2ND VIRP SEMI-ANNUAL PROGRESS REPORT
MERCER UNIVERSITY TRIANGLE
HSI #10779
1535 MONTPELIER AVE
MACON, BIBB COUNTY, GEORGIA
GEC JOB NO. 090698.340

PREPARED FOR

MERCER UNIVERSITY
1400 COLEMAN AVE
MACON, GEORGIA 31207

SUBMITTED TO

MR. JASON METZGER
GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
HAZARDOUS SITES RESPONSE PROGRAM
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SUITE 1462, EAST TOWER
ATLANTA, GEORIGA 30334

AUGUST 20, 2015

PREPARED BY

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.
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August 20, 2015

Mr. Jason Metzger
Georgia Environmental Protection Division
Response and Remediation Program
Suite 1462 East Tower
2 Martin Luther King, Jr. Drive S.E.
Atlanta, GA 30334

SUBJECT: **2ND VIRP Semi-annual Progress Report**
Mercer University Triangle
HSI #10779
1535 Montpelier Ave
Macon, Bibb County, Georgia
GEC Job No. 090698.340

Dear Mr. Metzger:

In accordance with the Voluntary Investigation and Remediation Program (VIRP) for the Mercer University Triangle site in Macon, Georgia, dated September 30, 2013, Geotechnical & Environmental Consultants, Inc. (GEC) is submitting this Semi-annual Progress Report. This report summarizes monitoring activities conducted at the site on February 23, 2015 and June 16-17, 2015 and the sampling results from the groundwater monitoring event. This report also addresses the comments provided by EPD regarding the previously submitted VIRP Progress Report.

Sincerely,
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Paige Sforzo, E.I.T
Project Engineer

Jason A. Cooper, P.E.
Project Manager
Georgia Reg. No. 31694

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MERCER UNIVERSITY TRIANGLE
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1.0 SITE DESCRIPTION

The subject property, known as the Mercer Triangle, consists of a single building housing different businesses including restaurants, Mercer University offices, and other offices. The primary source of contamination is located on the western side of the property under a sidewalk and Linden Avenue. No significant changes have occurred at the site since the last sampling event in June 2014. Mercer University Campus is located south of the subject property with Mercer offices and building located east and southeast. Residential properties are still located north of the subject site with residential property and a public park located west of the site.

No new potential receptors were noted during the sampling event, as development around the site has remained essentially the same since the June 2014 event.

2.0 SUMMARY OF WORK PERFORMED AT SITE

To further delineate the contaminant plume, GEC installed an additional well (MW-16) in the down gradient direction of the property. This well was installed on February 23, 2015 using a CME-55 drill rig with hallow stem augers and split-spoon capabilities. This process permits sampling of soils at five-foot intervals through the advancement and retrieval of the spilt-spoon sampler. All augers and downhole apparatus were thoroughly decontaminated prior to introduction into the subsurface. On-site personnel wore new disposable nitrile gloves when handling any tooling or sampling equipment in order to prevent cross-contamination of laboratory samples.

Groundwater was encountered at approximately 50 feet at the time of boring and a permanent monitoring well was set at 60 feet. The monitoring well was constructed with 2" PVC and screened with 15 feet of 0.010 inch machine-slotted PVC at the base. A DSI well gravel #2 filter pack was placed in the annular space around the screen in the well to approximately two feet above the top of the screened interval. A minimum two foot thick Enviroplug (3/8"medium chips) bentonite seal was placed on top of the filter pack. The remainder of the well was backfilled with cement/bentonite grout up to the ground surface. The monitoring well conforms to the Water Well Standards Act. A soil boring log for the constructed well is included in Appendix D.

Soil samples were collected at 5 foot intervals and evaluated using visual and olfactory methods, as well as with a flame-ionization detector (FID). No FID indications were so the soil sample closest to the water table, at 43.5 to 45 feet below the existing ground surface, was collected for laboratory analysis. The sample was analyzed for Volatile Organic Compounds (VOCs) using EPA Method 8260B. All of the constituents tested for in the soil were reported Below Laboratory Reporting Limits (BRL). A copy of the original laboratory report and chain-of-custody are included in Appendix C.

3.0 SUMMARY OF GROUNDWATER SAMPLING PROTOCOL

On July 16-17, GEC was on site to perform groundwater sampling at the Mercer Triangle. The following wells were to be sampled: MWA-1, MWA-2, MWB-4, MWA-5, MWD-6, MWA-8, MW-9, MW-10, MW-12, MW-13, MW-14, MW-15, and MW-16.

GEC arrived at the subject facility on July 16, 2015 to collect groundwater levels from the above-noted wells. Following the measurement of the groundwater depth, a required volume of water to be purged from each well was calculated specifically for the individual well. The wells were then slow-purged of a required volume determined specifically for each well utilizing a Proactive S.S. Hurricane centrifugal pump to minimize turbidity, which is equipped with an adjustable flow controller for low flow purging and sampling. Field parameters (pH, turbidity, conductivity, dissolved oxygen, oxidation/reduction potential (ORP), and temperature) were continually analyzed during the purging process utilizing a flow cell connected to a Horiba Water Quality Monitoring probe, which utilizes a hand-held computer for rapid, accurate measurement and display of the water quality parameters. The groundwater was pumped through the flow cell, and the field parameters were continually analyzed by the Horiba. Readings were recorded at least three times on five to six-minute intervals before sample collection began. Following the purging of each well, the well was sampled for metals through the pump. The pump was then removed from the well and a dedicated disposable PVC bailer was lowered into the well for volatile organic compound (VOC) collection. The VOC samples were immediately placed in a cooler with ice. The Horiba instrument was field calibrated each day prior to use. The water quality instruments, parameter measurement containers, and Hurricane pump were thoroughly cleansed with Liquinox soap solution and then rinsed with deionized water in preparation for the next monitoring point. Samples were collected as per EPD protocol as outlined in EPA Region 4 Field Branches Quality System and Technical Procedures, science and Ecosystem Support Division (SESD Ops), "Procedure SESDPROC-301-R3, Groundwater Sampling," effective date March 6, 2013, referenced in the EPD comment letter.

Following the completion of all sampling, the samples were transported back to the GEC office and placed into refrigeration. The following day, the samples were packed in ice and shipped overnight to Analytical Environmental Services Laboratory in Atlanta, Georgia with a corresponding chain of custody form. Copies of the laboratory analytical results and field parameter sheets for each sampling event are included in Appendix C.

4.0 SUMMARY OF FIELD AND HYDROGEOLOGIC PARAMETERS

Field parameters were measured at each well until stabilization of parameters was achieved. The turbidity in each sample was found to be above 38 NTU in every sample, except for MWD-6, due to the cloudy nature of the groundwater. Also, the pH in every well except MWB-4 was found to range between 2 and 5. This is likely a result of residual sodium persulfate in the groundwater. The readings for ORP, dissolved oxygen, and conductivity did not indicate conditions that would be uncommon for the site. Please refer to Appendix D for the field parameter sheets from each sampling event.

Based on groundwater levels measured during the July 2015 sampling event, the groundwater elevations decreased overall since the previous sampling event in June 2014. Groundwater levels showed a drop in every well sampled. The groundwater elevations are summarized on Table 3 in Appendix B.

5.0 GROUNDWATER SAMPLING [7/16-17/15]

On July 16 and 17, 2015, GEC performed Groundwater sampling at the subject facility. The following wells were sampled for Appendix I VOCs: MWA-1, MWA-2, MWB-4, MWA-5, MWD-6, MWA-8, MW-9, MW-10, MW-12, MW-13, MW-14, MW-15, and MW-16. Once the samples were collected, the groundwater samples were placed in laboratory-supplied, vapor and fluid tight containers, labeled, preserved on ice, and delivered to Analytical Environmental Services Laboratory in Atlanta, Georgia for analytical testing. Proper chain of custody procedures and documentation were observed. The water samples were analyzed for the Appendix I VOCs using EPA Method 8260B.

The analytical data indicated that tetrachloroethene (PCE) and trichloroethene (TCE) are still present above their respective MCLs. However, the highest PCE and TCE concentrations continue to persist in well MWA-1 and MWA-2. PCE and TCE concentrations continue to exhibit stable concentrations well below the historical high concentrations for each well. Well MWA-5 continues to be the only well with detections of chloromethane, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-trichloroethane, and methylene chloride. These compounds were first detected in MWA-5 in April 2012. Since that sampling event, the concentrations for each of the above-noted compounds have decreased substantially, with methylene chloride's concentrations decreasing from 600 to 25 μg/L and 1,2-dichloroethane decreasing from 28 to 6.44 μg/L. However, the June 2014 event showed an increase in the compounds with 1,2-dichloroethane concentration increasing from 6.44 to 9.8 μg/L, 1,1,2-Trichlorethane increasing from 4.37 to 12 μg/L and methylene chloride increasing from 25 to 210 μg/L. The July 2015 sampling event shows that these compounds have all decreased to less than 5.0 ug/L with the exception of Methylene Chloride which decreased from 210 ug/L to 40 ug/L. The presence of these compounds may be the result of degradation of PCE and TCE.

All of the wells sampled except for MWA-8, MW-10, MW-14, MW-15 and MW-16, had increases in PCE and TCE concentrations in the latest sampling event. Although the majority of the sampled wells showed an increase in PCE and TCE concentrations, the concentration values are lower than the historically highest values. The results for volatile organic compounds and metals analysis are included on Table 2A and 2B in Appendix B.

Historical data has indicated that the groundwater contamination has been delineated to respective MCLs in all directions with the addition of MW-16 to the southwest. The groundwater contamination continues to follow historical trends. There are some signs of increases for TCE and PCE, but are still well below historical high concentrations. All groundwater contamination levels detected during the July 2015 were well below historical highs for each respective well in which contamination has been observed.

6.0 VAPOR INTRUSION MODELING

Currently, the groundwater contaminant plume underlies a number of buildings within the project area. Therefore, the potential for vapor intrusion is a concern. Per GaEPD request (Correspondence dated May 22, 2015), GEC utilized the EPA Vapor Intrusion Screening Levels Calculator (VISL), groundwater concentration to indoor air concentration spreadsheet, to evaluate this concern. The VISL spreadsheet was utilized to evaluate the potential for vapor intrusion because it is routinely revised with updated Regional Screening Levels (RSLs), toxicity, and parameter changes, which makes it more suitable for evaluation of the VOCs detected at the site.

