	1
Tetrachloroethene	127-18-4	0.5	5	5	*
2-Hexanone	591-78-6	5			
Dibromochloromethane	124-48-1	0.5	80	80	
1,2-Dibromoethane	106-93-4	0.5	0.05	0.05	
Chlorobenzene	108-90-7	0.5	100	100	*
Ethylbenzene	100-41-4	0.5	700	700	*
Xylenes (total)	1330-20-7	0.5	10000	10000	
Styrene	100-42-5	0.5	100	100	*
Bromoform	75-25-2	0.5	80	80	*

NOTE : * The principal organic contaminant standard for groundwater of 5 ug/L applies to this substance.
[1] 1,2,4- & 1,3,-5 Trimethylbenzene are added to the Modified Analysis

QAPP Worksheet #15
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: TCL PCB Aroclors
Concentration Level: Trace

Analyte	CAS Number	Analytical Method – SOM02.3 2548.1 & 2578.0 Low Quantitation Limits (ug/L)	EPA RSLs – MCL (ug/L)	EPA RMLs – MCL (ug/L)	NYDEC Ground Water Quality Standards (ug/L)
Aroclor-1016	12674-11-2	0.1			
Aroclor-1221	11104-28-2	0.1			
Aroclor-1232	11141-16-5	0.1			
Aroclor-1242	53469-21-9	0.1			
Aroclor-1248	12672-29-6	0.1			
Aroclor-1254	11097-69-1	0.1			
Aroclor-1260	11096-82-5	0.1			
Aroclor-1262	37324-23-5	0.1			
Aroclor-1268	11100-14-4	0.1			

QAPP Worksheet #17
Sampling Design and Rationale

Site Access
The EPA RPM will be responsible for providing site access to the Sampling Team.

Field Planning
Prior to each field mobilization, each team member will review all project plans and participate in a field planning meeting. The meeting will be conducted by the EPA HWSB/SST Project Lead and attended by all field staff. The meeting objective is to allow team members to become familiar with the site history, special project requirements, and other items listed below.

-Objectives of field work
-Equipment and training needs
-Health and safety requirements
-Field operating procedures, schedules of events, communications, and individual assignments
-Required QC measures
-Documents governing field work that must be on site

Decontamination Procedures
Field decontamination will be performed on an as-needed basis on the field monitoring equipment in accordance with the USEPA ERT. *Sampling Equipment Decontamination Procedures*, SOP 2006, Revision 0.0. August 1994.

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	No. of Samples	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Aqueous	9 groundwater samples 9 Floatable Free Products 1 duplicates 1 rinsate blank	TCL VOCs	Low	SOM02.3 MA# 2548.1, 2576.0, 2577.0, & 2578.0	120 mL	(3) 40 ml amber glass vials w/Teflon lined septum	1:1 HCl to pH<2; cool to 4°C	14 days extract; 40 days analyze
		TCL PCBs	Trace		2000 ml	(2) 1L amber glass bottle w/Teflon lined cap	Cool to 4°C	7 days extract; 40 days analyze
	1 Trip Blank	TCL VOCs	Low	SOM02.3 MA# 2548.1	120 mL	(3) 40 ml amber glass vials w/Teflon lined septum	1:1 HCl to pH<2; cool to 4°C	14 days extract; 40 days analyze

QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
ERT-2007	Groundwater Well Sampling Standard Operating Procedure: SOP 2007 Rev 0.0 April 2001	USEPA/ERT	bladder or peristaltic pump, Teflon lined tubing, water level meter, parameter meter, power source	N	N/A

QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
SOM02.3 MA# 2548.1, 2576.0, 2577.0, & 2578.0	USEPA Contract Laboratory Program Statement of Work for Multi-Media, Multi-Concentration Organic Analysis; September 2015	Definitive	Target Compound List Volatile Organics	GC/MS	CLP RAS Laboratory	N
			Target Compound List PCBs	GC/ECD		

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
YSI	Calibrate with standard solutions; as per instrument manufacturer's recommended procedures	Prior to day's activities; end of day's activities; anytime anomaly suspected	+/- 0.1 units	Clean probe, replace battery, replace membrane, replace probe	EPA SST	Manufacturer's Instructions
HACH DR/2700 Spectrophotometer	Calibrate with standard solutions; as per instrument manufacturer's recommended procedures	Prior to day's activities; end of day's activities; anytime anomaly suspected	See Manufacturer's Instructions	Replace battery, replace standards, replace bottle, replace lightbulb	EPA SST	Manufacturer's Instructions

QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): EPA DESA HWSB SST
Sample Packaging (Personnel/Organization): EPA DESA HWSB SST
Coordination of Shipment (Personnel/Organization): EPA DESA HWSB SST
Type of Shipment/Carrier: UPS
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian, CLP Laboratory
Sample Custody and Storage (Personnel/Organization): Sample Custodian, CLP Laboratory
Sample Preparation (Personnel/Organization): Sample Technicians, CLP Laboratory
Sample Determinative Analysis (Personnel/Organization): Sample Technicians, CLP Laboratory
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped within 24hours, and arrive at laboratory within 24 hours (1 day) of sample shipment
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: Sample Technicians, CLP Laboratory
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; see Worksheet #19.

QAPP Worksheet #28
QC Samples Table

Matrix	Aqueous
Analytical Group	Target Compound List Low Concentration Volatile Organics +1,2,4 & 1,3,5-Trimehtylbenzene
Concentration Level	Low (ug/L)
Sampling SOP(s)	ERT-2007
Analytical Method/SOP Reference	SOM02.3 MA # 2576.0 & 2577.0
Sampler's Name	MMercado
Field Sampling Organization	US EPA SST
Analytical Organization	EPA CLP RAS Laboratory
No. of Sample Locations	18 + 1 duplicates

Lab QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**		**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**	
Method Blank	1 every 12 hours	No analyte > CRQL*		Suspend analysis; reanalyze blank and affected samples	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	No analyte > CRQL*	
Matrix Spike (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	61-145 %R	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,1-Dichloroethene	61-145 %R
		Benzene	76-127 %R				Benzene	76-127 %R
		Trichloroethene	71-120 %R				Trichloroethene	71-120 %R
		Toluene	76-125 %R				Toluene	76-125 %R
		Chlorobenzene	75-130 %R				Chlorobenzene	75-130 %R
Matrix Spike Duplicate (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	0-14 %RPD	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Precision	1,1-Dichloroethene	0-14 %RPD
		Benzene	0-11 %RPD				Benzene	0-11 %RPD
		Trichloroethene	0-14 %RPD				Trichloroethene	0-14 %RPD
		Toluene	0-13 %RPD				Toluene	0-13 %RPD
		Chlorobenzene	0-13 %RPD				Chlorobenzene	0-13 %RPD
Deuterated Monitoring Compounds	all samples	Vinyl chloride-d_3	65-131 %R	Check calculations and instruments, reanalyze affected samples	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	Vinyl chloride-d3	65-131 %R
		Chloroethane-d_5	71-131 %R				Chloroethane-d5	71-131 %R

*with the exception of methylene chloride, 2-butanone and acetone which can be up to 2 times the CRQL, or in some situations may require these compunds be up to 4 times the CRQL

QAPP Worksheet #28
QC Samples Table

Matrix	Aqueous
Analytical Group	Target Compound List Low Concentration Volatile Organics +1,2,4 & 1,3,5-Trimehtylbenzene [cont'd]
Concentration Level	Low (ug/L)
Sampling SOP(s)	ERT-2007
Analytical Method/SOP Reference	SOM02.3 MA # 2576.0 & 2577.0
Sampler's Name	MMercado
Field Sampling Organization	US EPA SST
Analytical Organization	EPA CLP RAS Laboratory
No. of Sample Locations	18 + 1 duplicates

Lab QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**		**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**	
Deuterated Monitoring Compounds [cont'd]	all samples	1,2-Dichlorobenzene-d_4	80-131 %R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet recovery limits	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,2-Dichlorobenzene-d4	80-131 %R
Internal Standards	all samples	60-140%		Check calculations and instruments, reanalyze affected samples	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	± 40 % of response area, ± 20 sec retention time shift	

QAPP Worksheet #29
Project Documents and Records Table (FIELD)

Sample Collection Documents and Records	Analysis Documents and Records	Data Assessment Documents and Records	Other
• Site and field logbooks • Well construction diagrams • COC forms • Well Data Sheets • Field Data Sheets • Site map • Signed QAPP • Project Data Evaluation Report	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Laboratory Audit checklist (if performed) • Review forms for electronic entry of data into database • Corrective action documentation	• SCRIBE

QAPP Worksheet #31
Planned Project Assessments Table

- There are no planned assessments for this project.

QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.	EPA SST Sample Leader
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	EPA SST Sample Leader
IIa	Chains of custody	Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).	EPA Region 2 Data Validation Personnel with contractor support
IIa	Laboratory data package	Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	EPA Region 2 Data Validation Personnel with contractor support
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	EPA Region 2 Data Validation Personnel with contractor support EPA SST Sample Leader
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	EPA SST Sample Leader

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

-**Precision:** Results of laboratory duplicates will be assessed during data validation and data will be qualified according to the data validation procedures cited in worksheet# 36. Field duplicates will be assessed during by matrix using the RPD for each pair of results above the QL for the performed analyses. RPD acceptance criteria, presented in worksheet #12, will be used to access field sampling precision. Absolute difference will be used for low results as described in worksheet # #28. A discussion summarizing the results of laboratory and field precision and any limitations on the use of the data will be described.

-**Accuracy/Bias Contamination:** Results for all laboratory blanks will be assessed as part of the data validation. During the data validation process, the validating personnel will qualify the data following the procedures described on worksheet #36. A discussion summarizing the results of the laboratory accuracy and bias based on contamination will be presented and any limitations on the use of the data will be described.

-**Overall Accuracy/Bias**: The results of instrument calibration and matrix spike recoveries will be reviewed and data will be qualified according to the data validation procedures cited on worksheet #36. A discussion summarizing the results of laboratory accuracy and any limitations on the use of the data will be described.

-**Sensitivity:** Data results will be compared to criteria provided in worksheet #15. A discussion summarizing any conclusions about the sensitivity of the analyses will be presented and any limitations on the use of the data will be described.

-**Representativeness:** Data representativeness will be assessed by collecting field replicate samples. The field replicates are by definition equally representative of a given point and space and time. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. Therefore, data representativeness will be satisfied by ensuring that:

The sampling program is followed according to:

U.S. EPA (Environmental Protection Agency). October 1989. *Region II CERCLA Quality Assurance Manual.* Final Copy, Revision 1. Division of Environmental Services and Assessment, Edison, NJ; and

QAPP Worksheet #37
Usability Assessment

Identify the personnel responsible for performing the usability assessment:

Sampling project leader.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

A Data Evaluation Report will describe the rationale for the data used and present any data limitations. The report will include a discussion of the accuracy, precision, representativeness, completeness and comparability of the data set and deviations from planned procedures and analysis. Tables will be prepared, including: a summary of samples collected and parameters analyzed; detections in field and trip blanks; and comparison of field duplicates. The report will be given to the RPM so she may examine the current extent of groundwater contamination within the Woodbrook Road site and decide the approach in the upcoming remedy.

QAPP APPENDIX B

SITE MAPS

QAPP APPENDIX C

USEPA ERT

GROUNDWATER WELL SAMPLING

SOP 2007

STANDARD OPERATING PROCEDURES

GROUNDWATER WELL SAMPLING

CONTENTS

GROUNDWATER WELL SAMPLING

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) provides general information on sampling groundwater wells and ensures that the sample is representative of the particular groundwater zone being sampled. The growing concern over the past several years with respect to low levels of volatile organic compounds (VOCs) in water supplies has led to the development of highly sophisticated analytical methods that can provide detection limits at part per trillion levels. While the laboratory methods are extremely sensitive, well controlled and quality assured, they cannot compensate for a poorly collected sample. The collection of a sample should be as sensitive, highly developed and quality assured as the analytical procedures.

The procedures are designed for sampling the most common types of groundwater contaminants (e.g., volatile and semivolatile organic compounds, pesticides, herbicides, polychlorinated biphenyls (PCBs), metals, and biological parameters).

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, or equipment limitations and limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute United States Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

In order to obtain a representative groundwater sample for chemical analysis (es), it is important to remove stagnant water from the well casing and the water immediately adjacent to the well before collection of the sample. This may be achieved with one of a number of sampling devices. The most common of these devices are the bailer, submersible pump, non-contact gas bladder pump, inertia pump and suction pump. At a minimum, three well volumes should be purged, if possible. Equipment must be decontaminated prior to use and between wells. Once purging is completed and the proper sample containers have been prepared, sampling may proceed. Samples should be collected from the depth interval where contaminants are expected but need not be collected with the same device used for well purging. However, some sampling methods will affect sample integrity and care should be taken when choosing the sampling device. If possible, sampling should occur progressively from the least to the most contaminated well.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The sample analysis determines the type of bottle, preservative, holding time, and filtering requirements. Samples should be collected directly from the sampling device into appropriate sample containers. Check that a Teflon liner is present in the cap of the sample container, if required. Attach a sample identification label. Complete a field data sheet, a chain of custody form, and record all pertinent data in the site logbook.

Samples should be placed in a cooler and maintained at 4°C and ideally should be shipped within 24 hours of sample collection. If large numbers of samples are being collected, shipments may occur on a regular

equipment as it will not normally come into contact with the sample. Rinsate blanks may be required to check the effectiveness of decontamination procedures when using non-dedicated equipment. In highly contaminated wells, disposable equipment (i.e., polypropylene bailers) may be appropriate to avoid cross-contamination.

4.3 Light Non-Aqueous Phase Liquids (LNAPL)

The presence of floating organic layers in a well may require reevaluation of the sampling plan. There is generally little point in sampling the groundwater directly beneath an organic layer and the presence of both phases complicates the sampling procedure. The organic phase is usually sampled by skimming the top of the liquid column in the well with a bailer or small pump, depending on the viscosity of the liquid.