In accordance with worst-case potential vapor intrusion pathway scenarios originally modeled by EPD, GEC utilized the most recent (July 2015) groundwater sampling data for PCE and TCE concentrations in monitoring wells MWA-1 and MWA-2, to evaluate potential commercial exposure scenarios. Similarly, the most recent PCE and/or TCE groundwater concentrations in monitoring wells MW-10, MW-13, and MW-14, were utilized to conservatively evaluate the potential for residential exposures (i.e. on-campus student residences). Note: Groundwater concentrations for cis-1,2-dichloroethene (CAS #156-59-2) identified MWA-1, MWA-2, and MW-13, were not included in the VISL calculation, because the chemical does not have toxicity data, and is therefore not listed.

GEC also modified the default VISL parameters where site-specific information was available, including revision of the water temperature parameter from the default of 25°C to 20°C and revision of the groundwater attenuation factor from 0.001 to 0.0005, based upon soil conditions. GEC also revised the Target Risk for Carcinogens from $1.00E^{-06}$ to $1.00E^{-05}$ (per GaEPD guidance), and set exposure scenarios at commercial for monitoring wells located in the area of the triangle, and at residential for monitoring wells located near on-campus buildings.

Commercial Vapor Intrusion Evaluation

Review of the VISL worksheets indicated that calculated indoor air concentrations (based upon July 2015, MWA-1 and MWA-2 groundwater data) indicated the following:

- Concentrations of PCE in air were calculated below the Target Risk for Carcinogens (TCR 1.00×10^{-5}) and the Target Hazard Quotient for Non-Carcinogens (THQ 1) for both monitoring wells.
- Concentrations of TCE in indoor air were calculated below the conservative Target Risk for Carcinogens for both monitoring wells.
- Concentrations of TCE in indoor air ***exceeded*** the Target Hazard Quotient for Non-Carcinogens.

Residential Vapor Intrusion Evaluation

Review of the VISL worksheets indicated that calculated indoor air concentrations (based upon July 2015, MW-10, MW-13, and MW-14 groundwater data) indicated the following:

- MW-10 and MW-14: Indoor concentrations of PCE and TCE in air were calculated below the conservative Target Risk for Carcinogens and the Target Hazard Quotient for Non-Carcinogens.
- MW-13: Concentrations of TCE in indoor air ***exceeded*** the Target Risk for Carcinogens and Target Hazard Quotient for Non-Carcinogens.

Based upon the results of VISL calculations, it appears that TCE groundwater concentrations represent a potential vapor-intrusion risk under both commercial and residential scenarios.

Copies of the VISL data sheets for all iterations are included in Appendix E.

7.0 GROUNDWATER MODELING

GEC utilized the Biochlor Natural Attenuation Decision Support System to determine the viability of natural attenuation for this site. The Biochlor input sheet and center line result sheets are included in Appendix F. Two different models were run by changing the model area length. A document describing the inputs is also included in Appendix F. Model analysis indicates that natural attenuation will effectively remediate the plume, which is still on Mercer University property.

8.0 CONCLUSION

Based upon the observance of increasing PCE and TCE concentrations, GEC proposes to continue semi-annual groundwater sampling to monitor the groundwater plume, and reporting per the approved VIRP application.

Additionally, due to the potential for vapor-intrusion, as identified utilizing groundwater concentration data from MWA-1, MWA-2, and MW-13, GEC recommends soil-gas vapor and indoor air testing to further evaluate the potential vapor intrusion exposure pathway.

GEC will complete another semi-annual monitoring event, which will include the full groundwater monitoring network. The next submittal will include updated vapor intrusion analysis utilizing the new soil-gas data and groundwater data.

Copies of the invoice summaries since the VIRP application submittal are presented in Appendix G. The summaries include a breakdown of hours used per project task.

APPENDIX A

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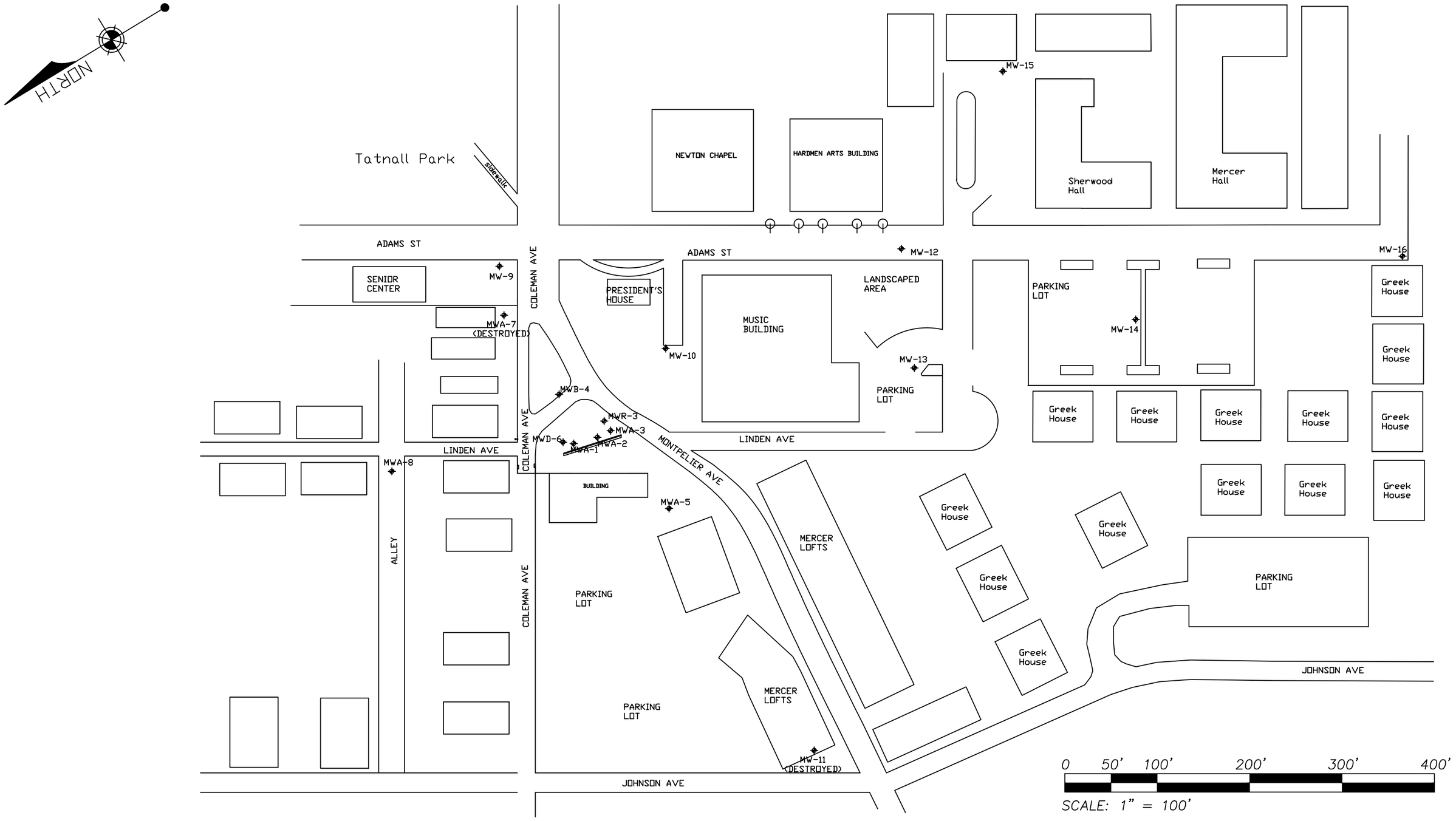

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FIGURE 1
SITE MAP
MERCER UNIVERSITY TRIANGLE, HSRA #10779
MACON, BIBB COUNTY, GEORGIA
GEC JOB #090698.210

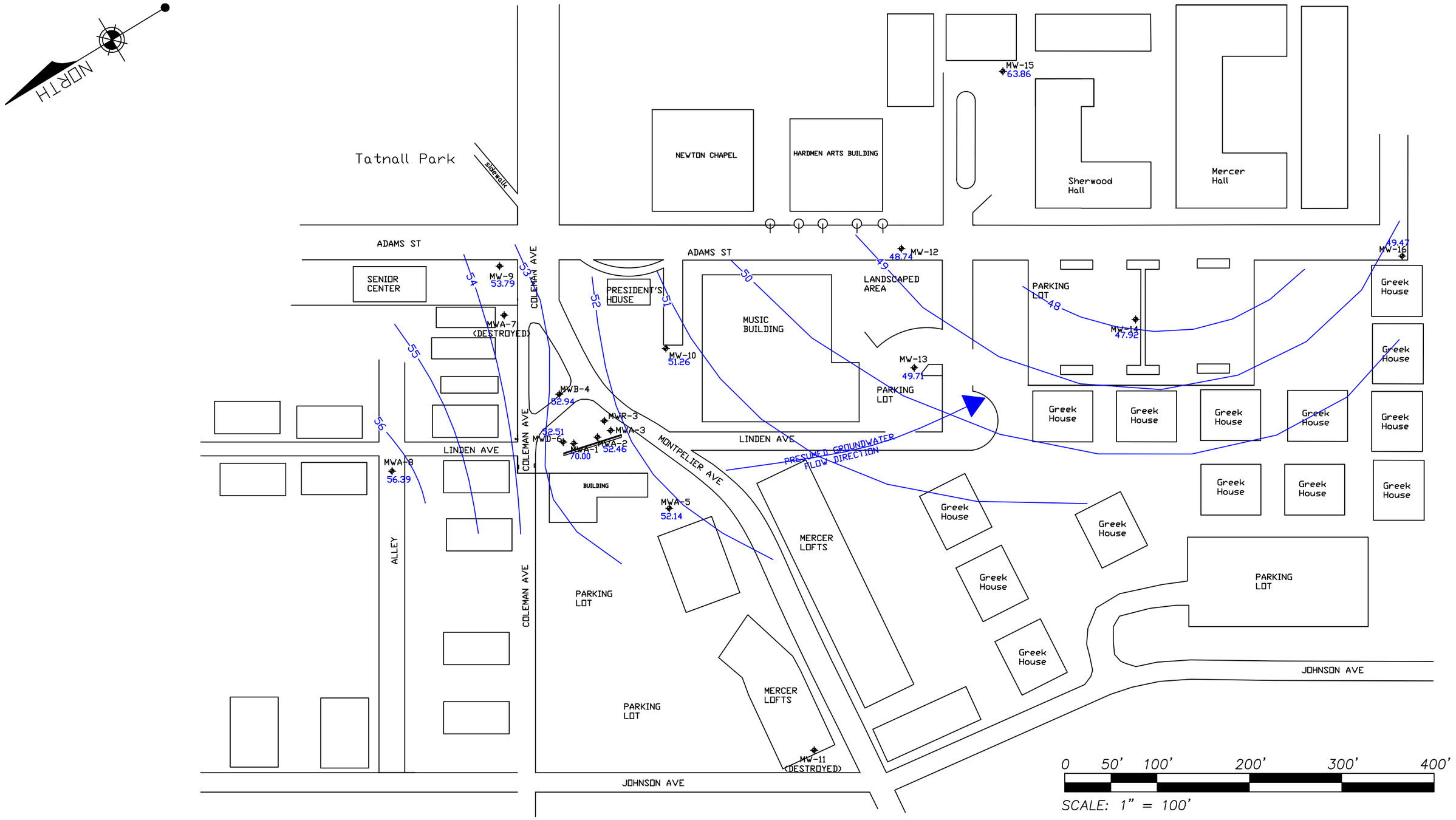

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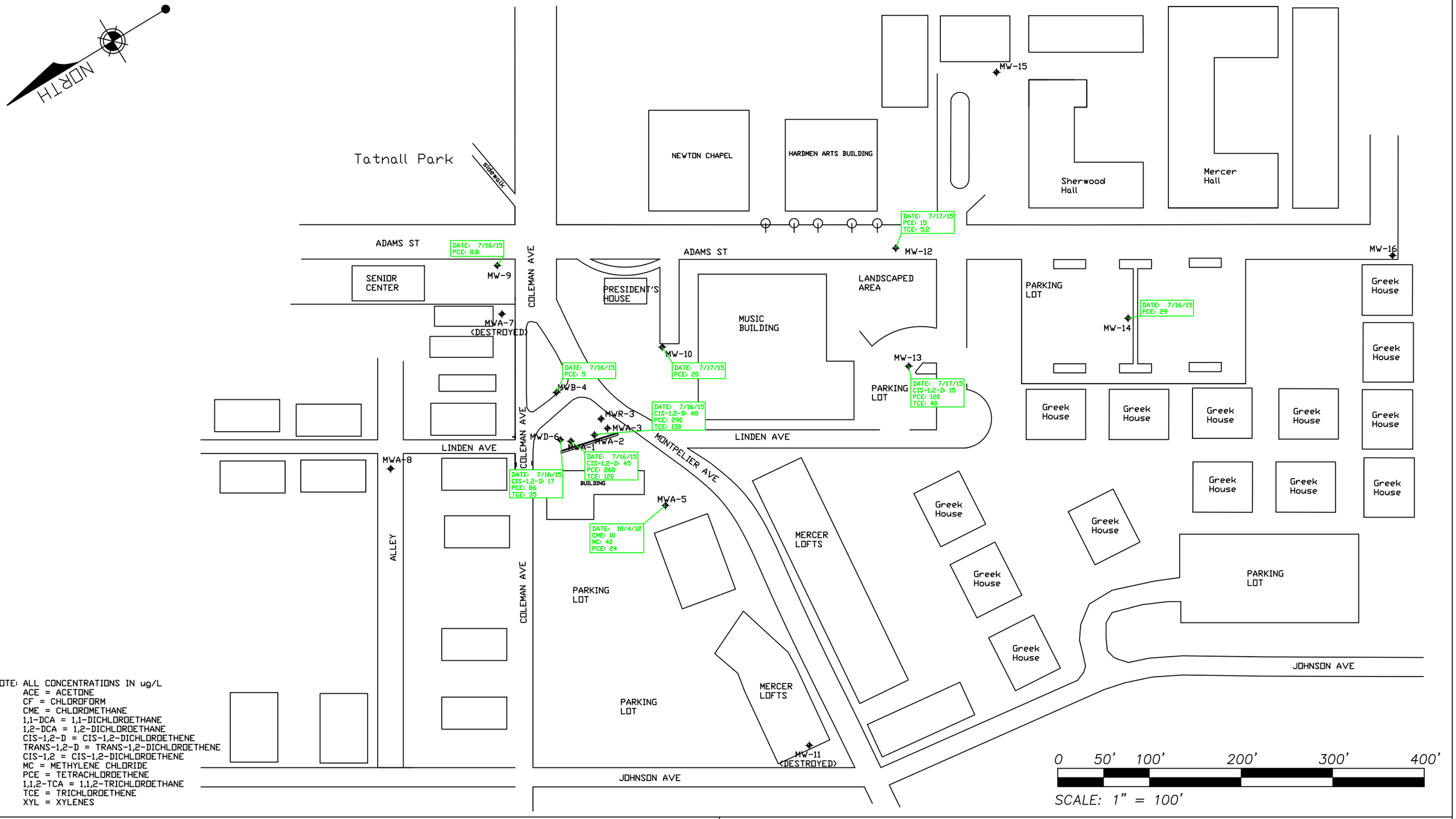
FIGURE 2
JULY 2015, POTENTIOMETRIC CONTOUR MAP
MERCER TRIANGLE, HSRA #10779
MACON, BIBB COUNTY, GEORGIA
GEC JOB #090698.210



NOTE: ALL CONCENTRATIONS IN ug/L
ACE = ACETONE
CF = CHLOROFORM
CME = CHLOROMETHANE
1,1-DCA = 1,1-DICHLOROETHANE
1,2-DCA = 1,2-DICHLOROETHANE
CIS-1,2-D = CIS-1,2-DICHLOROETHENE
TRANS-1,2-D = TRANS-1,2-DICHLOROETHENE
CIS-1,2 = CIS-1,2-DICHLOROETHENE
MC = METHYLENE CHLORIDE
PCE = TETRACHLOROETHENE
1,1,2-TCA = 1,1,2-TRICHLOROETHANE
TCE = TRICHLOROETHENE
XYL = XYLENES

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FIGURE 3: GROUNDWATER QUALITY MAP
VOCs - JULY 2015
MERCER TRIANGLE, HSRA #10779
MACON, BIBB COUNTY, GEORGIA
GEC JOB #090698.210

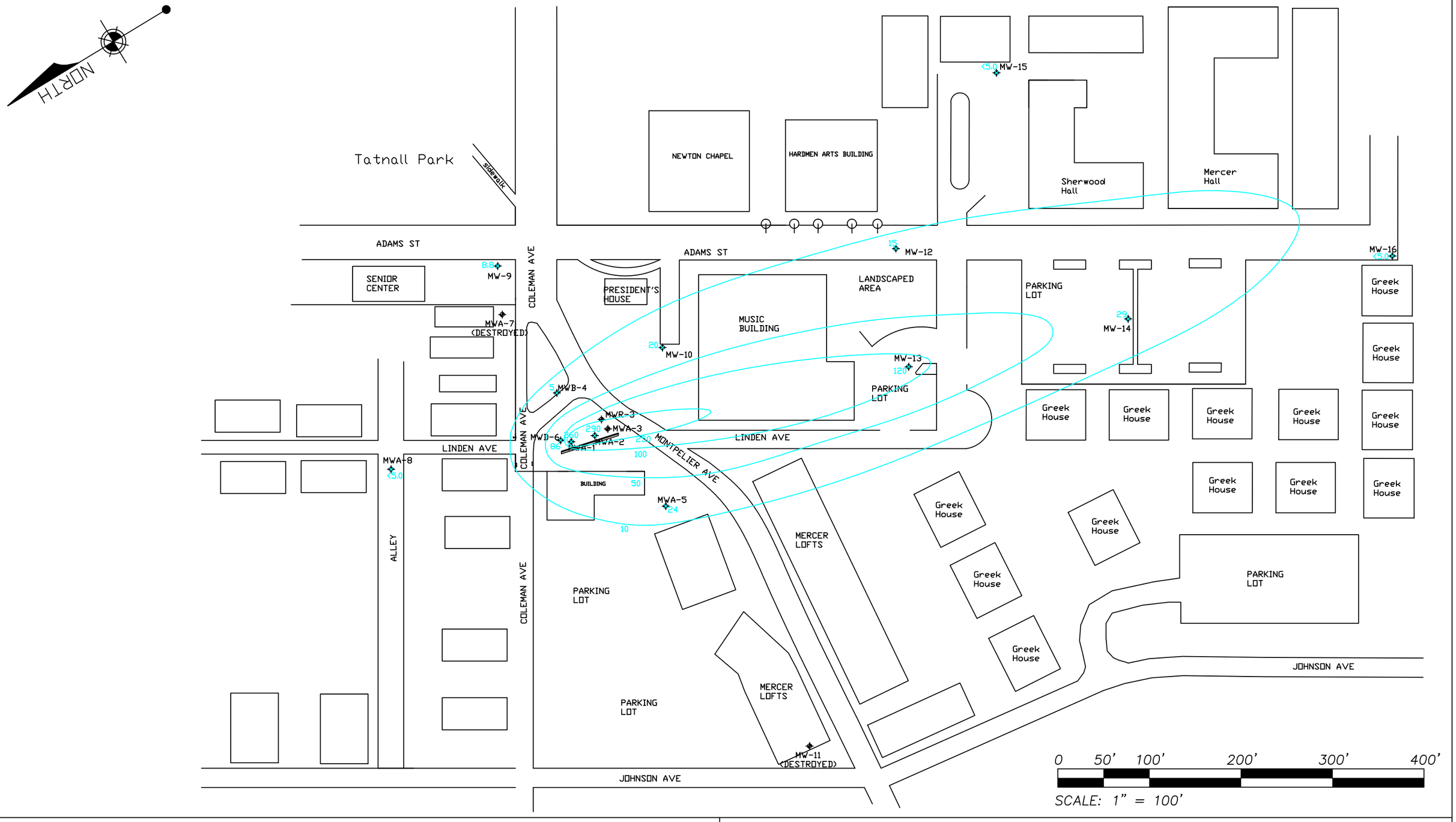

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FIGURE 4A
JUNE 2014, PCE ISOCONTOUR MAP
MERCER TRIANGLE, HSRA #10779
MACON, BIBB COUNTY, GEORGIA
GEC JOB #090698.210