5.0 EQUIPMENT/APPARATUS

5.1 Bailers

Advantages

- No power source needed
- Portable
- Inexpensive, so it can be dedicated and hung in a well, thereby reducing the chances of cross contamination
- Minimal outgassing of volatile organics while sample is in bailer
- Readily available
- Removes stagnant water first
- Rapid, simple method for removing small volumes of purge water

Disadvantages

- Time-consuming to flush a large well
- Transfer of sample may cause aeration
- The valve at the bottom of the bailer often leaks thus losing some of the sample

5.2 Submersible Pumps

Advantages

- Smaller diameter pumps are usually portable and can be transported from well to well
- Relatively high pumping rates are possible
- Generally very reliable and does not require priming

Disadvantages

- Potential for effects on analysis of trace organics

Disadvantages

- Restricted to areas with water levels within 70 feet of the ground surface
- May be time consuming to purge wells with these manual pumps
- Labor intensive
- WaTerra pumps (for example) are only effective in 2-inch diameter wells

5.6 Field Equipment Checklist

5.6.1 General

- Water level indicator
- electric sounder
- steel tape
- transducer
- reflection sounder
- airline
- Depth sounder
- Appropriate keys for well cap locks
- Steel brush
- HNU or OVA (whichever is most appropriate)
- Logbook (bound)
- Calculator
- Field data sheets and samples labels
- Chain of custody records and seals
- Sample containers
- Engineer's rule
- Sharp knife (locking blade)
- Tool box (to include at least: screwdrivers, pliers, hacksaw, hammer, flashlight
- Leather work gloves
- Surgical gloves (for sampling)
- Appropriate Health & Safety gear
- Five-gallon pail
- Plastic sheeting
- Shipping containers
- Packing materials
- Bolt cutters
- Ziploc plastic bags
- Containers for evacuation liquids
- Decontamination solutions
- Tap water
- Non phosphate soap
- Pails or tubs

- Non-contact gas bladder pump
- Compressor or nitrogen gas tank
- Batteries and charger
- Teflon tubing - enough to dedicate to each well
- Swagelock fitting
- Toolbox supplements - same as submersible pump
- Control box (if necessary)

5.6.5 Suction Pumps

- Pump
- Black PVC coil tubing - enough to dedicate to each well
- Gasoline - if required
- Toolbox
- Plumbing fittings
- Flow meter with gate valve

5.6.6 Inertia Pumps

- Pump assembly (WaTerra pump, piston pump)
- Five gallon bucket

5.6.7 Peristaltic Pumps

- Small diameter "Geotubing"
- Roll of Masterflex tubing
- 110 VAC generator or 12 VDC power source
- Knife, screwdriver

6.0 REAGENTS

Reagents may be used for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed and are summarized in Environmental Response Team/Scientific, Engineering, Response and Analytical Services (ERT/SERAS) SOP #2003, *Sample Storage, Preservation, and Handling*. Decontamination solutions are specified in ERT/SERAS SOP #2006, *Sampling Equipment Decontamination.*

7.0 PROCEDURES

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies needed (i.e., diameter and depth of wells to be sampled).

The amount of purging required before sampling depends on the intent of the monitoring program as well as the hydrogeologic conditions. General assessment of groundwater quality may require long pumping periods to obtain a sample representative of a large volume of the aquifer. The purge volume is determined prior to sampling and the sample is collected after a known volume of the water is pumped from the well, or the well can be pumped until parameters such as temperature, specific conductivity, pH, or turbidity have stabilized. Groundwater quality in the well is considered stabilized after three sets of consecutive readings indicate no change. The time between readings is based on the purge rate and cumulative volume but generally is between 5 to 15 minutes.

Sampling to define a contaminant plume requires a representative sample from a small volume of the aquifer. This requires that the well be purged enough to remove the stagnant water but not enough to induce flow from other areas. Generally, three well volumes are considered sufficient. The total volume purged, purge method, purge rate, and the start and end times of purging are recorded in the field log book.

The following purging devices are most commonly used. Other evacuation devices are available, but have been omitted in this discussion due to their limited use.

7.3.1 Bailers

Bailers are the simplest purging device and generally consist of a rigid length of tube, usually with a ball check-valve at the bottom. A nylon line is used to tie and lower the bailer into the well and retrieve a volume of water. The three most common types of bailers are made of PVC, Teflon, and stainless steel. Purging with bailers is best suited to shallow or small diameter wells. For deep, larger diameter wells that require removal of large volumes of water, pumps may be more appropriate.

Equipment needed will, include a clean decontaminated bailer, Teflon or nylon line, a sharp knife, and plastic sheeting.

1. Determine the volume of water to be purged as described in Section 8.0, *Calculations*.

2. Lay plastic sheeting around the well to prevent contamination of the bailer line with soil or other foreign materials. Do not let the bailer line touch the ground.

3. Attach the line to the bailer and lower into the well until the bailer is completely submerged.

4. Pull bailer out ensuring that the line either falls onto a clean area of plastic sheeting or never touches the ground.

5. Empty the bailer into a container of known volume to determine when the purge volume is reached.

7. Collect and dispose of purge waters as specified in the work plan.

7.3.3 Non-Contact Gas Bladder Pumps

Pumps in this category may be dedicated to a well and include stainless steel and Teflon Middleburg-squeeze bladder pumps such as IEA, TIMCO, Well Wizard or Geolog.

1. Assemble Teflon tubing, pump and charged control box.

2. Procedure for purging with a bladder pump is the same as for a submersible pump (Section 7.3.2).

3. Adjust flow rate to prevent violent movement of the hose as water is drawn in.

7.3.4 Suction Pumps

Suction pumps include centrifugal, peristaltic and diaphragm. Diaphragm pumps can be used for relatively rapid purging and can be adjusted to a slower rate for sampling. The peristaltic pump is a low volume pump that uses rollers to squeeze the flexible tubing thereby creating suction. The tubing can be dedicated to a well to prevent cross-contamination. Peristaltic pumps, however, require a power source.

1. Assemble the pump, tubing, and power source if necessary.

2. Procedure for purging with a suction pump is exactly the same as for a submersible pump (Section 7.3.2).

7.3.5 Inertia Pumps

Inertia pumps such as the WaTerra pump and piston pump, are manually operated. These pumps are most appropriate to use when wells are too deep to bail by hand, too shallow or too small in diameter to warrant the use of a submersible pump. The pumps are made of plastic and may either be decontaminated or discarded after use.

1. Determine the volume of water to be purged as described in Section 8.0, *Calculations*.

2. Assemble pump and lower to the appropriate depth in the well.

3. Begin pumping manually, discharging water into a five-gallon bucket (or other graduated vessel). Purge until a specified volume of water has been evacuated (or until field parameters such as temperature, pH, and conductivity, have stabilized).

4. Collect and dispose of purge waters as specified in the work plan.

Submersible pumps are not recommended for sampling but may be used in some situations. The generator and fuel (if needed) used to operate a submersible pump can be a source of contamination and should be kept separate from the sampling containers during transport and downwind during sampling.

1. Allow the monitor well to recharge after purging, keeping the pump just above the screened section.

2. Attach a clean gate valve to the discharge hose (if not already fitted), and reduce the flow of water to a manageable rate.

3. Assemble the appropriate bottles.

4. If a gate valve is not available, run the water down the side of a clean jar and fill the sample bottles from the jar.

5. Cap the sample container tightly and place the prelabeled sample container in a carrier.

6. Replace the well cap.

7. Log all samples in the site logbook and on the field data sheets and label all of the samples.

8. Package samples and complete the necessary paperwork.

9. Transport sample(s) to the decontamination zone for preparation for transport to the analytical laboratory.

10. Upon sampling completion, remove pump and assembly and fully decontaminate the equipment prior to setting it into the next sample well. When possible, dedicate the pump tubing to the well.

7.4.3 Non-Contact Gas Bladder Pumps

Non-contact gas positive displacement bladder pumps are often used when dedicated pumps are required. These pumps are also suitable for shallow (less than 100 feet) wells. They are somewhat difficult to clean, but may be used with dedicated sample tubing to avoid cleaning. These pumps require a power supply and a compressed gas supply (or compressor). They may be operated at variable flow and pressure rates making them ideal for both purging and sampling. Barcelona et al. (1984) and Nielsen and Yeates (1985) report that the non-contact gas positive displacement pumps cause the least amount of alteration in sample integrity as compared to other sample retrieval methods.

1. Allow the well to recharge after purging.

the sampler. The sample may be discharged from the pump outlet directly into the sample container.

4. Cap the sample container tightly and place the prelabeled sample container in a carrier.

5. Replace the well cap.

6. Log all samples in the site logbook and on the field data sheets and label all samples.

7. Package samples and complete necessary paperwork.

8. Upon completion, remove pump and decontaminate or discard, as appropriate.

7.5 Filtering

Samples collected for dissolved metals analysis may require filtration. The filter must be changed or decontaminated between uses. Several types of filters are available. A barrel filter such as the "Geotech" works with a pneumatic (e.g. bicycle) pump, used to build up positive pressure in the chamber containing the sample, which is then forced through the filter paper (minimum size 0.45 μm) into a jar placed underneath. The barrel itself is filled manually from the bailer or directly via the hose of the sampling pump. The pressure must be maintained up to 30 pounds/square inch (lbs/in^2) by periodic pumping.

A vacuum type filter involves two chambers; the upper chamber contains the sample and a filter (minimum size 0.45 μm) divides the chambers. Using a hand pump or a Gillian type pump, air is withdrawn from the lower chamber, creating a vacuum and thus causing the sample to move through the filter into the lower chamber where it is drained into a sample jar. Repeated pumping may be required to drain the entire sample into the lower chamber. If preservation of the sample is necessary, this should be done after filtering.

An in-line filter may be used with a peristaltic pump to transfer the sample from the original sample jar, through the filter, and into a new sample jar. In-line filters are used specifically for the preparation of groundwater samples for dissolved metals analysis, and for filtering large volumes of turbid groundwater. Groundwater samples collected for VOCs are generally not filtered. The filtering of groundwater is performed primarily to allow for the collection of silty or particulate-laden samples that would otherwise interfere with the laboratory analysis. The filters used in groundwater sampling are either cartridge type filters inserted into a reusable housing, or are self-contained and disposable. Disposable filters are preferred and often used to reduce cross-contamination of groundwater samples. Disposable filter chambers are usually constructed of polypropylene material, with an inert filtering material within the housing. Both reusable and disposable filters have barb or national pipe thread (NPT) fittings on the inlet and outlet sides of the housing to connect to ⅜" or ⅝" tubing.

7.6 Special Considerations for VOC Sampling

The volume, in gallons per linear foot, for various standard monitor well diameters can be calculated as follows:

$$V(gal/ft) = \pi r^2 k \quad \text{or} \quad V = 23.5r^2$$

where:

π = 3.14
r = radius of monitoring well (feet)
k = conversion factor (7.48 gal/ft^3)

For a 2-inch diameter well, the volume, in gallons per linear foot, can be calculated as follows:

$$V/\text{linear ft} = \pi r^2 k$$
$$= 3.14\ (1/12)^2\ (7.48\ gal/ft^3)$$
$$= 0.163\ gal/ft$$

The well radius must be in feet to be able to use the equation.

The conversion factors (**f**) for the most common diameter monitor wells are as follows:

Well diameter-inches	2	3	4	6
Volume (gal/ft.)	0.1631	0.3670	0.6528	1.4680

If you use the conversation factors above, Equation 1 should be modified as follows:

Well V = he

where:

h = height of water column (feet)
f = conversion factor

9.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance (QA) activities that apply to the implementation of these procedures. However, the following general QA procedures apply:

1. All sample collection data, including purge methods and time, sample collection methods, times of collection, analyses required, and decontamination procedures (if any) must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration

grounding stake to avoid this problem.

12.0 REFERENCES

Barcelona, M.J., J.A. Helfrich, E.E. Garske, J.P. Gibb. 1984. "A Laboratory Evaluation of Groundwater Sampling Mechanisms." *Groundwater Monitoring Review.* p. 32-41.

Barcelona, M.J., J.A. Helfrich, E.E. Garske. 1985. "Sampling Tubing Effects on Groundwater Samples." *Analytical Chemistry.* Vol. 57. p. 460-463.

Nielsen, David M. and Gillian L. Yeates. 1985. "A Comparison of Sampling Mechanisms Available for Small-Diameter Groundwater Monitoring Wells." *Groundwater Monitoring Review.* p. 83-99.

13.0 APPENDICES

This section does not apply to this SOP.

QAPP APPENDIX D

USEPA DESA HWSB

SOP HW-34A

Hazardous Waste Support Section
SOP No. HW-34A, Revision 0
SOM02.2
Trace Volatile Data Validation

Approvals:

Narendra Kumar
Chemist, Hazardous Waste Support Section

7-6-2015
Date

Philip Cocuzza
Chief, Hazardous Waste Support Section

7/6/15
Date

Jon Gabry
Chief, Hazardous Waste Support Branch

7/6/15
Date

TABLE OF CONTENTS

ACRONYMS

%D	Percent Difference
%RSD	Percent Relative Standard Deviation
ARO	Aroclor
ASB	Analytical Services Branch
BFB	Bromofluorobenzene
CCS	Contract Compliance Screening
CCV	Continuing Calibration Verification
CF	Calibration Factor
CLP	Contract Laboratory Program
CLP PO	Contract Laboratory Program Project Officer
COR	Contracting Officer Representative
CRQL	Contract Required Quantitation Limit
CSF	Complete SDG File
DART	Data Assessment Rapid Transmittal
DAT	Data Assessment Tool
DCB	Decachlorobiphenyl
DFTPP	Decafluorotriphenylphosphine
DMC	Deuterated Monitoring Compound
DQA	Data Quality Assessment
DQO	Data Quality Objective
EDD	Electronic Data Deliverable
EDM	EXES Data Manager
ESAT	Environmental Services Assistance Team
EXES	Electronic Data Exchange and Evaluation System
GC	Gas Chromatograph
GC/ECD	Gas Chromatograph/Electron Capture Detector
GC/MS	Gas Chromatograph/Mass Spectrometer
GPC	Gel Permeation Chromatography
HWSS	Hazardous Waste Support Section
INDA	Individual Standard Mixture A
INDB	Individual Standard Mixture B
INDC	Individual Standard Mixture C
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
OSRTI	Office of Superfund Remediation and Technology Innovation
PCBs	Polychlorinated Biphenyls
PE	Performance Evaluation
PEM	Performance Evaluation Mixture
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAPP	Quality Assurance Project Plan
QC	Quality Control

INTRODUCTION

This document is designed to offer the data reviewer guidance in determining the validity of analytical data generated through the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organics Analysis (SOM02.2), and any future editorial revisions of SOM02.2, hereinafter referred to as the SOM02.2 SOW. This guidance is somewhat limited in scope and is intended to be used as an aid in the formal technical review process.