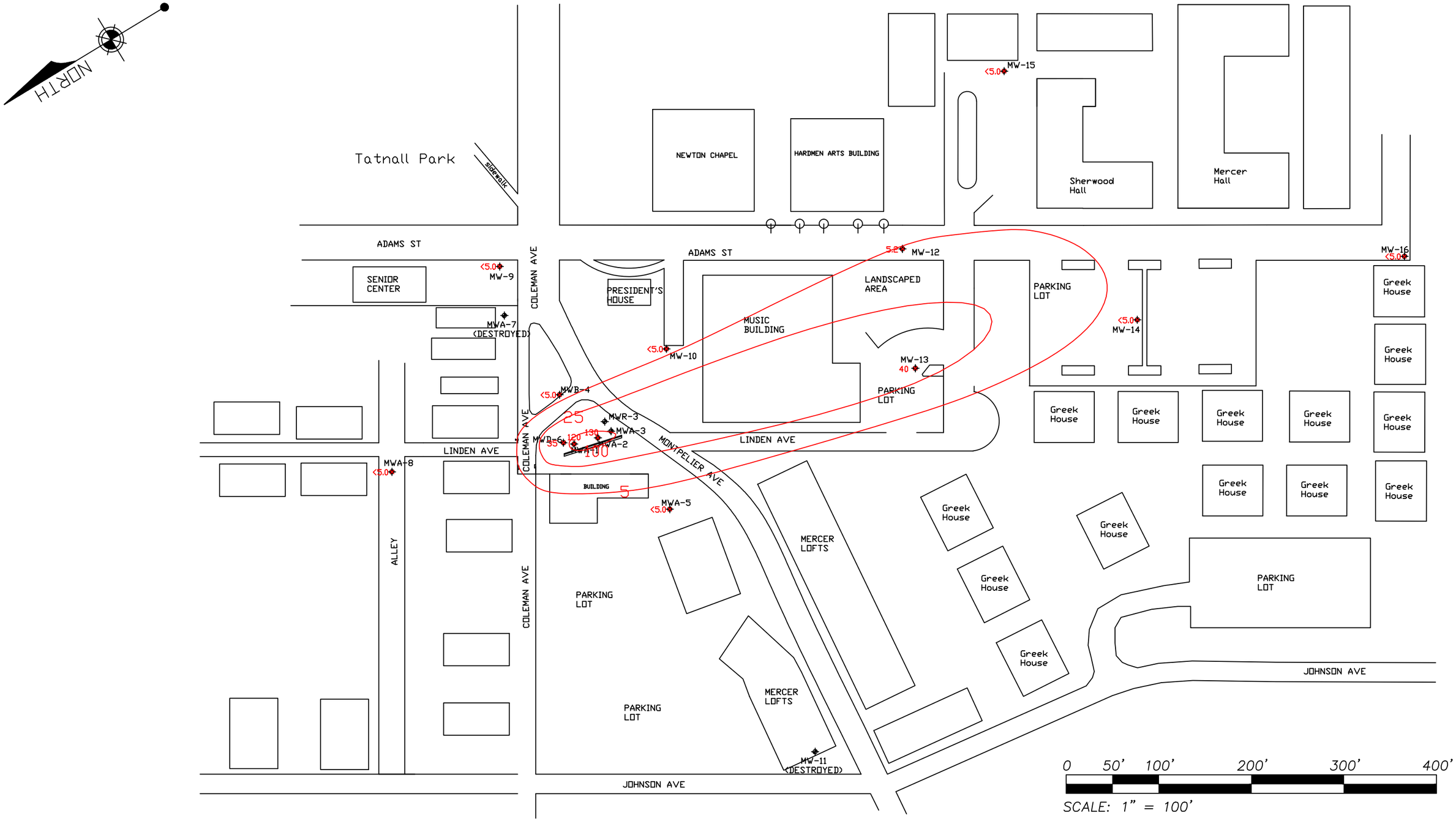

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FIGURE 4B
JULY 2015, TCE ISOCONTOUR MAP
MERCER TRIANGLE, HSRA #10779
MACON, BIBB COUNTY, GEORGIA
GEC JOB #090698.210

APPENDIX B

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Table 1
Risk Reduction Standards

Soil	
Constituent	Type 1 and/or 4 RRS (mg/kg)
Tetrachloroethene	0.5
Trichloroethene	0.5
Cis 1,2-Dichloroethene	7
Trans 1,2-Dichloroethene	10
Acetone	400
Benzene	0.5
Toluene	100
Ethylbenzene	70
Xylenes	1,000
Naphthalene	100
1,2 Dichlorobenzene	60
Vinyl Chloride	0.2
Groundwater	
Constituent	Type 1 and/or 4 RRS (ug/L)
Tetrachloroethene	5
Trichloroethene	5
Cis 1,2-Dichloroethene	70
Trans 1,2-Dichloroethene	100
Benzene	5
Toluene	1,000
Ethylbenzene	700
Xylenes	1,0000
Naphthalene	20
1,2 Dichlorobenzene	600
Vinyl Chloride	2

Mercer Triangle
1535 Montpelier Ave
Macon, Bibb County, HSI # 10779

TABLE 2A: GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Well Number	Date Sampled	Acetone	Benzene	Toluene	Ethylbenzene	Xylenes	cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Naphthalene	Tetrachloroethene	Trichloroethene	1,2-Dichloro benzene	Di-isopropyl ether	p-Isopropyltoluene	Chloromethane	Chloroform	Carbon Disulfide	1,1-Dichloroethane	1,2-Dichloroethane	1,1,2-Trichloroethane
MW-1*	10/11/2002	<10.0	**190**	**510**	**130**	**470**	**10**	<1.0	**25**	**180**	**14**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-2*	10/11/2002	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MWA-1	12/18/2002	<10.0	<1.0	<5.0	<1.0	<3.0	**23**	<1.0	<1.0	**550**	**30**	**1.1**	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	3/24/2006	<10.0	<1.0	<5.0	<1.0	<3.0	**120**	**2.4**	<5.0	**560**	**240**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**150**	**4.1**	<5.0	**1200**	**340**	**1.5**	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	2/21/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**190**	<1.0	<5.0	**760**	**400**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<20	<100	<20	<60	**72**	<20	<100	**500**	**240**	<20	<20	<20	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/29/2010	<10.0	<1.0	<5.0	<1.0	<3.0	**30**	**2.6**	<5.0	**200**	**86**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2011	<10.0	<1.0	<5.0	<1.0	<3.0	**95**	**2.6**	<5.0	**590**	**230**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	**45**	**2.6**	<5.0	**210**	**78**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	**19.5**	<1.0	<5.0	<1.0	<3.0	**64.3**	**3.78**	<5.0	**522**	**155**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	**76**	**7.8**	NT	**350**	**200**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	10/16/2013	<50	<5	<5	<5	<10	**37**	<5.0	NT	**380**	**140**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/23/2014	<50	<1.0	<5	<1.0	<3.0	**16**	**1.6**	<5	**63**	**41**	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/16/2015	<50	<5.0	<5.0	<5.0	<5.0	**45**	<5.0	NT	**260**	**120**	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MWA-2	12/18/2002	<10.0	<1.0	<5.0	<1.0	<3.0	**2.2**	<1.0	<5.0	**110**	**3.6**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	3/24/2006	<10.0	<1.0	<5.0	<1.0	<3.0	**55**	**1.1**	<5.0	**330**	**110**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**6.8**	<1.0	<5.0	**200**	**21**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	2/21/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**4.7**	<1.0	<5.0	<1.0	**12**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**70**	**2.6**	<5.0	**350**	**150**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/29/2010	<10.0	<1.0	<5.0	<1.0	<3.0	**9.7**	**1.4**	<5.0	**69**	**28**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2011	<10.0	<1.0	<5.0	<1.0	<3.0	**33**	**4.1**	<5.0	**190**	**71**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	**3.6**	<1.0	<5.0	**32**	**7.9**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<10.0	<1.0	<5.0	<1.0	<3.0	**3.39**	<1.0	<5.0	**47.7**	**9.38**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	**7.4**	<5	NT	**89**	**18**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	10/17/2013	<50	<5	<5	<5	<5	**35**	<5	NT	**240**	**100**	20	NT	NT	<10	<5	<5	<5	<5	<5
	6/23/2014	<50	<1.0	<5	<1.0	<5	**9.9**	<1.0	<5	**65**	**26**	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/16/2015	<50	<5.0	<5.0	<5.0	<5.0	**48**	<5.0	NT	**290**	**130**	<5.0	NT	NT	<10.0	<5.0	NT	<5.0	<5.0	<5.0
MWA-3	12/18/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NT	NT	NS	NS	NS	NS	NS	NS
	3/24/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NT	NT	NS	NS	NS	NS	NS	NS
	4/13/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/29/2010	<10.0	<1.0	<5.0	<1.0	<3.0	16	2.2	<5.0	**89**	**40**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0