The guidelines presented in the document will aid the data reviewer in establishing (a) if data meets the specific technical and QC criteria established in the SOW, and (b) the validity and extent of bias of any data not meeting the specific technical and QC criteria established in the SOW. It must be understood by the reviewer that acceptance of data not meeting technical requirements is based upon many factors, including, but not limited to site-specific technical requirements, the need to facilitate the progress of specific projects, and availability for re-sampling.

The reviewer should note that while this document is to be used as an aid in the formal data review process, other sources of guidance and information, as well as **professional judgment**, should also be used to determine the ultimate validity of data, especially in those cases where all data does not meet specific technical criteria.

HWSS DATA VALIDATION PROCESS

After downloading the data package from EDM, the data validator will use the recommendations in this SOP as well as their own professional judgment to validate the data.

The data will be saved in the following location, under the appropriate case number folder:

G:\DESADIV\HWSS\DATA VALIDATION

The file naming conventions will consist of

A. case number	i.e., 12345
B. SDG name	i.e., BXY12
C. level of validation performed	i.e., S3VE

Examples: **12345_BXY12_S3VE.xls**

12345_BXY12_S3VEM.xls

When data validation is completed, the data package is uploaded for the client to download from the HWSS data delivery website.

The completed data package includes the Executive Narrative (see Appendix B for template), the Sample Summary Report (see Appendix C for example), and the Electronic Data Deliverable (EDD) (see Appendix D for an example list of the column headers included in this document). Additional deliverables per modified analysis request and QAPP are also included.

All data is initially marked as "reportable" (Y) in the EDM before validation is begun. Sometimes, due to dilutions, re-analysis, or SIM/scan runs all being performed, there will be multiple results for a single sample. The following criteria and professional judgment are used to determine which results should be reported:

Analysis with a lower CRQL
The analysis with a better QC results
The analysis with a higher result

The analysis values and their respective CRQLs are then transferred to a single sample run. Other runs which are not being used are updated as "Not Reportable" or (N) in the EDM.

Preservation

Action:

1. Qualify sample results using preservation and technical holding time information as follows (see Table 1):
    a. If there is no evidence that the samples were properly preserved (pH < 2, T = 4°C ± 2°C), but the samples were analyzed within the technical holding time [7 days from sample collection], no qualification of the data is necessary.
    b. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [7 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
    c. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
    d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).
2. Whenever possible, the reviewer should comment on the effect of the holding time exceedance on the resulting data in the Data Review Narrative.
3. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2° C or above 6° C.
4. If air bubbles were present in the sample vial used for analysis, qualify detected compounds as estimated (J) and non-detected compounds as estimated (UJ).
5. Note, for Contract Laboratory COR action, when technical holding times are exceeded.

Table 1. Holding Time Actions for Trace Volatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	< 7 days	No qualification	
Aqueous	No	> 7 days	J	R
Aqueous	Yes	< 14 days	No qualification	
Aqueous	Yes	> 14 days	J	R
Aqueous	Samples > 6° C or >2° C upon arrival in the laboratory		Professional Judgment	

Initial Calibration

1. ICAL should be performed at the specified frequency and sequence. Each GC/MS system must be calibrated with a minimum of five concentrations to determine instrument sensitivity and the linearity of GC/MS response for the purgeable target analytes and Deuterated Monitoring Compounds (DMCs).
2. ICAL standards must be analyzed prior to any analysis of samples and required blanks and within 12 hours of the associated instrument performance check at the beginning of each analytical sequence, or as necessary if the CCV acceptance criteria are not met.
3. ICAL standards must contain all required target analytes and DMCs at concentrations of 0.50, 1.0, 5.0, 10, and 20 µg/L for non-ketones, and 5.0, 10, 50, 100, and 200 µg/L for ketones.
4. All three xylene isomers (o-, m-, and p-xylene) must be present in calibration standards. Concentrations for o-xylene must be at 0.50, 1.0, 5.0, 10, and 20 µg/L, while the total concentrations of the m- plus the p-xylene isomers must be at 0.50, 1.0, 5.0, 10, and 20 µg/L
5. The Relative Response Factor (RRF), mean RRF, and Percent Relative Standard Deviation (%RSD) must be calculated for each target analyte and DMC according to the SOW.
6. The RRF for each target analyte and DMC in each ICAL standard must be ≥ Minimum RRF value in Table 2.
7. The %RSD of the ICAL RRF for each target analyte and DMC must be ≤ Maximum %RSD value in Table 2.

NOTE: The technical acceptance criteria specified in a "Request for Quote (RFQ) for Modified Analysis" may impact some of the preceding evaluation criteria. A copy of this document should be present in the SDG, when applicable. Refer to the CLP home page at http://www.epa.gov/oerrpage/superfund/programs/clp/modifiedanalyses.htm for the specific method flexibility requirements.

Table 2. RRF, %RSD, and %D Acceptance Criteria in Initial Calibration and CCV for Trace Volatile Analysis

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Closing Maximum %D
Dichlorodifluoromethane	0.010	30.0	±40.0	±50.0
Chloromethane	0.010	30.0	±30.0	±50.0
Vinyl chloride	0.010	30.0	±30.0	±50.0
Bromomethane	0.010	40.0	±30.0	±50.0
Chloroethane	0.010	30.0	±30.0	±50.0
Trichlorofluoromethane	0.010	30.0	±30.0	±50.0
1,1-Dichloroethene	0.020	30.0	±20.0	±25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	0.010	30.0	±30.0	±50.0

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum $\%D_1$	Closing Maximum %D
Deuterated Monitoring Compound				
Vinyl chloride-d_3	0.010	30.0	±30.0	±50.0
Chloroethane-d_5	0.010	30.0	±30.0	±50.0
1,1-Dichloroethene-d_2	0.010	30.0	±25.0	±25.0
2-Butanone-d_5	0.010	40.0	±40.0	±50.0
Chloroform-d	0.010	20.0	±20.0	±25.0
1,2-Dichloroethane-d_4	0.010	20.0	±25.0	±25.0
Benzene-d_6	0.030	20.0	±20.0	±25.0
1,2-Dichloropropane-d_6	0.100	20.0	±20.0	±25.0
Toluene-d_8	0.200	20.0	±20.0	±25.0
trans-1,3-Dichloropropene-d_4	0.010	30.0	±25.0	±25.0
1,1,2,2- Tetrachloroethane-d_2	0.010	20.0	±25.0	±25.0
1,2-Dichlorobenzene-d_4	0.060	20.0	±20.0	±25.0

[1] If a closing CCV is acting as an opening CCV, all target analytes must meet the requirements for an opening CCV.

Action:

Qualify all volatile target compounds using the following criteria:

a. If any volatile target compound has an RRF value less than the minimum criterion listed in Table 2, use professional judgment for detects, based on mass spectral identification to qualify the data as estimated (J+).
b. If any volatile target compound has an RRF value less than the minimum criterion listed in Table 2 qualify non-detected compounds as unusable (R).
c. If any of the volatile target compounds has %RSD greater than the maximum in table 2, qualify detects as estimated (J), and non-detected compounds using professional judgment (see Action 2).
d. If the volatile target compounds meet the acceptance criteria for RRF and the %RSD, no qualification of the data is necessary.
e. No qualification of the data is necessary on the DMC RRF and %RSD data alone. Use professional judgment and follow the guidelines in Action 2, to evaluate the DMC RRF and %RSD data in conjunction with the DMC recoveries to determine the need for qualification of data.

2. At the reviewer's discretion, and based on the project-specific Data Quality Objectives (DQOs), a more in-depth review may be considered using the following guidelines:
    a. If any volatile target compound has a %RSD greater than the maximum criterion in Table 2 and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:
        i. Qualify detects for that compound(s) as estimated (J).
        ii. Qualify non-detected volatile target compounds using professional judgment.

Continuing Calibration Verification (CCV)

Action:

1. If a CCV (opening and closing) was not run at the appropriate frequency, qualify data using professional judgment.
2. Qualify all volatile target compounds listed in table 2 using the following criteria:
    a. For an opening CCV, if any volatile target compound has an RRF value less than the minimum stated in table 2 above use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J).
    b. For a closing CCV, if any volatile target compound has an RRF value less than stated in the table 2 above use professional judgment for detects based on mass spectral identification to qualify the data as estimated (J).
    c. For an opening CCV, if any volatile target compound has an RRF value less than the minimum stated in table 2 above, qualify non-detected compounds as unusable (R).
    d. For a closing CCV, if any volatile target compound has an RRF value less than the limit stated in table 2 above, qualify non-detected compounds as unusable (R).
    e. For an opening CCV, if the Percent Difference value for any of the volatile target compounds is outside the limits stated in table 2 above, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
    f. For a closing CCV, if the Percent Difference value for any of the volatile target compounds is outside the limit listed in Table 2, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
    g. If the volatile target compounds meet the acceptable criteria for RRF and the Percent Difference, no qualification of the data is necessary.
    h. No qualification of the data is necessary on the DMC RRF and the Percent Difference data alone. Use professional judgment to evaluate the DMC RRF and Percent Difference data in conjunction with the DMC recoveries to determine the need for qualification of data.
3. If the laboratory has failed to provide adequate calibration information, the Region's designated representative should contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.
4. Note in the Data Review Narrative, whenever possible, the potential effects on the data due to calibration criteria exceedance.
5. Note, for Laboratory COR action, if calibration criteria are grossly exceeded.

Blanks

Action:

NOTES: The concentration of each target compound found in the storage, method, field, or trip blanks must be less than its CRQL listed in the method, except for methylene chloride, acetone, and 2-butanone, which must be less than 2x their respective CRQLs. The concentration of non-target compounds in all blanks must be less than 0.5 µg/L.
Data concerning the field or trip blanks are not evaluated as part of the CCS process. If field or trip blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

"Water blanks, "drill blanks", and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

Action regarding unsuitable blank results depends on the circumstances and origin of the blank. The method blank, like any other sample in the SDG, must meet the technical acceptance criteria for sample analysis. In instances where more than one of the same type of blank is associated with a given sample, qualification should be based upon a comparison with the associated blank having the highest concentration of a contaminant. Do not correct the results by subtracting any blank value.

1. If a volatile compound is found in a method blank, but not found in the sample, no qualification of the data is necessary (Table 5).
2. If the method , storage, field, or trip blanks contain a listed volatile Target compound(s) (TCL) at a concentration less than the CRQL (less than 2x the CRQL for methylene chloride, 2-butanone, and acetone) and:
    a. The sample concentration is less than the CRQL (less than 2x the CRQL for methylene chloride, 2-butanone, and acetone), report the CRQL value with a "U".
    b. The sample concentration is greater than or equal to the CRQL (greater than or equal to 2x the CRQL for methylene chloride, 2-butanone, and acetone), and less than 2x the CRQL (less than 4x the CRQL for methylene chloride, 2-butanone, and acetone), report the concentration of the compound in the sample and qualify with a "U".
    c. The sample concentration is greater than or equal to 2x the CRQL (greater than or equal to 4x the CRQL for methylene chloride, 2-butanone, and acetone), no qualification of the data is necessary.
3. If the method, storage, field, or trip blanks contain a volatile TCL compound(s) at a concentration greater than the CRQL (greater than 2x the CRQL for methylene chloride, 2-butanone, and acetone) and:
    a. The sample concentration is less than the CRQL (less than 2x the CRQL for methylene chloride, 2-butanone, and acetone), report the CRQL value with a "U".
    b. The sample concentration is greater than or equal to the CRQL (greater than or equal to 2x the CRQL for methylene chloride, 2-butanone, and acetone), and less

Table 5. Blank Actions for Trace Volatiles Analyses

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Storage, Field, Trip, Instrument***	Detects	Not detected	No qualification required
	< CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL* and < 2x the CRQL**	Report concentration of sample with a U
		≥ 2x the CRQL**	No qualification required
	> CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL* and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL* and > blank concentration	No qualification required
	= CRQL*	≤ CRQL*	Report CRQL value with a U
		> CRQL*	No qualification required
	Gross contamination **	Detects	Report blank value for sample concentration with a U

* 2x the CRQL for methylene chloride, 2-butanone and acetone.

** 4x the CRQL for methylene chloride, 2-butanone, and acetone.

*** Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 µg/L.

concern is whether the blank problems represent an isolated problem with the blank alone, or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence. However, even if this judgment allows some use of the affected data, note analytical problems for Laboratory COR action.

6. If more than three DMCs are outside of the recovery limits for trace volatiles analysis and the sample was not reanalyzed, note under Contract Problems/Non-Compliance.

Table 7. Deuterated Monitoring Compound (DMC) Recovery Actions for Trace Volatiles Analyses

Criteria	Action	
	Detect	**Non-detect**
%R < 10%	J-	R
10% ≤ %R < Lower Acceptance Limit	J-	UJ
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

Table 8. Volatile Deuterated Monitoring Compounds (DMCs) and the Associated Target Compounds

Vinyl chloride-d_3 (DMC-1)	**Chloroethane-d_5 (DMC-2)**	**1,1-Dichloroethene-d_2 (DMC-3)**
Vinyl chloride	Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon disulfide	trans-1,2-Dichloroethene cis-1,2-Dichloroethene 1,1-Dichloroethene
2-Butanone-d_5 (DMC-4)	**Chloroform-d (DMC-5)**	**1,2-Dichloroethane-d_4 (DMC-6)**
Acetone 2-Butanone	1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl acetate Methylene chloride Methyl-tert-butyl ether 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dibromoethane 1,2-Dichloroethane
Benzene-d_6 (DMC-7)	**1,2-Dichloropropane-d_6 (DMC-8)**	**Toluene-d_8 (DMC-9)**
Benzene	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylene m,p-Xylene Styrene Isopropylbenzene

Matrix Spike/Matrix Spike Duplicates (MS/MSDs)

Action:

NOTES: Data for MS and MSDs will not be present unless requested by the Region. Notify the Laboratory COR if a field or trip blank was used for the MS and MSD.

NOTE: For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

1. No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

Table 9. Internal Standard Actions for Trace Volatiles Analyses

Criteria	Action	
	Detect	Non-detect
Area response < 20% of the opening CCV or mid-point standard CS3 from initial calibration	J+	R
20% ≤ Area response < 50% of the opening CCV or mid-point standard CS3 from initial calibration	J+	UJ
50% ≤ Area response ≤ 200% of the opening CCV or mid-point standard CS3 from initial calibration	No qualification	No qualification
Area response > 200% of the opening CCV or mid-point standard CS3 from initial calibration	J-	No qualification
RT shift between sample/blank and opening CCV or mid-point standard CS3 from initial calibration > 10.0 seconds	R	R

* For volatile compounds associated to each internal standard, see Table 3 - Trace Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM02.2, Exhibit D, available at: http://www.epa.gov/superfund/programs/clp/som2.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

Target Compound Identification

Action:

1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).
2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.
3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Laboratory COR action, the necessity for numerous or significant changes.

Compounds Quantitation and Reported Contract Required Quantitation Limits (CRQLs)

Action:

1. When a sample is analyzed at more than one dilution, the lowest CRQLs are used unless a QC exceedance dictates the use of the higher CRQLs from the diluted sample. Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from the diluted sample.
2. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
3. Note, for laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
4. Results between MDL and CRQL should be qualified as estimated "J".
5. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves are not reported.

System Performance

Action:

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Note, for Contract Laboratory Program Project Officer (CLP PO) action, any degradation of system performance which significantly affected the data.

Overall Assessment of Data

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Note, for the Laboratory COR action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

Contract Laboratory Program (CLP) -- Supports the USEPA's Superfund effort by providing a range of state-of-the-art chemical analytical services of known quality. This program is directed by the Analytical Services Branch (ASB) of the Office of Superfund Remediation and Technical Innovation (OSRTI) of USEPA.
Laboratory COR -- The Regional USEPA official responsible for monitoring laboratory performance and/or requesting analytical data or services from a CLP laboratory.
Contract Required Quantitation Limit (CRQL) -- Minimum level of quantitation acceptable under the contract Statement of Work (SOW).
Duplicate -- A second aliquot of a sample that is treated the same as the original sample in order to determine the precision of the method.
Field Blank -- Any sample that is submitted from the field and identified as a blank. A field blank is used to check for cross-contamination during sample collection, sample shipment, and in the laboratory. A field blank includes trip blanks, rinsate blanks, bottle blanks, equipment blanks, preservative blanks, decontamination blanks, etc.
Field Duplicate -- A duplicate sample generated in the field, not in the laboratory.
Holding Time -- The maximum amount of time samples may be held before they are processed.
Contractual -- The maximum amount of time that the Contract Laboratory Program (CLP) laboratory may hold the samples from the sample receipt date until analysis and still be in compliance with the terms of the contract, as specified in the CLP Analytical Services Statement of Work (SOW). These times are the same or less than technical holding times to allow for sample packaging and shipping.
Technical -- The maximum amount of time that samples may be held from the collection date until analysis.
Initial Calibration -- Analysis of analytical standards for a series of different specified concentrations to define the quantitative response, linearity, and dynamic range of the instrument to target analytes.
Initial Calibration Verification (ICV) -- Solution(s) prepared from stock standard solutions, metals, or salts obtained from a source separate from that utilized to prepare the calibration standards. The ICV is used to verify the concentration of the calibration standards and the adequacy of the instrument calibration. The ICV should be traceable to National Institute of Standards and Technology (NIST) or other certified standard sources when USEPA ICV solutions are not available.
Internal Standard -- A non-target element added to a sample at a known concentration after preparation but prior to analysis. Instrument responses to internal standards are monitored as a means of assessing overall instrument performance.
Matrix -- The predominant material of which the sample to be analyzed is composed. For the purposes of this document, the matrices are aqueous/water, soil/sediment, wipe, and filter.
Matrix Spike -- Introduction of a known concentration of analyte into a sample to provide information about the effect of the sample matrix on the digestion and measurement methodology (also identified as a pre-distillation/digestion spike).
Method Detection Limit (MDL) -- The concentration of a target parameter that, when a sample is processed through the complete method, produces a signal with 99 percent probability that it is different from the blank. For 7 replicates of the sample, the mean value must be 3.14s above the blank, where "s" is the standard deviation of the 7 replicates.
Narrative (SDG Narrative) -- Portion of the data package which includes laboratory, contract, Case, Sample Number identification, and descriptive documentation of any problems

APPENDIX B: ORGANIC DATA EXECUTIVE NARRATIVE TEMPLATE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
DESA/HWSB/HWSS
2890, Woodbridge Avenue, Edison, NJ 08837

EXECUTIVE NARRATIVE

Case No. :
Site:
Number of Samples:
Analysis:

SDG No.:
Laboratory:
Sampling dates:

QAPP
HWSS #:
Contractor Document #:

SUMMARY:

Critical: Results have an unacceptable level of uncertainty and should not be used for making decisions. Data have been qualified "R" rejected.
Major: A level of uncertainty exists that may not meet the data quality objectives for the project. A bias is likely to be present in the results. Data has been qualified "J" estimated.
Minor: The level of uncertainty is acceptable. No significant bias in the data was observed.

Critical Findings:

Major Findings:

Minor Findings:

COMMENT:

Reviewer Name(s):

Approver's Signature: Date:

Name:

Affiliation: USEPA/R2/HWSB/HWSS

Page 1 of 3

APPENDIX D: ELECTRONIC DATA DELIVERABLE TEMPLATE

DATA_PROVIDER	LAB_MATRIX_CODE	RESULT_UNIT
SYS_SAMPLE_CODE	ANAL_LOCATION	DETECTION_LIMIT_UNIT
SAMPLE_NAME	BASIS	TIC_RETENTION_TIME
SAMPLE_MATRIX_CODE	CONTAINER_ID	RESULT_COMMENT
SAMPLE_TYPE_CODE	DILUTION_FACTOR	QC_ORIGINAL_CONC
SAMPLE_SOURCE	PREP_METHOD	QC_SPIKE_ADDED
PARENT_SAMPLE_CODE	PREP_DATE	QC_SPIKE_MEASURED
SAMPLE_DEL_GROUP	LEACHATE_METHOD	QC_SPIKE_RECOVERY
SAMPLE_DATE	LEACHATE_DATE	QC_DUP_ORIGINAL_CONC
SYS_LOC_CODE	LAB_NAME_CODE	QC_DUP_SPIKE_ADDED
START_DEPTH	QC_LEVEL	QC_DUP_SPIKE_MEASURED
END_DEPTH	LAB_SAMPLE_ID	QC_DUP_SPIKE_RECOVERY
DEPTH_UNIT	PERCENT_MOISTURE	QC_RPD
CHAIN_OF_CUSTODY	SUBSAMPLE_AMOUNT	QC_SPIKE_LCL
SENT_TO_LAB_DATE	SUBSAMPLE_AMOUNT_UNIT	QC_SPIKE_UCL
SAMPLE_RECEIPT_DATE	ANALYST_NAME	QC_RPD_CL
SAMPLER	INSTRUMENT_ID	QC_SPIKE_STATUS
SAMPLING_COMPANY_CODE	COMMENT	QC_DUP_SPIKE_STATUS
SAMPLING_REASON	PRESERVATIVE	QC_RPD_STATUS
SAMPLING_TECHNIQUE	FINAL_VOLUME	BREAK_2
TASK_CODE	FINAL_VOLUME_UNIT	SYS_SAMPLE_CODE
COLLECTION_QUARTER	CAS_RN	LAB_ANL_METHOD_NAME
COMPOSITE_YN	CHEMICAL_NAME	ANALYSIS_DATE
COMPOSITE_DESC	RESULT_VALUE	TOTAL_OR_DISSOLVED
SAMPLE_CLASS	RESULT_ERROR_DELTA	COLUMN_NUMBER
CUSTOM_FIELD_1	RESULT_TYPE_CODE	TEST_TYPE
CUSTOM_FIELD_2	REPORTABLE_RESULT	TEST_BATCH_TYPE
CUSTOM_FIELD_3	DETECT_FLAG	TEST_BATCH_ID
COMMENT	LAB_QUALIFIERS	CASE
BREAK_1	VALIDATOR_QUALIFIERS	CONTRACT_NUM
SYS_SAMPLE_CODE	INTERPRETED_QUALIFIERS	SCRIBE_SAMPLE_ID
LAB_ANL_METHOD_NAME	ORGANIC_YN	SAMPLE_TIME
ANALYSIS_DATE	METHOD_DETECTION_LIMIT	FRACTION
TOTAL_OR_DISSOLVED	REPORTING_DETECTION_LIMIT	PH
COLUMN_NUMBER	QUANTITATION_LIMIT	DATA_VAL_LABEL
TEST_TYPE		

QAPP APPENDIX E

USEPA DESA HWSB

SOP HW-37A

Hazardous Waste Support Section
SOP No. HW-37A Revision 0
SOM02.2
Polychlorinated Biphenyl (PCB) Aroclor Data Validation

Approvals:

Russell Arnone
Chemist, Hazardous Waste Support Section

06/30/15
Date

Philip Cocuzza
Chief, Hazardous Waste Support Section

6/29/15
Date

Jon Gabry
Chief, Hazardous Waste Support Branch

7/1/15
Date

TABLE OF CONTENTS

ACRONYMS

%D	Percent Difference
%RSD	Percent Relative Standard Deviation
ARO	Aroclor
ASB	Analytical Services Branch
BFB	Bromofluorobenzene
CCS	Contract Compliance Screening
CCV	Continuing Calibration Verification
CF	Calibration Factor
CLP	Contract Laboratory Program
CLP PO	Contract Laboratory Program Project Officer
CRQL	Contract Required Quantitation Limit
CSF	Complete SDG File
DART	Data Assessment Rapid Transmittal
DAT	Data Assessment Tool
DCB	Decachlorobiphenyl
DFTPP	Decafluorotriphenylphosphine
DMC	Deuterated Monitoring Compound
DQA	Data Quality Assessment
DQO	Data Quality Objective
EDD	Electronic Data Deliverable
EDM	EXES Data Manager
ESAT	Environmental Services Assistance Team
EXES	Electronic Data eXchange and Evaluation System
GC	Gas Chromatograph
GC/ECD	Gas Chromatograph/Electron Capture Detector
GC/MS	Gas Chromatograph/Mass Spectrometer
GPC	Gel Permeation Chromatography
HWSS	Hazardous Waste Support Section
INDA	Individual Standard Mixture A
INDB	Individual Standard Mixture B
INDC	Individual Standard Mixture C
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
OSRTI	Office of Superfund Remediation and Technology Innovation
PCBs	Polychlorinated Biphenyls
PE	Performance Evaluation
PEM	Performance Evaluation Mixture
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAS	Routine Analytical Services
RIC	Reconstructed Ion Chromatogram

INTRODUCTION

This document is designed to offer the data reviewer guidance in determining the validity of analytical data generated through the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organics Analysis (SOM02.2), and any future editorial revisions of SOM02.2, hereinafter referred to as the SOM02.2 SOW. This guidance is somewhat limited in scope and is intended to be used as an aid in the formal technical review process.

The guidelines presented in the document will aid the data reviewer in establishing (a) if data meets the specific technical and QC criteria established in the SOW, and (b) the validity and extent of bias of any data not meeting the specific technical and QC criteria established in the SOW. It must be understood by the reviewer that acceptance of data not meeting technical requirements is based upon many factors, including, but not limited to site-specific technical requirements, the need to facilitate the progress of specific projects, and availability for re-sampling.

The reviewer should note that while this document is to be used as an aid in the formal data review process, other sources of guidance and information, as well as **professional judgment**, should also be used to determine the ultimate validity of data, especially in those cases where all data does not meet specific technical criteria.

HWSS DATA VALIDATION PROCESS

After downloading the data package from EDM, the data validator will use the recommendations in this SOP as well as their own professional judgment to validate the data.

All data is initially marked as "reportable" (Y) in EDM before validation is begun. Sometimes, due to dilutions, re-analyses, or SIM/scan runs all being performed, there will be multiple results for a single analyte from a single sample. The following criteria and professional judgment are used to determine which result should be reported:

The analysis with the lower CRQL
The analysis with the better QC results
The analysis with the higher result

The analyte values and their respective CRQLs are then transferred into a single sample run. The runs that are not to be used are updated as "not reportable" or (N) in EDM.

The data will be saved in the following location, under the appropriate case number folder:

G:\DESADIV\HWSS\DATA VALIDATION

The file naming conventions will consist of

A. case number	i.e., 12345
B. SDG name	i.e., BXY12
C. level of validation performed	i.e., S3VE

Examples: **12345_BXY12_S3VE.xls**

12345_BXY12_S3VEM.xls

When data validation is completed, the data package is uploaded for the client to download from the HWSS data delivery website:

The completed data package includes the Executive Narrative (see Appendix B for template), the Sample Summary Report (see Appendix C for example), and the Electronic Data Deliverable (EDD) (see Appendix D for a list of the column headers included in this document).