Mercer Triangle
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TABLE 2A: GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Well Number	Date Sampled	Acetone	Benzene	Toluene	Ethylbenzene	Xylenes	cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Naphthalene	Tetrachloroethene	Trichloroethene	1,2-Dichloro benzene	Di-isopropyl ether	p-Isopropyltoluene	Chloromethane	Chloroform	Carbon Disulfide	1,1-Dichloroethane	1,2-Dichloroethane	1,1,2-Trichloroethane
MWR-3	9/16/2011	<10.0	<1.0	<5.0	<1.0	<3.0	44	4.3	<5.0	190	92	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/4/2012	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
	4/30/2013	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
MWB-4	12/18/2002	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	11	<1.0	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	3/28/2006	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	31	3.4	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	4.1	<1.0	<5.0	69	15	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	2/21/2008	<10.0	<1.0	<5.0	<1.0	<3.0	4.9	<1.0	<5.0	45	14	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<1.0	<5.0	<1.0	<3.0	3	<1.0	<5.0	36	13	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/29/2010	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	7.9	2.8	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	6.83	3.51	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	<5	<5	<5	NT	NT	<10	<5	8.4	<5	<5	<5
	10/17/2013	<50	<5	<5	<5	<10	<5	<5	NT	5.6	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/23/2014	<50	<1.0	<5	<1.0	<3.0	<1.0	<1.0	<5	2.9	1.6	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/16/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	5	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MWA-5	8/24/2006	NT	NT	NT	NT	NT	<1.0	<1.0	NT	27	<1.0	<1.0	NT	NT	NT	NT	NT	NT	NT	NT
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	20	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2009	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	26	1.4	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/30/2010	<10.0	12	81	5.2	16	3	<1.0	<5.0	66	8.6	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2011	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	26	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	9	<1.0	<1.0	<1.0	<1.0	490	16	<1.0	11	28	16
	10/4/2012	18	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	28.7	1.09	<1.0	<1.0	<1.0	65.6	6.09	<1.0	1.49	6.44	4.37
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	26	<5	<5	NT	NT	19	<5	<5	<5	<5	<5
	10/17/2013	<50	<5	<5	<5	<10	<5	<5	NT	24	<5	<5	NT	NT	29	<5	<5	<5	<5	<5
	6/23/2014	<50	<5	<25	<5	<15	<5	<5	<25	16	<5	<5	<5	<5	44	<5	NT	5	9.8	12
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	24	<5.0	<5.0	NT	NT	10	<5.0	<5.0	<5.0.	<5.0	<5.0
MWD-6	8/24/2006	NT	NT	NT	NT	NT	<1.0	<1.0	NT	5	<1.0	<1.0	NT	NT	NT	NT	NT	NT	NT	NT
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	11	<1.0	<5.0	47	16	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<1.0	<5.0	<1.0	<3.0	28	1.2	<5.0	150	74	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/30/2010	<10.0	<1.0	<5.0	<1.0	<3.0	2.1	<1.0	<5.0	17	5.3	<1.0	<1.0	<1.0	8.9	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2011	<10.0	<1.0	<5.0	<1.0	<3.0	1.6	<1.0	<5.0	5	1.7	<1.0	<1.0	<1.0	25	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	4.8	<1.0	<5.0	13	6.9	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0

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TABLE 2A: GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Well Number	Date Sampled	Acetone	Benzene	Toluene	Ethylbenzene	Xylenes	cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Naphthalene	Tetrachloroethene	Trichloroethene	1,2-Dichloro benzene	Di-isopropyl ether	p-Isopropyltoluene	Chloromethane	Chloroform	Carbon Disulfide	1,1-Dichloroethane	1,2-Dichloroethane	1,1,2-Trichloroethane
	10/4/2012	**88.8**	<1.0	<1.0	<1.0	2.1	**5.01**	<1.0	NT	**17**	**7.5**	<1.0	NT	NT	<1.0	**1.22**	<1.0	<1.0	<1.0	<1.0
	4/30/2013	**80**	<5	<5	<5	<5	**32**	<5	NT	**94**	**46**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	10/17/2013	**88**	<5	<5	<5	<10	**47**	<5	NT	**200**	**87**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<10	**14**	<1.0	<5	**56**	**20**	<1.0	<1.0	<1.0	**2.6**	<5	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	**17**	<5.0	NT	**86**	**35**	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MWA-7	8/24/2006	NT	NT	NT	NT	NT	**7.6**	<1.0	NT	**14**	**16**	<1.0	NT	NT	NT	**NT**	NT	NT	NT	NT
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**2**	<1.0	<5.0	**7.7**	**3.1**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**1.8**	<1.0	<5.0	**8.7**	**2**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MWA-8	9/22/2006	NT	NT	NT	NT	NT	<1.0	<1.0	NT	<1.0	<1.0	<1.0	NT	NT	NT	NT	NT	NT	NT	NT
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2009	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/16/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	<5	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<3.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/16/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-9	10/17/2007	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**5.1**	**1**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**4**	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**1.1**	<1.0	<5.0	**6.2**	**1.1**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	7/30/2010	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**5.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2011	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**3.5**	<1.0	<1.0	<1.0	<1.0	**<1.0**	<5.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<10.0	<1.0	<1.0	<1.0	**2.1**	<1.0	<1.0	NT	**4.33**	<1.0	<1.0	NT	NT	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	<5	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	10/17/2013	<50	<5	<5	<5	<10	<5	<5	NT	<5	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<3	<1.0	<1.0	<5	**1.9**	<1.0	<5	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/16/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	**8.8**	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-10	10/17/2007	<10.0	<1.0	<5.0	<1.0	<3.0	**12**	<1.0	<5.0	**71**	**11**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**8.8**	<1.0	<5.0	<1.0	<1.0	<1.0	**4.7**	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**2.5**	<1.0	<5.0	**50**	**6.5**	<1.0	**1.1**	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/19/2011	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**25**	**3.7**	<1.0	**1.1**	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**11**	**1.9**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry

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TABLE 2A: GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Well Number	Date Sampled	Acetone	Benzene	Toluene	Ethylbenzene	Xylenes	cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Naphthalene	Tetrachloroethene	Trichloroethene	1,2-Dichloro benzene	Di-isopropyl ether	p-Isopropyltoluene	Chloromethane	Chloroform	Carbon Disulfide	1,1-Dichloroethane	1,2-Dichloroethane	1,1,2-Trichloroethane
	10/17/2013	<50	<5.0	<5.0	<5.0	<10	<5.0	<5.0	NT	**35**	<5.0	<5.0	NT	NT	<10	<5.0	<5.0	<5.0	<5.0	<5.0
	6/24/2014	<50	<1.0	<5.0	<1.0	<3.0	**1.1**	<1.0	<5.0	**30**	4.9	<1.0	<1.0	<1.0	<2.5	<5.0	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	**20**	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-11	10/17/2007	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2009	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	11/19/2007	<10.0	<1.0	<5.0	<1.0	<3.0	**21**	<1.0	<5.0	**180**	**43**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**4.4**	<1.0	<5.0	**46**	**9.4**	<1.0	<1.0	**54**	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**1.5**	<1.0	<5.0	**37**	**5.1**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	**6.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	**5.3**	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<3.0	<1.0	<1.0	<5	**7.2**	**1.1**	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	**15**	**5.2**	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-13	11/19/2007	<10.0	<1.0	<5.0	<1.0	<3.0	**3.1**	<1.0	<5.0	**41**	**6.5**	<1.0	NT	NT	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	**19**	<1.0	<5.0	**150**	**47**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/14/2009	<10.0	<1.0	<5.0	<1.0	<3.0	**10**	<1.0	<5.0	**82**	**26**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/13/2012	<10.0	<1.0	<5.0	<1.0	<3.0	**7.9**	**1.3**	<5.0	**83**	**22**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<1.0	<3	<5	<5	NT	**15**	<5	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<3	**6.6**	<1.0	<5.0	**36**	**13**	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	**15**	<5.0	NT	**120**	**40**	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-14	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	2.1	<1.0	<5.0	**71**	**40**	<1.0	2	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/16/2009	<10.0	<1.0	<5.0	<1.0	<3.0	9.5	<1.0	<5.0	**79**	**25**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	1.4	<1.0	<5.0	**40**	**5.7**	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	**30**	**6**	<5	NT	NT	<10	<5	<5	<5	<5	<5
	6/23/2014	<50	<1.0	<5	<1.0	<3	8.1	<1.0	<5	**55**	**18**	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	**29**	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-15	1/18/2008	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	9/15/2009	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/11/2012	<10.0	<1.0	<5.0	<1.0	<3.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
	4/30/2013	<50	<5	<5	<5	<5	<5	<5	NT	<5	<5	<5	<5	NT	NT	<10	<5	<5	<5	<5
	6/24/2014	<50	<1.0	<5	<1.0	<3.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5	<5	NT	<1.0	<1.0	<1.0
	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0

Mercer Triangle
1535 Montpelier Ave
Macon, Bibb County, HSI # 10779

TABLE 2A: GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Well Number	Date Sampled	Acetone	Benzene	Toluene	Ethylbenzene	Xylenes	cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Naphthalene	Tetrachloroethene	Trichloroethene	1,2-Dichloro benzene	Di-isopropyl ether	p-Isopropyltoluene	Chloromethane	Chloroform	Carbon Disulfide	1,1-Dichloroethane	1,2-Dichloroethane	1,1,2-Trichloroethane
MW-16	7/17/2015	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NT	<5.0	<5.0	<5.0	NT	NT	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
Type 1 Risk Reduction Standards (ug/l)		4000	--	--	700	10,000	70		20	5	5	600	--	--		100			5	5
Type 4 Risk Reduction Standards (ug/l)		--	8.8	5241	--	--	1020	161	--	--	34.5	--	--	--	861			29000		

NOTE: All units reported in ug/l (ppb)
NOTE: NS = Not Sampled due to insufficient recharge; NT = Not Tested.
NOTE: * Only initial boring and sample locations, only temporary wells were used at MW-1 or MW-2
NOTE: The higher value between Type 1 and Type 4 RRS were used for determining whether or not the RRS had been exceeded.