Preservation

Action:

1. Qualify aqueous sample results using preservation and technical holding time information as follows (see Table 1):
    a. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed within the technical holding times [seven (7) days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as estimated (J) and non-detects as estimated (UJ).
    b. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed outside the technical holding times [seven (7) days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as estimated (J) and non-detects as estimated (UJ).
    c. If the samples were properly preserved, and were extracted and analyzed within the technical holding times [seven (7) days from sample collection for extraction; 40 days from sample collection for analysis], no qualification of the data is necessary.
    d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding times [seven (7) days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.
2. Qualify non-aqueous sample results using preservation and technical holding time information as follows (see Table 1):
    a. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed within the technical holding time [14 days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as estimated (J) and non-detects as estimated (UJ).
    b. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed outside the technical holding time [14 days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as estimated (J) and non-detects as estimated (UJ).
    c. If the samples were properly preserved, and were extracted and analyzed within the technical holding time [14 days from sample collection for extraction; 40 days from sample collection for analysis], no qualification of the data is necessary.
    d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding time [14 days from sample collection for extraction; 40 days from sample collection for analysis], qualify detects as

Initial Calibration

Action:

NOTE: Either peak area or peak height may be used to calculate the Calibration Factors (CFs) that are, in turn, used to calculate %RSD. However, the type of peak measurement used to calculate each CF for a given compound must be consistent. For example, if peak area is used to calculate the CS1 CF for a given peak of a certain Aroclor, the remaining CFs for the same peak in the remaining standards (CS2-CS5) for that Aroclor must also be calculated using peak area.

1. If the proper initial calibration sequence is not performed, or the steps of the initial calibration are not followed in the proper sequence, use professional judgment to evaluate the effect on the data, note in the data assessment, and notify the Contract Laboratory Program Project Officer (CLP PO) (see Table 2). This is especially critical for the low-level standards and non-detects.
2. If RT Windows are not calculated correctly, recalculate the windows and use the corrected values for all evaluations.
3. At least one chromatogram from each of the Aroclor Standards must yield peaks that give recorder deflections between 50-100% of full scale. If the chromatogram display (recorder deflection) criteria are not met, use professional judgment to evaluate the effect on the data.
4. The five standards containing the Aroclors should be prepared at the following concentrations 100, 200, 400, 800, and 1600 ng/mL and surrogates at 5.0, 10, 20, 40 and 80 ng/mL for TCX and 10, 20, 40, 80 and 160 ng/mL for DCB. If the standard concentration criteria are not met, use professional judgment to evaluate the effect on the data and notify the CLP PO. This is especially critical for the low-level standards and non-detects.
5. The %RSD of the CFs for the three to five major peaks of each of the Aroclor compounds and the two surrogates must be less than or equal to 20.0%. If the %RSD criteria are not met, qualify detects as estimated (J) and non-detected target compounds as estimated (UJ).
6. If the %RSD criteria are within allowable limits, no qualification of the data is necessary.
7. At the reviewer's discretion, and based on the project-specific data quality objectives, consider a more in-depth review using the following guidelines:
    a. If any Aroclor peak has a %RSD greater than the maximum criterion, and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:
        i. Qualify detects for that Aroclor as estimated (J).
        ii. Qualify non-detected Aroclor using professional judgment.
    b. If the high-point of the curve is outside of the linearity criteria (e.g., due to saturation):
        i. No qualifiers are required for detects in the linear portion of the curve.
        ii. Qualify detects outside of the linear portion of the curve as estimated (J).
        iii. No qualifiers are required for Aroclors that were not detected.

Continuing Calibration Verification (CCV)

Action:

1. RT Windows are used in qualitative identification. If the standards do not fall within the RT Windows, carefully evaluate the associated sample results (see Table 3). All samples injected after the last in-control standard are potentially affected.
    a. For non-detected target compounds in the affected samples, check to see if the sample chromatograms contain any peaks that are close to the expected RT Window of the Aroclor of interest.
        i. If no peaks are present, consider non-detected values to be valid and no qualification of the data is necessary.
        ii. If any peaks are present close to the expected RT Window of the Aroclor of interest, use professional judgment to qualify the non-detects as presumptively present (N).
    b. For detected compounds in the affected samples, if the peaks are within the RT Window, no qualification of the data is necessary. However, if the peaks are close to the expected RT Window of the Aroclor of interest, the reviewer may take additional effort to determine if sample peaks represent the compounds of interest.
    For example, the reviewer can examine the data package for the presence of three or more standards containing the Aroclor of interest that were run within the analytical sequence during which the sample was analyzed. If three or more such standards are present, the RT Window can be re-evaluated using the Mean Retention Times ($\overline{RT}$s) of the standards.
        i. If the peaks in the affected sample fall within the revised window, qualify the detected target compounds as tentatively identified (NJ).
        ii. If the reviewer cannot do anything with the data to resolve the problem of concern, qualify all non-detects as unusable (R).
2. For the opening CCV, or closing CCV that is used as an opening CCV for the next 12-hour period, the %D between the CF of each of the three to five peaks used to identify an Aroclor and surrogates in the mid-point concentration (CS3) of the Aroclor Standards and the CF from the initial calibration must be within ±25.0% and ±30.0% for surrogates. If the %D is not within ± 25% qualify associated detects as estimated (J) and non-detects as estimated (UJ).
3. For a closing CCV, the Percent Difference between the CF of each of the three to five peaks used to identify an Aroclor and surrogates in the mid-point concentration (CS3) of the Aroclor Standards and the CF from the initial calibration must be within ±50.0%. If the %D is not within ± 50%, qualify associated detects as estimated (J) and non-detects as estimated (UJ).
4. If more than 14 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of the last mid-point concentration (CS3) of the Aroclor Standards that ends an analytical sequence (closing CCV), qualify all data as unusable (R).

Blanks

Action:

NOTES: The concentration of any target Aroclor or interfering peak found in the method, instrument, or sulfur cleanup blanks must be less than its CRQL.
Data concerning the field blanks are not evaluated as part of the CCS process. If field blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

NOTES: "Water blanks, "drill blanks", and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.
All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for system monitoring compounds, instrument performance criteria, and spectral or calibration QC problems.
Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Samples taken from a drinking water tap do not have associated field blanks.
When applied as described in Table 4 below, the contaminant concentration in the blank is multiplied by the sample dilution factor.

Action regarding unsuitable blank results depends on the circumstances and origin of the blank. In instances where more than one of the same type of blank is associated with a given sample, qualification should be based upon a comparison with the associated blank having the highest concentration of a contaminant. Do not correct the results by subtracting any blank value.

1. If a target Aroclor compound is found in a method blank, but not found in the sample, no qualification of the data is necessary (see Table 4).
2. If a target Aroclor compound concentration in a method or field blank is less than the CRQL and:
    a. the sample concentration is less than the CRQL, report the CRQL value with a "U".
    b. the sample concentration is greater than or equal to the CRQL, no qualification is required.
3. If a target Aroclor compound concentration in a method or field blank is greater than the CRQL and:
    a. the sample concentration is less than the CRQL, report the CRQL value with a "U".
    b. the sample concentration is greater than or equal to the CRQL, and less than or equal to the blank concentration, report the concentration of the compound in the sample at the same concentration found in the blank and qualify with a "U".
    c. the sample concentration is greater than or equal to the CRQL and greater than the blank concentration, no qualification is required.

Table 4. Blank Actions for Aroclor Analyses

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Sulfur Cleanup, Instrument, Field, TCLP/SPLP	Detects	Not detected	No qualification required
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	No qualification required
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL and > blank concentration	No qualification required
	= CRQL	≤ CRQL	Report CRQL value with a U
		> CRQL	No qualification required
	Gross contamination	Detects	Report blank value for sample concentration with a U

Table 5. Surrogate Actions for Aroclor Analyses

Criteria	Action*	
	Detected Target Compounds	**Non-detected Target Compounds**
%R > 150%	J+	No qualification
30% < %R < 150%	No qualification	
10% < %R < 30%	J-	UJ
%R < 10% (sample dilution not a factor)	J-	R
%R < 10% (sample dilution is a factor)	Use professional judgment	
RT out of RT window	Use professional judgment	
RT within RT window	No qualification	

* Use professional judgment in qualifying data, as surrogate recovery problems may not directly apply to target analytes.

Laboratory Control Samples (LCSs)

Table 6. Aroclor Laboratory Control Sample (LCS) Recovery

LCS Spike Compound	Recovery Limits (%)
Aroclor 1016	50 – 150
Aroclor 1260	50 – 150
Tetrachloro-m-xylene (surrogate)	30 – 150
Decachlorobiphenyl (surrogate)	30 – 150

Action:

NOTE: All samples prepared and analyzed with an LCS that does not meet the technical acceptance criteria in the method will require re-extraction and re-analysis.

If the LCS criteria are not met, laboratory performance and method accuracy are in question. Use professional judgment to determine if the data should be qualified or rejected. The following guidance is suggested for qualifying sample data for which the associated LCS does not meet the required criteria (see Table 7).

1. If the LCS recovery criteria are not met, use the LCS results to qualify sample data for the specific compounds that are included in the LCS solution.
    a. If the LCS recovery exceeds the upper acceptance limit, qualify detected target compounds as estimated (J). Do not qualify non-detected target compounds.
    b. If the LCS recovery is less than the lower acceptance limit, qualify detected target compounds as estimated (J) and non-detects as unusable (R).
    c. Use professional judgment to qualify data for compounds other than those compounds that are included in the LCS.
    d. Use professional judgment to qualify non-LCS compounds. Take into account the compound class, compound recovery efficiency, analytical problems associated with each compound, and comparability in the performance of the LCS compound to the non-LCS compound.
2. If the LCS recovery is within allowable limits, no qualification of the data is necessary.
3. Note, for Contract Laboratory Program Project Officer (CLP PO) action, if a laboratory fails to analyze an LCS with each Sample Delivery Group (SDG), or if the reviewer has knowledge that a laboratory consistently fails to generate acceptable LCS recoveries.

Target Compound Identification

Criteria:

1. The Retention Times (RTs) of both of the surrogates and reported target compounds in each sample must be within the calculated RT Windows on both columns. Tetrachloro-m-xylene (TCX) must be within ±0.05 minutes of the Mean RT ($\overline{RT}$) determined from the initial calibration and Decachlorobiphenyl (DCB) must be within ±0.10 minutes of the $\overline{RT}$ determined from the initial calibration.
2. The Percent Difference (%D) for the detected mean concentrations of an Aroclor target compound between the two Gas Chromatograph (GC) columns must be within the inclusive range of ±25.0.
3. When no analytes are identified in a sample, the chromatograms from the analyses of the sample extract must use the same scaling factor as was used for the low-point standard of the initial calibration associated with those analyses.
4. Chromatograms must display the largest peak of any Aroclors detected in the sample at less than full scale.
5. If an extract must be diluted, chromatograms must display Aroclors peaks between 25-100% of full scale.
6. If a chromatogram is replotted electronically to meet these requirements, the scaling factor used must be displayed on the chromatogram, and both the initial chromatogram and the replotted chromatogram must be submitted in the data package.

Action:

1. If the qualitative criteria for both columns were <u>not</u> met, all target compounds that are reported as detected should be considered non-detected. The reviewer should use professional judgment to assign an appropriate quantitation limit using the following guidance:
   a. If the detected target compound peak was sufficiently outside the Aroclor RT Window, the reported values may be a false positive and should be replaced with the sample Contract Required Quantitation Limits (CRQL) value.
   b. If the detected target compound peak poses an interference with potential detection of another target peak, the reported value should be considered and qualified as unusable (R).
2. If the data reviewer identifies a peak in both GC column analyses that falls within the appropriate RT Windows, but was reported as a non-detect, the compound may be a false negative. Use professional judgment to decide if the compound should be included. Note in the Data Review Narrative all conclusions made regarding target compound identification.
3. If the Aroclor peak RT windows determined from the calibration overlap with chromatographic interferences, use professional judgment to qualify the data.
4. If Aroclors were detected on both GC columns, and the Percent Difference between the two results is greater than 25.0%, consider the potential for coelution and use professional judgment to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering

Gas Chromatograph/Mass Spectrometer (GC/MS) Confirmation

Action:

NOTE: This confirmation is not usually provided by the laboratory. In cases where it is provided, use professional judgment to determine if data qualified with "C" can be salvaged if it was previously qualified as unusable (R).

1. If the quantitative criteria for both columns were met (≥ 10 ng/µL), determine whether GC/MS confirmation was performed. If it was performed, qualify the data using the following guidance (see Table 9):
    a. If GC/MS confirmation was not required because the quantitative criteria for both columns was not met, but it was still performed, use professional judgment when evaluating the data to decide whether the detect should be qualified with "C".
    b. If GC/MS confirmation was performed, but unsuccessful for a target compound detected by GC/ECD analysis, qualify those detects as "X".

Table 9. Gas Chromatograph/Mass Spectrometer (GC/MS) Confirmation Actions

Criteria	Action
Aroclor peak was confirmed by GC/MS	Detects C
Aroclor peak was not confirmed by GC/MS	Detects X

Field Duplicates

Action:

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. If large RPDs (> 50%) is observed, confirm identification of samples and note difference in the executive summary.