Indicates exceedance of Type 1 RRS
7/30/2010 indicates dates after ISCO treatment

Please see laboratory results in Appendix C for full listing of QC Qualifiers

Mercer Triangle
1535 Montpelier Ave
Macon, Bibb County, HSI # 10779

TABLE 3: GROUNDWATER ELEVATIONS

Well Number	Date Measured	Ground Surface Elev. (ft)	Top of Casing Elev. (ft)	Depth of Screen Interval (ft)	Water Depth (ft)	Groundwater Elev. (ft)
MWA-1	5/9/2003	101.41	101.56	25-40’	31.26	70.30
	10/25/2006				32.49	68.92
	11/19/2007				32.73	68.83
	1/18/2008				33.32	68.24
	4/11/2012				33.20	68.36
	10/4/2012				31.45	70.11
	4/30/2013				31.10	70.46
	10/16/2013				29.45	72.11
	6/23/2014				30.90	70.66
	7/16/2015				31.56	70.00
MWA-2	5/9/2003	101.74	101.89	35-60’	49.61	52.28
	10/25/2006				50.09	51.80
	11/19/2007				51.64	50.25
	1/18/2008				50.85	51.04
	4/11/2012				51.05	50.84
	10/4/2012				51.29	50.60
	4/30/2013				51.03	50.86
	10/17/2013				48.44	53.45
	6/23/2014				47.87	54.02
	7/16/2015				49.43	52.46
MWA-3	5/9/2003	102.1	102.26	33-53’	50.40	51.86
	10/25/2006				DRY	-
	11/19/2007				DRY	-
	1/18/2008				50.20	52.06
	10/17/2013				DRY	DRY
	6/23/2014				48.40	53.86
	7/16/2015				DRY	DRY
MWB-4	5/9/2003	100.44	100.59	40-55’	47.55	53.04
	10/25/2006				48.43	52.16
	11/19/2007				49.38	51.21
	1/18/2008				49.60	50.99
	4/11/2012				49.30	51.29
	10/4/2012				49.56	51.03
	4/30/2013				49.25	51.34
	10/17/2013				46.45	54.14
	6/23/2014				45.85	54.74
	7/16/2015				47.65	52.94
MWA-5	8/12/2006	103.94	103.65	40-65’	42.36	61.29
	10/25/2006				51.98	51.67
	11/19/2007				52.45	51.20
	1/18/2008				52.68	50.97
	4/11/2012				52.77	50.88
	10/4/2012				53.22	50.43

Mercer Triangle
1535 Montpelier Ave
Macon, Bibb County, HSI # 10779

TABLE 3: GROUNDWATER ELEVATIONS

Well Number	Date Measured	Ground Surface Elev. (ft)	Top of Casing Elev. (ft)	Depth of Screen Interval (ft)	Water Depth (ft)	Groundwater Elev. (ft)
	4/30/2013				53.20	50.45
	10/17/2013				51.45	52.20
	6/23/2014				50.35	53.30
	7/17/2015				51.51	52.14
MWD-6	8/12/2006	101.28	101.13	63-73’	68.32	32.81
	10/25/2006				51.48	49.65
	11/19/2007				49.41	51.72
	1/18/2008				49.52	51.61
	4/11/2012				49.81	51.32
	10/4/2012				49.90	51.23
	4/30/2013				51.80	49.33
	10/17/2013				47.23	53.90
	6/24/2014				46.75	54.38
	7/17/2015				48.62	52.51
MW-7	8/12/2006	100.13	99.9	5-20’	8.47	91.43
	10/25/2006				10.88	89.02
	11/19/2007				18.78	81.12
	1/18/2008				13.28	86.62
MWA-8	9/20/2006	98.13	97.96	45-60’	51.63	46.33
	10/25/2006				42.76	55.20
	11/19/2007				42.3	55.66
	1/18/2008				42.48	55.48
	4/11/2012				42.49	55.47
	4/30/2013				41.85	56.11
	6/24/2014				40.03	57.93
	7/16/2015				41.57	56.39
MW-9	10/26/2007	98.22	97.81	35-50’	44.96	52.85
	11/19/2007				44.83	52.98
	1/18/2008				45.10	52.71
	4/11/2012				45.13	52.68
	10/4/2012				45.27	52.54
	4/30/2013				44.71	53.10
	10/17/2013				42.35	55.46
	6/24/2014				41.92	55.89
	7/16/2015				44.02	53.79
MW-10	10/26/2007	112.85	112.67	50-65’	61.43	51.24
	11/19/2007				62.05	50.62
	1/18/2008				62.19	50.48
	4/11/2012				63.10	49.57
	10/4/2012				DRY	DRY
	10/17/2013				60.75	51.92
	6/24/2014				59.88	52.79

Mercer Triangle
1535 Montpelier Ave
Macon, Bibb County, HSI # 10779

TABLE 3: GROUNDWATER ELEVATIONS

Well Number	Date Measured	Ground Surface Elev. (ft)	Top of Casing Elev. (ft)	Depth of Screen Interval (ft)	Water Depth (ft)	Groundwater Elev. (ft)
	7/17/2015				61.41	51.26
MW-11	10/26/2007	111.93	111.7	55-70’	58.89	52.81
	11/19/2007				58.88	52.82
	1/18/2008				59.60	52.10
MW-12	11/19/2007	118.32	118.09	68-83’	71.30	46.79
	1/18/2008				71.49	46.60
	4/11/2012				71.17	46.92
	4/30/2013				72.60	45.49
	6/24/2014				68.21	49.88
	7/17/2015				69.35	48.74
MW-13	11/19/2007	115.99	115.72	60-75'	67.72	48.00
	1/18/2008				68.00	47.72
	4/11/2012				67.97	47.75
	4/30/2013				69.35	46.37
	6/24/2014				65.38	50.34
	7/17/2015				66.01	49.71
MW-14	1/18/2008	118.58	118.39	70-85'	72.80	45.59
	4/11/2012				72.40	45.99
	4/30/2013				74.38	44.01
	6/23/2014				69.93	48.46
	7/17/2015				70.47	47.92
MW-15	1/18/2008	115.04	114.64	50-65'	57.02	57.62
	4/11/2012				53.25	61.39
	4/30/2013				50.83	63.81
	6/24/2014				49.7	64.94
	7/17/2015				50.78	63.86
MW-16	7/17/2015	106.26	106.03	45-60'	56.56	49.47

APPENDIX C

GEC

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

March 03, 2015

Paige Sforzo
GeoTechnical & Env. Consultants, Inc.
514 Hillcrest Industrial Blvd.
Macon GA 31204

TEL: (478) 757-1606
FAX: (478) 757-1608

RE: Mercer Triangle

Dear Paige Sforzo: Order No: 1502K53

Analytical Environmental Services, Inc. received 1 samples on 2/25/2015 1:25:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/14-06/30/15.
-AIHA-LAP, LLC Laboratory ID: 100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) Direct Examination, effective until 09/01/15.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

CRKanhai

Chantelle Kanhai
Project Manager

ANALYTICAL ENVIRONMENTAL SERVICES, INC
3080 Presidential Drive, Atlanta GA 30340-3704
AES TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1502K53

Date: _____ Page _____ of _____

COMPANY: GEC

ADDRESS: 514 Hillcrest Industrial Macon GA 31204

PHONE:

FAX:

SAMPLED BY: Diana Finch

SIGNATURE: Diana Finch

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	VOC	No # of Containers
1	MW-16	2-23-15	4:10	✓		Soil	✓	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

ANALYSIS REQUESTED

PRESERVATION (See codes)

REMARKS

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

RELINQUISHED BY: DATE/TIME

1: Diana Finch 2-25-15 1700

2:

3:

RECEIVED BY: DATE/TIME

1: Latoya Reeves 2/25/15 1:25

2:

3:

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD

OUT / / VIA:

IN / / VIA:

CLIENT FedEx UPS MAIL COURIER GREYHOUND OTHER_____

PROJECT INFORMATION

PROJECT NAME: Mercer Triangle

PROJECT #:

SITE ADDRESS:

SEND REPORT TO: Paige Sforzo

INVOICE TO: (IF DIFFERENT FROM ABOVE)

QUOTE #:_____ PO#:_____

RECEIPT

Total # of Containers

Turnaround Time Request

- (●) Standard 5 Business Days
- ( ) 2 Business Day Rush
- ( ) Next Business Day Rush
- ( ) Same Day Rush **(auth req.)**
- ( ) Other _____

STATE PROGRAM (if any): _____

E-mail? Y / N; Fax? Y / N

DATA PACKAGE: I II III IV

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES. SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc

Date: 3-Mar-15

Client: GeoTechnical & Env. Consultants, Inc.
Project: Mercer Triangle
Lab ID: 1502K53

Case Narrative

Insufficient sample volume was provided to allow for percent moisture determination.

Analytical Environmental Services, Inc **Date:** 3-Mar-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-16
Project Name:	Mercer Triangle	**Collection Date:**	2/23/2015 4:10:00 PM
Lab ID:	1502K53-001	**Matrix:**	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5035)**				
1,1,1-Trichloroethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,1,2,2-Tetrachloroethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,1,2-Trichloroethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,1-Dichloroethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,1-Dichloroethene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2,4-Trichlorobenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2-Dibromo-3-chloropropane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2-Dibromoethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2-Dichlorobenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2-Dichloroethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,2-Dichloropropane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,3-Dichlorobenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
1,4-Dichlorobenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
2-Butanone	BRL	36		ug/Kg	203880	1	03/03/2015 12:23	MD
2-Hexanone	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
4-Methyl-2-pentanone	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Acetone	BRL	73		ug/Kg	203880	1	03/03/2015 12:23	MD
Benzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Bromodichloromethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Bromoform	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Bromomethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Carbon disulfide	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Carbon tetrachloride	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Chlorobenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Chloroethane	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Chloroform	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Chloromethane	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
cis-1,2-Dichloroethene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
cis-1,3-Dichloropropene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Cyclohexane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Dibromochloromethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Dichlorodifluoromethane	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Ethylbenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Freon-113	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Isopropylbenzene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
m,p-Xylene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Methyl acetate	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Methyl tert-butyl ether	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Methylcyclohexane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Methylene chloride	BRL	15		ug/Kg	203880	1	03/03/2015 12:23	MD
o-Xylene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 3-Mar-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-16
Project Name:	Mercer Triangle	**Collection Date:**	2/23/2015 4:10:00 PM
Lab ID:	1502K53-001	**Matrix:**	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5035)**				
Styrene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Tetrachloroethene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Toluene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
trans-1,2-Dichloroethene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
trans-1,3-Dichloropropene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Trichloroethene	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Trichlorofluoromethane	BRL	3.6		ug/Kg	203880	1	03/03/2015 12:23	MD
Vinyl chloride	BRL	7.3		ug/Kg	203880	1	03/03/2015 12:23	MD
Surr: 4-Bromofluorobenzene	98.3	70-128		%REC	203880	1	03/03/2015 12:23	MD
Surr: Dibromofluoromethane	98.6	78.2-128		%REC	203880	1	03/03/2015 12:23	MD
Surr: Toluene-d8	97	76.5-116		%REC	203880	1	03/03/2015 12:23	MD