APPENDIX A: GLOSSARY

Analyte -- The element of interest, ion, or parameter an analysis seeks to determine.
Analytical Services Branch (ASB) -- Directs the Contract Laboratory Program (CLP) from within the Office of Superfund Remediation and Technical Innovation (OSRTI) in the Office of Solid Waste and Emergency Response (OSWER).
Analytical Sample -- Any solution or media introduced into an instrument on which an analysis is performed excluding instrument calibration, Initial Calibration Verification (ICV), Initial Calibration Blank (ICB), Continuing Calibration Verification (CCV), and Continuing Calibration Blank (CCB). Note that the following are all defined as analytical samples: undiluted and diluted samples (USEPA and non-USEPA); Matrix Spike samples; duplicate samples; serial dilution samples, analytical (post-digestion/post-distillation) spike samples; Interference Check Samples (ICSs); Laboratory Control Samples (LCSs); and Preparation Blanks.
Associated Samples -- Any sample related to a particular Quality Control (QC) analysis. For example, for Initial Calibration Verification (ICV), all samples run under the same calibration curve. For duplicates, all Sample Delivery Group (SDG) samples digested/distilled of the same matrix.
Blank -- A sample designed to assess specific sources of contamination. See individual definitions for types of blanks.
Calibration -- The establishment of an analytical curve based on the absorbance, emission intensity, or other measured characteristic of known standards. The calibration standards are to be prepared using the same type of reagents or concentration of acids as used in the sample preparation.
Calibration Blank -- A blank solution containing all of the reagents in the same concentration as those used in the analytical sample preparation. This blank is not subject to the preparation method.
Calibration Curve -- A plot of instrument response versus concentration of standards.
Calibration Standards -- A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve). The solutions may or may not be subjected to the preparation method, but contain the same matrix (i.e., the same amount of reagents and/or preservatives) as the sample preparations to be analyzed.
Case -- A finite, usually predetermined number of samples collected over a given time period from a particular site. Case numbers are assigned by the Sample Management Office (SMO). A Case consists of one or more Sample Delivery Groups (SDGs).
Contract Compliance Screening (CCS) -- A screening of electronic and hardcopy data deliverables for completeness and compliance with the contract. This screening is performed under USEPA direction by the Contract Laboratory Program (CLP) Sample Management Office (SMO) contractor.
Continuing Calibration Verification (CCV) -- A single parameter or multi-parameter standard solution prepared by the analyst and used to verify the stability of the instrument calibration with time, and the instrument performance during the analysis of samples. The CCV can be one of the calibration standards. However, all parameters being measured by the particular system must be represented in this standard and the standard must have the same matrix (i.e., the same amount of reagents and/or preservatives) as the samples.

Narrative (SDG Narrative) -- Portion of the data package which includes laboratory, contract, Case, Sample Number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution.

Office of Solid Waste and Emergency Response (OSWER) – The USEPA office that provides policy, guidance, and direction for the USEPA's solid waste and emergency response programs, including Superfund.

Percent Difference (%D) -- As used in this document and the Statement of Work (SOW), is used to compare two values. The difference between the two values divided by one of the values.

Performance Evaluation (PE) Sample -- A sample of known composition provided by USEPA for contractor analysis. Used by USEPA to evaluate Contractor performance.

Preparation Blank -- An analytical control that contains reagent water and reagents, which is carried through the entire preparation and analytical procedure.

Relative Percent Difference (RPD) -- As used in this document and the Statement of Work (SOW) to compare two values, the RPD is based on the mean of the two values, and is reported as an absolute value (i.e., always expressed as a positive number or zero).

Regional Sample Control Center Coordinator (RSCC) -- In USEPA Regions, coordinates sampling efforts and serves as the central point-of-contact for sampling questions and problems. Also assists in coordinating the level of Regional sampling activities to correspond with the monthly projected demand for analytical services.

Relative Standard Deviation (RSD) -- As used in this document and the Statement of Work (SOW), the mean divided by the standard deviation, expressed as a percentage.

Sample -- A single, discrete portion of material to be analyzed, which is contained in single or multiple containers and identified by a unique Sample Number.

Sample Delivery Group (SDG) -- A unit within a sample Case that is used to identify a group of samples for delivery. An SDG is defined by the following, whichever is most frequent:

a. Each 20 field samples [excluding Performance Evaluation (PE) samples] within a Case; or
b. Each 7 calendar day period (3 calendar day period for 7-day turnaround) during which field samples in a Case are received (said period beginning with the receipt of the first sample in the SDG).
c. Scheduled at the same level of deliverable.

In addition, all samples and/or sample fractions assigned to an SDG must be scheduled under the same contractual turnaround time. Preliminary Results have **no impact** on defining the SDG. Samples may be assigned to SDGs by matrix (i.e., all soil/sediment samples in one SDG, all aqueous/water samples in another) at the discretion of the laboratory.

Sample Management Office (SMO) -- A contractor-operated facility operated under the SMO contract, awarded and administered by the USEPA. Provides necessary management, operations, and administrative support to the Contract Laboratory Program (CLP).

Statement of Work (SOW) -- A document which specifies how laboratories analyze samples under a particular Contract Laboratory Program (CLP) analytical program.

APPENDIX C: SAMPLE ORGANIC DATA SAMPLE SUMMARY

Case No:	00001	Contract:	XY1234	SDG No:	XY123	Lab Code:	00001
Sample Number:	ABLKMJ	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:		pH:		Sample Date:		Sample Time:	
% Moisture :	0			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1221	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1232	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1242	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1248	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1254	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1260	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1262	33	ug/kg	1.0	U	U	Yes	S3VEM
Aroclor-1268	33	ug/kg	1.0	U	U	Yes	S3VEM

APPENDIX B

Well Sheets

WELL DATA SHEET

Sampling Personnel: Mercado/Denno/Finke/Graham

Site Name: Vestal Chlorinated Solvents Groundwater Date: 2/1/16 – 2/3/16 Well #: MW-A

***Evacuation Information*:**

Date/Time: 2/2/16@1427 Method: Bailer Total Depth: 16.75

Well Casing Type/Diam.: 1.5"PVC Screen: 8-18

Water Column Height: 4.35" Top of Casing to Water Level: 12.4 Well Volume: 0.387 gal

***Sampling Information*:**

Date/Time 2/2/16@1515 HRS Sample/Lab Number: 2016-S-MW-01/BC333

***Field Measurement Data*:**

Time	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Redox (eH)
1430	---	11.4	0.987	8.5	4.9	35	35
1433	Pumped well dry will need to wait for recovery						
1515	Started collecting samples						
Sunny, Clear, 35°F, & 746.6 mmHg							

WELL DATA SHEET

Sampling Personnel: Mercado/Denno/Finke/Graham

Site Name: Vestal Chlorinated Solvents Groundwater Date: 2/1/16 – 2/3/16 Well #: MW-C

***Evacuation Information*:**

Date/Time: 2/2/16@1200 Method: Bailer Total Depth: 17.81

Well Casing Type/Diam.: 1.5"PVC Screen: 8-18

Water Column Height: 4.70" Top of Casing to Water Level: 13.11 Well Volume: 0.423gal

***Sampling Information*:**

Date/Time 2/2/16@1335 HRS Sample/Lab Number: 2016-S-MW-C/BC335

***Field Measurement Data*:**

Time	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Redox (eH)
1210	---	11.1	0.313	6.7	7.9	182	35
1215	---	10.2	0.310	6.8	7.7	132	36
1218	Pumped well dry will need to wait for recovery						
1335	Started collecting samples						
Sunny, Clear, 40^{0}F, & 746.6 mmHg							

WELL DATA SHEET

Sampling Personnel: Mercado/Denno/Finke/Graham

Site Name: Vestal Chlorinated Solvents Groundwater Date: 2/1/16 – 2/3/16 Well #: MW-E

***Evacuation Information*:**

Date/Time: 2/2/16@1400 Method: Bailer Total Depth: 17.76

Well Casing Type/Diam.: 1.5"PVC Screen: 8-18

Water Column Height: 3.99" Top of Casing to Water Level: 13.77 Well Volume: 0.359gal

***Sampling Information*:**

Date/Time 2/2/16@1440 HRS Sample/Lab Number: 2016-S-MW-E/BC337

***Field Measurement Data*:**

Time	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Redox (eH)
1400	---	10.2	0.689	6.1	6.4	109	27
1413	Pumped well dry will need to wait for recovery						
1440	Started collecting samples						
Sunny, Clear, 35^{0}F, & 746.6 mmHg							

WELL DATA SHEET

Sampling Personnel: Mercado/Denno/Finke/Graham

Site Name: Vestal Chlorinated Solvents Groundwater Date: 2/1/16 – 2/3/16 Well #: MW-G

***Evacuation Information*:**

Date/Time: 2/2/16@1043 Method: Bailer Total Depth: 20.30

Well Casing Type/Diam.: 2"SS Screen: 5-20

Water Column Height: 5.55" Top of Casing to Water Level: 14.75 Well Volume: 0.906gal

***Sampling Information*:**

Date/Time 2/2/16@1115 HRS Sample/Lab Number: 2016-S-MW-G/BC339

***Field Measurement Data*:**

Time	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Redox (eH)
1050	---	11.3	0.341	6.5	3.1	16	127
1055		11.3	0.341	6.6	2.5	5	129
1100		11.3	0.341	6.6	1.9	4	113
1105		11.3	0.345	6.7	1.6	1	116
1110		11.3	0.363	6.7	1.5	1	115
1115		11.3	0.369	6.7	1.4	4	108
Sunny, Clear, 45^{0}F, & 749.0 mmHg							

WELL DATA SHEET

Sampling Personnel: Mercado/Denno/Finke/Graham

Site Name: Vestal Chlorinated Solvents Groundwater Date: 2/1/16 – 2/3/16 Well #: MW-I

***Evacuation Information*:**

Date/Time: 2/2/16@0958 Method: Bailer Total Depth: 19.00

Well Casing Type/Diam.: 2"SS Screen: 5-20

Water Column Height: 6.30" Top of Casing to Water Level: 13.30 Well Volume: 1.028gal

***Sampling Information*:**

Date/Time 2/2/16@1400 HRS Sample/Lab Number: 2016-S-MW-I/BC341

***Field Measurement Data*:**

Time	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Redox (eH)
1005	---	10.4	0.780	6.4	3.2	230	-123
1012	---	10.4	0.822	6.6	2.0	155	-156
1018	Pumped well dry will need to wait for recovery						
1400	Started collecting samples						
Sunny, Clear, 35°F, & 749.0 mmHg							

APPENDIX C
Laboratory Data Package

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
DESA/HWSB/HWSS
2890, Woodbridge Avenue, Edison, NJ 08837

EXECUTIVE NARRATIVE

Case No. : 45904
Site: VESTAL WATER SUPPLY WELL 1-1
Number of Samples: 13(WATER)
Analysis: VOA (MA 2576.0), PCB (MA 2548.1)

SDG No.: BC321
Laboratory: KAP
Sampling dates: 02/02/2016
Validation SOP: HW-33A (Rev0), HW-37A (Rev0)

QAPP:
Contractor: DCN: SERAS-064-DQAPPR1-112612
Reference: CDM

SUMMARY OF DEFINITIONS:
Critical: Results have an unacceptable level of uncertainty and should not be used for making decisions. Data have been qualified "R" rejected.
Major: A level of uncertainty exists that may not meet the data quality objectives for the project. A bias is likely to be present in the results. Data has been qualified "J" estimated. "J+" and "J-" represent likely direction of the bias.
Minor: The level of uncertainty is acceptable. No significant bias in the data was observed.

Critical Findings:
None

Major Findings:
None.

Minor Findings:
None.

COMMENTS: **VOA:** Several analytes have exceeded project action levels for one or more samples

Reviewer Name(s): Archana Mirle

Approver's Signature: **Date: 03/17/2016**

Name: **Narendra Kumar**

Affiliation: USEPA/R2/HWSB/HWSS

DATA ASSESSMENT

ANALYSIS: VOA

The current SOP HW-33A (Revision 0) July 2015, USEPA Region II for the evaluation of Volatile organic data generated through Statement of Work SOM02.2 has been applied. Data have been reviewed according to TDF specifications, the National Functional Guidelines Report and the CCS Semi-Automated Screening Results Report. Tentatively Identified Compounds (TICs) for VOA organic fraction is not validated.

1. **HOLDING TIME:**

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

2. **DEUTERATED MONITORING COMPOUNDS (DMC's)**

All samples are spiked with DMC compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured DMC recovery limits were outside Table 6 of the SOP HW-33A (Revision 0) qualifications were applied as per Table 7 SOP HW-33A (Revision 0) to all the samples and analytes as shown below.

The following samples have DMC/surrogate percent recoveries greater than the primary maximum criteria Detects are qualified as estimated J+. Non-detects are not qualified.

1,1,2,2-Tetrachloroethane-d2 BC328

1,1,2,2-Tetrachloroethane, 1,2-Dibromo-3-chloropropane

3. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD):**

MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other QC criteria for additional qualification of data. Qualifications were applied to the samples and analytes as shown below.

Not applicable.

4. **BLANK CONTAMINATION:**

The response factor measures the instrument's response to specific chemical compounds. All analytes for initial and continuing calibration should meet the minimum RRF criteria as listed in Table 2 of SOP HW 33A (Rev 0). If RRF is less than minimum RRF as specified in Table 2 for all target analytes, use professional judgment and all detects in the sample will be qualified as "J+" or "R". All non-detects for that compound will be rejected "R". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance.

Percent RSD must be less than maximum %RSD in Table 2 of SOP HW 33A (Rev 0) for all target analytes. For the opening or closing CCV %D must be within the inclusive opening or closing maximum %D limits as listed in Table 2 of SOP HW 33A (Rev 0) for all Target compounds. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and Non-detects are flagged "UJ" for %D values outside criteria only. If %RSD exceeds QC criteria, detects may be qualified as "J" and use professional judgment to qualify non-detects. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

7. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must be in the range as specified in Table 9 of SOP HW 33A (Rev 0) of the associated continuing calibration internal standard area. The retention time of the internal standards must be within the range as specified in Table 9 of SOP HW 33A (Rev 0). If the area count is greater than, all positive results quantitated using that IS are qualified as estimated "J-", and non-detects are not qualified. If the area count is less than the associated standard, all positive results for compounds quantitated with that IS are qualified as estimated "J+" and all non-detects are qualified "R".

If an internal standard retention time were not met as specified in Table 9 of SOP HW 33A (Rev 0), the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction. Qualifications were applied to the samples and analytes as shown below. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". Use professional judgment to qualify the non-detects (sample quantitation limits), if the holding times are grossly exceeded. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

2. **SURROGATES:**

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate recovery were outside Table 5 of the SOP HW-37A (Revision 0), qualifications were applied to the samples and analytes as shown below.

The following samples have surrogate percent recoveries greater than the primary maximum criteria but are less than or equal to the expanded maximum criteria. Detects are qualified as estimated J+. Non-detects are not qualified.

Tetrachloro-m-xylene BC341, BC340
Aroclor-1016, Aroclor-1221, Aroclor-1232. Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268

Decachlorobiphenyl BC328
Aroclor-1016, Aroclor-1221, Aroclor-1232. Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268

3. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD):**

MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other QC criteria for additional qualification of data. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

4. **Laboratory Control Samples (LCS):**

LCS data provides information on the accuracy of the analytical method and laboratory performance. If LCS recoveries fell outside of the acceptable limits, qualifications were applied to the associated samples and compounds as shown below.

No problems were found for this criterion.

5. **BLANK CONTAMINATION:**

Quality assurance (QA) blanks, i.e., method, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Field and rinse blanks measure cross-contamination of samples during field operations. Depending

the concentration exceeds 10ng/ml in the final sample extract. Qualifications were applied to the samples and analytes as shown below.

Percent Differences	Qualifier
0% - 25%	No qualification
26% - 200%	Professional Judgment
101% - 200% (interference detected, either column)	JN
> 50% (pesticide value < CRQL, value raised to CRQL)	U
> 200%	R

The following samples were qualified for % difference on the two columns.

BC328, BC341

9. CONTRACT PROBLEMS NON-COMPLIANCE:

None.

10. FIELD DOCUMENTATION:

No problems were identified.

11. OTHER PROBLEMS:

None.

12. DILUTIONS, RE-EXTRACTIONS & RE-ANALYSIS:

Samples may be re-analyzed for dilution, re-extraction and for other QC reasons. In such cases, the best result values are used. See summary report and EDD for applicable samples and analytes.

Sample Summary Report

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: ABLK47	Method: Aroclors	Matrix: Water	MA Number: 2548.1
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC321	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-TB-1	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 09:00:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC322	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-RB-1	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 09:00:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No:	45904	Contract:	EPW14031	SDG No:	BC321	Lab Code:	KAP
Sample Number:	BC322	Method:	Aroclors	Matrix:	Water	MA Number:	2548.1
Sample Location:	2016-RB-1	pH:	8.1	Sample Date:	02/02/2016	Sample Time:	09:00:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.031	J	ug/L	0.031	J	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
Tetrachloroethene	Target	14	J	ug/L	14	J	5.0	Yes	S3VEM
2-Hexanone	Target	50	U	ug/L	50	U	5.0	Yes	S3VEM
Dibromochloromethane	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,2-Dibromoethane	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
Chlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
Ethylbenzene	Target	170		ug/L	170		5.0	Yes	S3VEM
o-Xylene	Target	570		ug/L	570		5.0	Yes	S3VEM
m,p-Xylene	Target	760		ug/L	760		5.0	Yes	S3VEM
Styrene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
Bromoform	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
Isopropylbenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	5.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	25	U	ug/L	25	U	5.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	280	NJ	ug/L	280	NJ	5.0	Yes	NV
Benzene, 1-ethyl-3-methyl-	TIC	250	NJ	ug/L	250	NJ	5.0	Yes	NV
Benzene, 1-ethyl-2,4-dimethyl-	TIC	150	NJ	ug/L	150	NJ	5.0	Yes	NV
Unknown-08	TIC	190	J	ug/L	190	J	5.0	Yes	NV
Dodecane	TIC	160	NJ	ug/L	160	NJ	5.0	Yes	NV
Unknown-04	TIC	120	J	ug/L	120	J	5.0	Yes	NV
Unknown-02	TIC	120	J	ug/L	120	J	5.0	Yes	NV
1,2,4-Trimethyl benzene	Target	860		ug/L	860	D	100.0	Yes	S3VEM
Unknown-03	TIC	130	J	ug/L	130	J	5.0	Yes	NV
Benzene, 1-ethyl-3-methyl-	TIC	350	NJ	ug/L	350	NJ	5.0	Yes	NV
Benzene, 1-methyl-3-propyl-	TIC	240	NJ	ug/L	240	NJ	5.0	Yes	NV
Unknown-07	TIC	120	J	ug/L	120	J	5.0	Yes	NV
Undecane	TIC	390	NJ	ug/L	390	NJ	5.0	Yes	NV
1,3,5-Trimethyl benzene	Target	2000		ug/L	2000	D	100.0	Yes	S3VEM
Unknown-01	TIC	340	J	ug/L	340	J	5.0	Yes	NV

Case No:	45904	Contract:	EPW14031	SDG No:	BC321	Lab Code:	KAP
Sample Number:	BC328	Method:	Aroclors	Matrix:	Water	MA Number:	2548.1
Sample Location:	2016-L-MW-F	pH:	7.0	Sample Date:	02/02/2016	Sample Time:	09:30:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	7.4		ug/L	7.4	D	20.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC333	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-MW-A	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 15:15:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	3.0	J	ug/L	3.0	J	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	12		ug/L	12		1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	3.4	J	ug/L	3.4	J	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP	
Sample Number: BC334	Method: Volatile Organics	Matrix: Water		MA Number: 2576.0
Sample Location: 2016-S-MW-B	pH: 2.0	Sample Date: 02/02/2016		Sample Time: 12:05:00
% Moisture :		% Solids :		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP	
Sample Number: BC334	Method: Aroclors	Matrix: Water	MA Number: 2548.1	
Sample Location: 2016-S-MW-B	pH: 7.4	Sample Date: 02/02/2016	Sample Time: 12:05:00	
% Moisture :		% Solids :		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.034	J	ug/L	0.034	J	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC335	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-MW-C	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 13:35:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	13		ug/L	13		1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC336	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-MW-D	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 14:45:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	3.1	J	ug/L	3.1	J	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC336	Method: Aroclors	Matrix: Water	MA Number: 2548.1
Sample Location: 2016-S-MW-D	pH: 6.9	Sample Date: 02/02/2016	Sample Time: 14:45:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.071	J	ug/L	0.071	J	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC337	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-MW-E	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 14:40:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	4.1	J	ug/L	4.1	J	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC338	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0
Sample Location: 2016-S-MW-F	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 10:20:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Vinyl chloride	Target	1600		ug/L	1600		10.0	Yes	S3VEM
Bromomethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloroethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Trichlorofluoromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1-Dichloroethene	Target	280		ug/L	280		10.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	230		ug/L	230		10.0	Yes	S3VEM
Acetone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Carbon disulfide	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Methyl acetate	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Methylene chloride	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	410		ug/L	410		10.0	Yes	S3VEM
Methyl tert-butyl ether	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1-Dichloroethane	Target	530		ug/L	530		10.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	43000		ug/L	43000	D	400.0	Yes	S3VEM
2-Butanone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Bromochloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloroform	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	2400		ug/L	2400	D	40.0	Yes	S3VEM
Cyclohexane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Carbon tetrachloride	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Benzene	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,2-Dichloroethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Trichloroethene	Target	1800		ug/L	1800		10.0	Yes	S3VEM
Methylcyclohexane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,2-Dichloropropane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Bromodichloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Toluene	Target	880		ug/L	880		10.0	Yes	S3VEM

Case No:	45904	Contract:	EPW14031	SDG No:	BC321	Lab Code:	KAP
Sample Number:	BC338	Method:	Aroclors	Matrix:	Water	MA Number:	2548.1
Sample Location:	2016-S-MW-F	pH:	7.2	Sample Date:	02/02/2016	Sample Time:	10:20:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.11		ug/L	0.11		1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP	
Sample Number: BC339	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0	
Sample Location: 2016-S-MW-G	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 11:15:00	
% Moisture :		% Solids :		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	74		ug/L	74		1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	4.1	J	ug/L	4.1	J	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	3.1	J	ug/L	3.1	J	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	7.3		ug/L	7.3		1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	340		ug/L	340	D	5.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	6.4		ug/L	6.4		1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	35		ug/L	35		1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC339MS	Method: Aroclors	Matrix: Water	MA Number: 2548.1
Sample Location:	pH: 6.2	Sample Date: 02/02/2016	Sample Time: 11:15:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Spike	0.41		ug/L	0.41		1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Spike	0.40		ug/L	0.40		1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Case No:	45904	Contract:	EPW14031	SDG No:	BC321	Lab Code:	KAP
Sample Number:	BC340	Method:	Aroclors	Matrix:	Water	MA Number:	2548.1
Sample Location:	2016-S-MW-H	pH:	6.2	Sample Date:	02/02/2016	Sample Time:	12:50:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Tetrachloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Hexanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Dibromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromoethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
o-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
m,p-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Styrene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromoform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Isopropylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	61	NJ	ug/L	61	NJ	1.0	Yes	NV
Unknown-01	TIC	11	J	ug/L	11	J	1.0	Yes	NV
1,2,4-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3,5-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethane, 1,2-dichloro-1,1,2-trifluoro-	TIC	74	NJ	ug/L	74	NJ	1.0	Yes	NV

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP	
Sample Number: BC341	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0	
Sample Location: 2016-S-MW-I	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 14:00:00	
% Moisture :		% Solids :		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Vinyl chloride	Target	3200		ug/L	3200	D	400.0	Yes	S3VEM
Bromomethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloroethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Trichlorofluoromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1-Dichloroethene	Target	130		ug/L	130		10.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	45	J	ug/L	45	J	10.0	Yes	S3VEM
Acetone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Carbon disulfide	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Methyl acetate	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Methylene chloride	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	59		ug/L	59		10.0	Yes	S3VEM
Methyl tert-butyl ether	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1-Dichloroethane	Target	180		ug/L	180		10.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	65000		ug/L	65000	D	400.0	Yes	S3VEM
2-Butanone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Bromochloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Chloroform	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	740		ug/L	7600		400.0	Yes	S3VEM
Cyclohexane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Carbon tetrachloride	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Benzene	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,2-Dichloroethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Trichloroethene	Target	7600		ug/L	7600	D	400.0	Yes	S3VEM
Methylcyclohexane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
1,2-Dichloropropane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
Bromodichloromethane	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	50	U	ug/L	50	U	10.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	100	U	ug/L	100	U	10.0	Yes	S3VEM
Toluene	Target	170		ug/L	170		10.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP	
Sample Number: BC342	Method: Volatile Organics	Matrix: Water	MA Number: 2576.0	
Sample Location: 2016-S-MW-J	pH: 2.0	Sample Date: 02/02/2016	Sample Time: 12:50:00	
% Moisture :		% Solids :		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	13		ug/L	13		1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	4.1	J	ug/L	4.1	J	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	3.4	J	ug/L	3.4	J	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	51		ug/L	51		1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	6.5		ug/L	6.5		1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: BC321	Lab Code: KAP
Sample Number: BC342	Method: Aroclors	Matrix: Water	MA Number: 2548.1
Sample Location: 2016-S-MW-J	pH: 7.3	Sample Date: 02/02/2016	Sample Time: 12:50:00
% Moisture :		% Solids :	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1221	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1232	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1242	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1248	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1254	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1260	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1262	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM
Aroclor-1268	Target	0.10	U	ug/L	0.10	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Tetrachloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Hexanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Dibromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromoethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
o-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
m,p-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Styrene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromoform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Isopropylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3,5-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	62	NJ	ug/L	62	NJ	1.0	Yes	NV

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Tetrachloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Hexanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Dibromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromoethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
o-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
m,p-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Styrene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromoform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Isopropylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3,5-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	57	NJ	ug/L	57	NJ	1.0	Yes	NV
1,2,4-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Tetrachloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Hexanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Dibromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromoethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
o-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
m,p-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Styrene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromoform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Isopropylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	57	NJ	ug/L	57	NJ	1.0	Yes	NV
1,2,4-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3,5-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
trans-1,3-Dichloropropene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Tetrachloroethene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
2-Hexanone	Target	10	U	ug/L	10	U	1.0	Yes	S3VEM
Dibromochloromethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromoethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Chlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Ethylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
o-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
m,p-Xylene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Styrene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Bromoform	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
Isopropylbenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,1,2,2-Tetrachloroethane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,4-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2-Dibromo-3-chloropropane	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,3-Trichlorobenzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,3,5-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
1,2,4-Trimethyl benzene	Target	5.0	U	ug/L	5.0	U	1.0	Yes	S3VEM
cis-1,3-dichloropropene-d4	TIC	57	NJB	ug/L	57	NJB	1.0	Yes	NV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
DESA/HWSB/HWSS
2890, Woodbridge Avenue, Edison, NJ 08837

EXECUTIVE NARRATIVE

Case No. : 45904
Site: VESTAL WATER SUPPLY WELL 1-1
Number of Samples: 1(Light Non-Aqueous Phase Liquid)
Analysis: VOA (MA 2577.0), PCB (MA 2578.0)

SDG No.: B5TB1
Laboratory: KAP
Sampling dates: 02/02/2016
Validation SOP: HW-33A & HW-37A (Rev0)

QAPP:
Contractor: DCN: SERAS-064-DQAPPR1-112612
Reference: CDM

SUMMARY OF DEFINITIONS:
Critical: Results have an unacceptable level of uncertainty and should not be used for making decisions. Data have been qualified "R" rejected.
Major: A level of uncertainty exists that may not meet the data quality objectives for the project. A bias is likely to be present in the results. Data has been qualified "J" estimated. "J+" and "J-" represent likely direction of the bias.
Minor: The level of uncertainty is acceptable. No significant bias in the data was observed.

Critical Findings:
None

Major Findings:
The following samples have analytes that have been qualified "J", J+" or "J-".
PCB: B5TB1DL

Minor Findings:
None.