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client GeoTechnical Work Order Number 1502K53

Checklist completed by Katie Jacuma 2/26/15
Signature Date

Carrier name: FedEx __ UPS __ Courier __ Client ✓ US Mail __ Other _____

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ Not Present ✓

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Container/Temp Blank temperature in compliance? (0°≤6°C)* Yes ✓ No __

Cooler #1 3.4°C Cooler #2 _____ Cooler #3 _____ Cooler #4 _____ Cooler#5 _____ Cooler #6 _____

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted ✓ Yes __ No __

Water - pH acceptable upon receipt? Yes __ No __ Not Applicable ✓

Adjusted? _____ Checked by _____

Sample Condition: Good ✓ Other(Explain) _____

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\\Aes_server\I\Sample Receipt\My Documents\COCs and pH Adjustment Sheet\Sample_Cooler_Recipt_Checklist_Rev1.rtf

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

July 23, 2015

Paige Sforzo
GeoTechnical & Env. Consultants, Inc.
514 Hillcrest Industrial Blvd.
Macon GA 31204

TEL: (478) 757-1606
FAX: (478) 757-1608

RE: Mercer HSRA

Dear Paige Sforzo: Order No: 1507F63

Analytical Environmental Services, Inc. received 13 samples on 7/18/2015 9:45:00 AM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/15-06/30/16.
-AIHA-LAP, LLC Laboratory ID: 100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) Direct Examination, effective until 09/01/15.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

CRKanhai

Chantelle Kanhai
Project Manager

ANALYTICAL ENVIRONMENTAL SERVICES, INC
3080 Presidential Drive, Atlanta GA 30340-3704
AES TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1507F63

Date: 7/13/15 Page 1 of 1

COMPANY: GEC

ADDRESS: 614 Hillcrest Industrial Blvd. Macon Ga, 31204

PHONE: (478) 757-1606

FAX: (478) 757-1608

SAMPLED BY: Anthony Wipple / Amber Hughes

SIGNATURE:

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	VOC's	No # of Containers
1	MWA-1	7/16/15	10:40a	X		GW	X	2
2	MWA-2	7/16/15	12:09p					2
3	MW-9	7/16/15	1:35p					2
4	MWB-4	7/16/15	2:29p					2
5	MWA-8	7/16/15	3:25p					2
6	MWA-5	7/17/15	7:13a					2
7	MWD-6	7/17/15	7:43a					2
8	MW-14	7/17/15	11:01a					2
9	MW-13	7/17/15	8:50a					2
10	MW-10	7/17/15	9:45a					2
11	MW-16	7/17/15	1:00p					2
12	MW-15	7/17/15	2:08p					2
13	MW-12	7/17/15	2:54p					2
14								

PRESERVATION (See codes)

ANALYSIS REQUESTED

REMARKS

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1: Anthony Wipple	7/17/15 3:45	1: [illegible]	7/18/15 9:45
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
CLIENT (FedEx) UPS MAIL COURIER
GREYHOUND OTHER_____

PROJECT INFORMATION
PROJECT NAME: Mercer HSRA
PROJECT #: MCE-02-596D
SITE ADDRESS:
SEND REPORT TO: Paige S.
INVOICE TO:
(IF DIFFERENT FROM ABOVE)
QUOTE #:_____ PO#:_____

RECEIPT
Total # of Containers: 26

Turnaround Time Request
Standard 5 Business Days
2 Business Day Rush
Next Business Day Rush
Same Day Rush **(auth req.)**
Other _____

STATE PROGRAM (if any): _____
E-mail? Y / N, Fax? Y / N
DATA PACKAGE: I II III IV

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES.
SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water
PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-1
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 10:40:00 AM
Lab ID:	1507F63-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
2-Butanone	BRL	50		ug/L	210489	1	07/22/2015 20:10	CH
2-Hexanone	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
Acetone	BRL	50		ug/L	210489	1	07/22/2015 20:10	CH
Benzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Bromoform	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Bromomethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Chloroethane	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
Chloroform	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Chloromethane	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
cis-1,2-Dichloroethene	45	5.0		ug/L	210489	1	07/22/2015 20:10	CH
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Cyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Freon-113	BRL	10		ug/L	210489	1	07/22/2015 20:10	CH
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Methyl acetate	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Methylene chloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
o-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-1
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 10:40:00 AM
Lab ID:	1507F63-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Tetrachloroethene	260	50		ug/L	210489	10	07/23/2015 01:54	CG
Toluene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Trichloroethene	120	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:10	CH
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/22/2015 20:10	CH
Surr: 4-Bromofluorobenzene	88.5	70.6-123		%REC	210489	1	07/22/2015 20:10	CH
Surr: 4-Bromofluorobenzene	88.8	70.6-123		%REC	210489	10	07/23/2015 01:54	CG
Surr: Dibromofluoromethane	102	78.7-124		%REC	210489	1	07/22/2015 20:10	CH
Surr: Dibromofluoromethane	104	78.7-124		%REC	210489	10	07/23/2015 01:54	CG
Surr: Toluene-d8	98.9	81.3-120		%REC	210489	1	07/22/2015 20:10	CH
Surr: Toluene-d8	94.4	81.3-120		%REC	210489	10	07/23/2015 01:54	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-2
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 12:09:00 PM
Lab ID:	1507F63-002	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
2-Butanone	BRL	50		ug/L	210489	1	07/22/2015 20:58	CH
2-Hexanone	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
Acetone	BRL	50		ug/L	210489	1	07/22/2015 20:58	CH
Benzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Bromoform	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Bromomethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Chloroethane	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
Chloroform	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Chloromethane	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
cis-1,2-Dichloroethene	48	5.0		ug/L	210489	1	07/22/2015 20:58	CH
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Cyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Freon-113	BRL	10		ug/L	210489	1	07/22/2015 20:58	CH
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Methyl acetate	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Methylene chloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
o-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
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- N Analyte not NELAC certified
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- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-2
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 12:09:00 PM
Lab ID:	1507F63-002	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Tetrachloroethene	290	50		ug/L	210489	10	07/22/2015 21:22	CH
Toluene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Trichloroethene	130	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:58	CH
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/22/2015 20:58	CH
Surr: 4-Bromofluorobenzene	85.8	70.6-123		%REC	210489	10	07/22/2015 21:22	CH
Surr: 4-Bromofluorobenzene	92.6	70.6-123		%REC	210489	1	07/22/2015 20:58	CH
Surr: Dibromofluoromethane	101	78.7-124		%REC	210489	1	07/22/2015 20:58	CH
Surr: Dibromofluoromethane	105	78.7-124		%REC	210489	10	07/22/2015 21:22	CH
Surr: Toluene-d8	98.8	81.3-120		%REC	210489	1	07/22/2015 20:58	CH
Surr: Toluene-d8	99.9	81.3-120		%REC	210489	10	07/22/2015 21:22	CH

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-9
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 1:35:00 PM
Lab ID:	1507F63-003	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
2-Butanone	BRL	50		ug/L	210489	1	07/22/2015 20:34	CH
2-Hexanone	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
Acetone	BRL	50		ug/L	210489	1	07/22/2015 20:34	CH
Benzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Bromoform	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Bromomethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Chloroethane	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
Chloroform	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Chloromethane	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Cyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Freon-113	BRL	10		ug/L	210489	1	07/22/2015 20:34	CH
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Methyl acetate	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Methylene chloride	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
o-Xylene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-9
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 1:35:00 PM
Lab ID:	1507F63-003	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Tetrachloroethene	8.8	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Toluene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Trichloroethene	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/22/2015 20:34	CH
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/22/2015 20:34	CH
Surr: 4-Bromofluorobenzene	87.7	70.6-123		%REC	210489	1	07/22/2015 20:34	CH
Surr: Dibromofluoromethane	102	78.7-124		%REC	210489	1	07/22/2015 20:34	CH
Surr: Toluene-d8	99.7	81.3-120		%REC	210489	1	07/22/2015 20:34	CH