COMMENTS: The Site specific QAPP did not specify the project action levels for sample from this site.

Reviewer Name(s): Archana Mirle

Approver's Signature: **Date: 03/17/2016**

Name: **Narendra Kumar**

Affiliation: USEPA/R2/HWSB/HWSS

DATA ASSESSMENT

ANALYSIS: VOA

The current SOP HW-33A (Revision 0) July 2015, USEPA Region II for the evaluation of Volatile organic data generated through Statement of Work SOM02.2 has been applied. Data have been reviewed according to TDF specifications, the National Functional Guidelines Report and the CCS Semi-Automated Screening Results Report. Tentatively Identified Compounds (TICs) for VOA organic fraction is not validated.

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

2. DEUTERATED MONITORING COMPOUNDS (DMC's)

All samples are spiked with DMC compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured DMC recovery limits were outside Table 6 of the SOP HW-33A (Revision 0) qualifications were applied as per Table 7 SOP HW-33A (Revision 0) to all the samples and analytes as shown below.

The following samples have DMC/surrogate percent recoveries greater than the primary maximum criteria Detects are qualified as estimated J+. Non-detects are not qualified.

1,1,2,2-Tetrachloroethane-d2 B5TB1

1,1,2,2-Tetrachloroethane, 1,2-Dibromo-3-chloropropane

3. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD):

MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other QC criteria for additional qualification of data. Qualifications were applied to the samples and analytes as shown below.

Not applicable.

4. BLANK CONTAMINATION:

The response factor measures the instrument's response to specific chemical compounds. All analytes for initial and continuing calibration should meet the minimum RRF criteria as listed in Table 2 of SOP HW 33A (Rev 0). If RRF is less than minimum RRF as specified in Table 2 for all target analytes, use professional judgment and all detects in the sample will be qualified as "J+" or "R". All non-detects for that compound will be rejected "R". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance.

Percent RSD must be less than maximum %RSD in Table 2 of SOP HW 33A (Rev 0) for all target analytes. For the opening or closing CCV %D must be within the inclusive opening or closing maximum %D limits as listed in Table 2 of SOP HW 33A (Rev 0) for all Target compounds. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and Non-detects are flagged "UJ" for %D values outside criteria only. If %RSD exceeds QC criteria, detects may be qualified as "J" and use professional judgment to qualify non-detects. Qualifications were applied to the samples and analytes as shown below.

The following samples are associated with an initial calibration percent relative standard deviation (%RSD) outside criteria. Detects are qualified as estimated J. Non-detects are not qualified.

1,2-Dichlorobenzene B5TB1, B5TB1DL, VBLK28
1,2,4-Trichlorobenzene VBLK31, VHBLK01
1,2,3-Trichlorobenzene VBLK31, VHBLK01

7. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must be in the range as specified in Table 9 of SOP HW 33A (Rev 0) of the associated continuing calibration internal standard area. The retention time of the internal standards must be within the range as specified in Table 9 of SOP HW 33A (Rev 0). If the area count is greater than, all positive results quantitated using that IS are qualified as estimated "J-", and non-detects are not qualified. If the area count is less than the associated standard, all positive results for compounds quantitated with that IS are qualified as estimated "J+" and all non-detects are qualified "R".

If an internal standard retention time were not met as specified in Table 9 of SOP HW 33A (Rev 0), the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction. Qualifications were applied to the samples

been reviewed according to TDF specifications, the National Functional Guidelines Report and the CCS Semi-Automated Screening Results Report.

1. **HOLDING TIME:**

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". Use professional judgment to qualify the non-detects (sample quantitation limits), if the holding times are grossly exceeded. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

2. **SURROGATES:**

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate recovery were outside Table 5 of the SOP HW-37A (Revision 0), qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

3. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD):**

MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other QC criteria for additional qualification of data. Qualifications were applied to the samples and analytes as shown below.

The following matrix/matrix spike duplicate samples have percent recoveries less than the primary acceptance criteria limit. Detects are qualified as estimated J. Non-detects are qualified as estimated UJ.

Aroclor 1260 B5TB1, B5TB1DL, B5TB1MS, B5TB1MSD

The following matrix/matrix spike duplicate samples have percent recoveries greater than the primary acceptance criteria limit. Detects are qualified as estimated J. Non-detects are not qualified.

Aroclor 1016 B5TB1, B5TB1DL, B5TB1MS, B5TB1MSD

The relative percent difference (RPD) between the following matrix spike and matrix spike duplicate recoveries is outside criteria. Detects are qualified as estimated J. Non-detects are not qualified.

Aroclor 1260 B5TB1, B5TB1DL, B5TB1MS, B5TB1MSD

4. **Laboratory Control Samples (LCS):**

No problems were found for this criterion.

7. **FIELD DUPLICATES:**

Not applicable.

8. **COMPOUND IDENTIFICATION:**

A) **PCB Fraction:**

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10ng/ml in the final sample extract. Qualifications were applied to the samples and analytes as shown below.

Percent Differences	Qualifier
0% - 25%	No qualification
26% - 200%	Professional Judgment
101% - 200% (interference detected, either column)	JN
> 50% (pesticide value < CRQL, value raised to CRQL)	U
> 200%	R

The following samples were qualified for % difference on the two columns.

B5TB1, B5TB1DL, B5TB1MS, B5TB1MSD

9. **CONTRACT PROBLEMS NON-COMPLIANCE:**

None.

10. **FIELD DOCUMENTATION:**

No problems were identified.

11. **OTHER PROBLEMS:**

None.

12. **DILUTIONS, RE-EXTRACTIONS & RE-ANALYSIS:**

Samples may be re-analyzed for dilution, re-extraction and for other QC reasons. In such cases, the best result values are used. See summary report and EDD for applicable samples and analytes.

Sample Summary Report

Case No: 45904	Contract: EPW14031	SDG No: B5TB1	Lab Code: KAP
Sample Number: ABLK48	Method: Aroclors	Matrix: Soil	MA Number: 2578.0
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100.00	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1221	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1232	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1242	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1248	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1254	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1260	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1262	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM
Aroclor-1268	Target	1.7	U	ug/kg	1.7	U	1.0	Yes	S3VEM

Case No:	45904	Contract:	EPW14031	SDG No:	B5TB1	Lab Code:	KAP		
Sample Number:	B5TB1	Method:	Volatile Organics	Matrix:	Light Non-Aqueous Phase Liquid	MA Number:	2577.0		
Sample Location:	2016-L-MW-F	pH:		Sample Date:	02/02/2016	Sample Time:	09:30:00		
% Moisture :				% Solids :	100.00				

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Chloromethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Vinyl chloride	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Bromomethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Chloroethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	12000		ug/kg	12000		1.0	Yes	S3VEM
Acetone	Target	430	J	ug/kg	430	J	1.0	Yes	S3VEM
Carbon disulfide	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Methyl acetate	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Methylene chloride	Target	210	J	ug/kg	210	J	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	580		ug/kg	580		1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	27000		ug/kg	27000	D	1.0	Yes	S3VEM
2-Butanone	Target	980	U	ug/kg	980	U	1.0	Yes	S3VEM
Bromochloromethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Chloroform	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	53000		ug/kg	53000	D	1.0	Yes	S3VEM
Cyclohexane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	6500		ug/kg	6500		1.0	Yes	S3VEM
Benzene	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Trichloroethene	Target	1500		ug/kg	1500		1.0	Yes	S3VEM
Methylcyclohexane	Target	7400		ug/kg	7400		1.0	Yes	S3VEM
1,2-Dichloropropane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	490	U	ug/kg	490	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	980	U	ug/kg	980	U	1.0	Yes	S3VEM

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Benzene, 1,2,4,5-tetramethyl-	TIC	11000	NJ	ug/kg	11000	NJ	1.0	Yes	NV
1,3,5-Trimethyl benzene	Target	340000		ug/kg	340000	D	1.0	Yes	S3VEM
Benzene, propyl-	TIC	13000	NJ	ug/kg	13000	NJ	1.0	Yes	NV
Unknown-08	TIC	23000	J	ug/kg	23000	J	1.0	Yes	NV
Unknown-10	TIC	6400	J	ug/kg	6400	J	1.0	Yes	NV
Benzene, 4-ethyl-1,2-dimethyl-	TIC	12000	NJ	ug/kg	12000	NJ	1.0	Yes	NV
Cyclohexane, 1,3-dimethyl-, cis-	TIC	13000	NJ	ug/kg	13000	NJ	1.0	Yes	NV
1-Ethyl-4-methylcyclohexane	TIC	11000	NJ	ug/kg	11000	NJ	1.0	Yes	NV
Benzene, 1,2-diethyl-	TIC	8700	NJ	ug/kg	8700	NJ	1.0	Yes	NV
Benzene, 1,2,3-trimethyl-	TIC	20000	NJ	ug/kg	20000	NJ	1.0	Yes	NV
Benzene, 1-ethyl-3,5-dimethyl-	TIC	14000	NJ	ug/kg	14000	NJ	1.0	Yes	NV
Benzene, 1-ethyl-2-methyl-	TIC	37000	NJ	ug/kg	37000	NJ	1.0	Yes	NV
1-Pentene, 2,4,4-trimethyl-	TIC	10000	NJ	ug/kg	10000	NJ	1.0	Yes	NV

Case No: 45904	Contract: EPW14031	SDG No: B5TB1	Lab Code: KAP	
Sample Number: B5TB1MS	Method: Aroclors	Matrix:	Light Non-Aqueous Phase Liquid	MA Number: 2578.0
Sample Location:	pH:	Sample Date:	02/02/2016	Sample Time: 09:30:00
% Moisture :		% Solids :	100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aroclor-1016	Spike	1100	R	ug/kg	1100	P	1.0	Yes	S3VEM
Aroclor-1221	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1232	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1242	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1248	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1254	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1260	Spike	17000	J	ug/kg	17000	EP	1.0	Yes	S3VEM
Aroclor-1262	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM
Aroclor-1268	Target	51	U	ug/kg	51	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: B5TB1	Lab Code: KAP	
Sample Number: VBLK28	Method: Volatile Organics	Matrix: Soil		MA Number: 2577.0
Sample Location:	pH:	Sample Date:		Sample Time:
% Moisture :		% Solids : 100.00		

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Chloromethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Vinyl chloride	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Bromomethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Chloroethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Acetone	Target	500	U	ug/kg	500	U	1.0	Yes	S3VEM
Carbon disulfide	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Methyl acetate	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Methylene chloride	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
2-Butanone	Target	500	U	ug/kg	500	U	1.0	Yes	S3VEM
Bromochloromethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Chloroform	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Cyclohexane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Benzene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Trichloroethene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	500	U	ug/kg	500	U	1.0	Yes	S3VEM
Toluene	Target	250	U	ug/kg	250	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: B5TB1	Lab Code: KAP
Sample Number: VBLK31	Method: Volatile Organics	Matrix: Soil	MA Number: 2577.0
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100.00	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM

Case No: 45904	Contract: EPW14031	SDG No: B5TB1	Lab Code: KAP
Sample Number: VHBLK01	Method: Volatile Organics	Matrix: Soil	MA Number: 2577.0
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100.00	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Dichlorodifluoromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Vinyl chloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Bromomethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Trichlorofluoromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Acetone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Carbon disulfide	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methyl acetate	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methylene chloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
trans-1,2-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methyl tert-butyl ether	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1-Dichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
cis-1,2-Dichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
2-Butanone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Bromochloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Chloroform	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,1,1-Trichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Cyclohexane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Carbon tetrachloride	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Benzene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,2-Dichloroethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Trichloroethene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Methylcyclohexane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
1,2-Dichloropropane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
Bromodichloromethane	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
cis-1,3-Dichloropropene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM
4-Methyl-2-pentanone	Target	10	U	ug/kg	10	U	1.0	Yes	S3VEM
Toluene	Target	5.0	U	ug/kg	5.0	U	1.0	Yes	S3VEM

APPENDIX D

Trip Report

SAMPLING TRIP REPORT

SITE NAME: Vestal Water Supply Well Site
CERCLIS ID NUMBER: NYD 98076376702
SAMPLING DATE: 1-3 February 2016
CLP CASE NUMBER: None
SITE LOCATION: Vestal, New York
SAMPLE CRITERIA: Samples will be compared to both the New York State and Federal MCLs for Groundwater.

1. Laboratories Receiving Samples:

Sample Type	Laboratory Code	Name and Address of Laboratory
Ground Water – TCL Volatile Organic Compounds (VOCs) & PCBs	KAP	KAP Technologies Inc, 9391Grogans Mill Rd, The Woodlands, TX 77380

2. Sample Dispatch Data:

The total numbers of environmental samples delivered to the laboratory via UPS were 11. This number included MW-J which is a Laboratory Blind Duplicate from MW-H. In addition, one trip blank (TB) -1 and a rinsate blank (RB) -1 was also delivered to the laboratory for QA/QC purpose.

On February 1, 2016, the field team traveled to the site and search for the wells. All wells were located.

On February 2, 2016, a dedicated bailer at each well was lower and a sample was collected from the top of the water columns. These sample were visually observed for the present of LNAPL. The only well with visual LNAPL was MW-F. The field team collected LNAPL samples from MW-F for VOCs & PCBs.

Between February 2 & 3, 2016, the field team purged and sampled all wells for TCL VOCs and PCBs. The samples were collected from MW-A, MW-B, MW-C, MW-D, MW-E, MW-F, MW-G, MW-H, and MW-I. A duplicate sample was collected and named MW-J. This duplicate sample MW-J is the duplicate of MW-H.

On February 3, 2016, the sampling team shipped three cooler with the samples to KAP Lab in The Woodlands, TX via UPS. The UPS tracking number for VOCs was A381 085 648 0 and for the PCBs they were 1Z 061- 547 21 1000 607 1 and 1Z 061- 547 21 1000 608 0. After shipping the samples to the lab the field team returned to Edison, NJ and off-loaded the GOV.