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWB-4
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 2:29:00 PM
Lab ID:	1507F63-004	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 02:46	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 02:46	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 02:46	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWB-4
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 2:29:00 PM
Lab ID:	1507F63-004	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Tetrachloroethene	5.0	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:46	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 02:46	CG
Surr: 4-Bromofluorobenzene	88.4	70.6-123		%REC	210489	1	07/23/2015 02:46	CG
Surr: Dibromofluoromethane	102	78.7-124		%REC	210489	1	07/23/2015 02:46	CG
Surr: Toluene-d8	92.6	81.3-120		%REC	210489	1	07/23/2015 02:46	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-8
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 3:25:00 PM
Lab ID:	1507F63-005	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 03:11	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 03:11	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 03:11	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-8
Project Name:	Mercer HSRA	**Collection Date:**	7/16/2015 3:25:00 PM
Lab ID:	1507F63-005	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Tetrachloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:11	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 03:11	CG
Surr: 4-Bromofluorobenzene	93	70.6-123		%REC	210489	1	07/23/2015 03:11	CG
Surr: Dibromofluoromethane	104	78.7-124		%REC	210489	1	07/23/2015 03:11	CG
Surr: Toluene-d8	95.6	81.3-120		%REC	210489	1	07/23/2015 03:11	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-5
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 7:13:00 AM
Lab ID:	1507F63-006	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 02:20	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 02:20	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 02:20	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 02:20	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 02:20	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Chloromethane	10	10		ug/L	210489	1	07/23/2015 02:20	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 02:20	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 02:20	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Methylene chloride	40	5.0		ug/L	210489	1	07/23/2015 02:20	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWA-5
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 7:13:00 AM
Lab ID:	1507F63-006	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Tetrachloroethene	24	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 02:20	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 02:20	CG
Surr: 4-Bromofluorobenzene	87.9	70.6-123		%REC	210489	1	07/23/2015 02:20	CG
Surr: Dibromofluoromethane	104	78.7-124		%REC	210489	1	07/23/2015 02:20	CG
Surr: Toluene-d8	96.8	81.3-120		%REC	210489	1	07/23/2015 02:20	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWD-6
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 7:43:00 AM
Lab ID:	1507F63-007	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 03:37	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 03:37	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
cis-1,2-Dichloroethene	17	5.0		ug/L	210489	1	07/23/2015 03:37	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 03:37	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MWD-6
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 7:43:00 AM
Lab ID:	1507F63-007	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Tetrachloroethene	86	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Trichloroethene	35	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 03:37	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 03:37	CG
Surr: 4-Bromofluorobenzene	86.1	70.6-123		%REC	210489	1	07/23/2015 03:37	CG
Surr: Dibromofluoromethane	104	78.7-124		%REC	210489	1	07/23/2015 03:37	CG
Surr: Toluene-d8	96.6	81.3-120		%REC	210489	1	07/23/2015 03:37	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-14
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 11:01:00 AM
Lab ID:	1507F63-008	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 04:03	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 04:03	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 04:03	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-14
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 11:01:00 AM
Lab ID:	1507F63-008	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Tetrachloroethene	29	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:03	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 04:03	CG
Surr: 4-Bromofluorobenzene	93.1	70.6-123		%REC	210489	1	07/23/2015 04:03	CG
Surr: Dibromofluoromethane	106	78.7-124		%REC	210489	1	07/23/2015 04:03	CG
Surr: Toluene-d8	97.1	81.3-120		%REC	210489	1	07/23/2015 04:03	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-13
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 8:50:00 AM
Lab ID:	1507F63-009	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 04:29	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 04:29	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
cis-1,2-Dichloroethene	15	5.0		ug/L	210489	1	07/23/2015 04:29	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 04:29	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-13
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 8:50:00 AM
Lab ID:	1507F63-009	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Tetrachloroethene	120	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Trichloroethene	40	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:29	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 04:29	CG
Surr: 4-Bromofluorobenzene	91.3	70.6-123		%REC	210489	1	07/23/2015 04:29	CG
Surr: Dibromofluoromethane	105	78.7-124		%REC	210489	1	07/23/2015 04:29	CG
Surr: Toluene-d8	96.3	81.3-120		%REC	210489	1	07/23/2015 04:29	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-10
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 9:45:00 AM
Lab ID:	1507F63-010	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 04:55	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 04:55	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 04:55	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-10
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 9:45:00 AM
Lab ID:	1507F63-010	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Tetrachloroethene	20	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 04:55	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 04:55	CG
Surr: 4-Bromofluorobenzene	85.1	70.6-123		%REC	210489	1	07/23/2015 04:55	CG
Surr: Dibromofluoromethane	106	78.7-124		%REC	210489	1	07/23/2015 04:55	CG
Surr: Toluene-d8	91.3	81.3-120		%REC	210489	1	07/23/2015 04:55	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-16
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 1:00:00 PM
Lab ID:	1507F63-011	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 05:21	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 05:21	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 05:21	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-16
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 1:00:00 PM
Lab ID:	1507F63-011	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Tetrachloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:21	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 05:21	CG
Surr: 4-Bromofluorobenzene	89	70.6-123		%REC	210489	1	07/23/2015 05:21	CG
Surr: Dibromofluoromethane	102	78.7-124		%REC	210489	1	07/23/2015 05:21	CG
Surr: Toluene-d8	93	81.3-120		%REC	210489	1	07/23/2015 05:21	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-15
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 2:08:00 PM
Lab ID:	1507F63-012	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 05:47	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 05:47	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 05:47	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-15
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 2:08:00 PM
Lab ID:	1507F63-012	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Tetrachloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Trichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 05:47	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 05:47	CG
Surr: 4-Bromofluorobenzene	88.4	70.6-123		%REC	210489	1	07/23/2015 05:47	CG
Surr: Dibromofluoromethane	110	78.7-124		%REC	210489	1	07/23/2015 05:47	CG
Surr: Toluene-d8	95.2	81.3-120		%REC	210489	1	07/23/2015 05:47	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-12
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 2:54:00 PM
Lab ID:	1507F63-013	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,1,2-Trichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,1-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,1-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2-Dibromoethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2-Dichloroethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,2-Dichloropropane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,3-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
1,4-Dichlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
2-Butanone	BRL	50		ug/L	210489	1	07/23/2015 06:13	CG
2-Hexanone	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
4-Methyl-2-pentanone	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
Acetone	BRL	50		ug/L	210489	1	07/23/2015 06:13	CG
Benzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Bromodichloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Bromoform	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Bromomethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Carbon disulfide	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Carbon tetrachloride	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Chlorobenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Chloroethane	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
Chloroform	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Chloromethane	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
cis-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
cis-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Cyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Dibromochloromethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Dichlorodifluoromethane	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
Ethylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Freon-113	BRL	10		ug/L	210489	1	07/23/2015 06:13	CG
Isopropylbenzene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
m,p-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Methyl acetate	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Methyl tert-butyl ether	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Methylcyclohexane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Methylene chloride	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
o-Xylene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 23-Jul-15

Client:	GeoTechnical & Env. Consultants, Inc.	**Client Sample ID:**	MW-12
Project Name:	Mercer HSRA	**Collection Date:**	7/17/2015 2:54:00 PM
Lab ID:	1507F63-013	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Tetrachloroethene	15	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Toluene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
trans-1,2-Dichloroethene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
trans-1,3-Dichloropropene	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Trichloroethene	5.2	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Trichlorofluoromethane	BRL	5.0		ug/L	210489	1	07/23/2015 06:13	CG
Vinyl chloride	BRL	2.0		ug/L	210489	1	07/23/2015 06:13	CG
Surr: 4-Bromofluorobenzene	86.8	70.6-123		%REC	210489	1	07/23/2015 06:13	CG
Surr: Dibromofluoromethane	106	78.7-124		%REC	210489	1	07/23/2015 06:13	CG
Surr: Toluene-d8	95.1	81.3-120		%REC	210489	1	07/23/2015 06:13	CG

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client Geotechnical Work Order Number 1507F63

Checklist completed by Miriam Ramirez 7/18/2015
Signature Date

Carrier name: FedEx ✓ UPS __ Courier __ Client __ US Mail __ Other _____

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes ✓ No __ Not Present XMP 7/18

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Container/Temp Blank temperature in compliance? (0°≤6°C)* Yes ✓ No __

Cooler #1 3.4°C Cooler #2 _____ Cooler #3 _____ Cooler #4 _____ Cooler#5 _____ Cooler #6 _____

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted __ Yes ✓ No __

Water - pH acceptable upon receipt? Yes ✓ No __ Not Applicable __

Adjusted? _____ Checked by _____

Sample Condition: Good ✓ Other(Explain) _____

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\\Aes_server\I\Sample Receipt\My Documents\COCs and pH Adjustment Sheet\Sample_Cooler_Recipt_Checklist_Rev1.rtf

APPENDIX D

GEC

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/16/15 Team Leader: _____

Well ID: MWA-1 Sample Time: 10:40a Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	Pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 31.56 ft Does well purge dry? ☐ Yes ☑ No

Well Depth:* 40.26 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 8.7 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 1.47 1.5 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16/15	10:24	31.93	0	4.15	0.133	24.56	3109	4.72	182
7/16/15	10:27	32.42	1.5	4.00	0.140	23.19	152	3.96	195
7/16/15	10:30	32.73	3.00	3.98	0.139	22.96	114	4.02	199
7/16/15	10:33	33.11	4.5	3.97	0.144	23.09	139	3.90	203
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: mercer HSRA Sample Date : 7/16/15 Team Leader :

Well ID : MWA-2 Sample Time : 12:09p Team Number:

Sample ID: Sample Team Members:

	(planned method)	(note changes to planned method in comments section below)
Purge Method :		Changed Method:
Sample Method :		Changed Method:

Static Water Level: 49.43 ft. Does well purge dry? ☒ Yes ☑ No

Well Depth:* 60.30 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 10.87 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 1.8 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
~~7/16/15~~	Dry					~~23.79~~			
7/16/15	11:50	49.60	0	3.95	0.157	23.79	<800	5.92	253
7/16	11:54	49.80	2	3.96	0.135	22.80	<800	6.14	261
7/16	11:58	49.80	4	3.91	0.132	22.69	364	6.06	265
7/16	12:02	49.80	6	3.87	0.133	22.79	205	6.00	271
7/16	12:06	49.91	8	3.74	0.133	22.42	75.3	6.07	281
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: ft Hach Ferrous Iron Result: mg/L

Constructed Well Depth: ft Hach Dissolved Oxygen Result: mg/L

Well Stickup Height: ft Sample Mgmnt. Turbidity: NTUs

Purge Flow Rate: gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
/ /

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID:
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date : _____ Team Leader : _____

Well ID : MWA-3 Sample Time : _____ Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method :	pump	Changed Method: _____
Sample Method :	_____	Changed Method: _____

Static Water Level: Dry ft Does well purge dry? ☑ Yes ☐ No

Well Depth:* 49.47 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** _____ ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: _____ in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** _____ gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16	Dry								
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date : _____ Team Leader : _____

Well ID : MWR-3 Sample Time : _____ Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method :	pump	Changed Method: _____
Sample Method :	_____	Changed Method: _____

Static Water Level: Dry ft Does well purge dry? ☑ Yes ☐ No

Well Depth:* 44.84 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** _____ ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: _____ in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** _____ gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16	Dry								
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/16 Team Leader: _____

Well ID: MW B-4 Sample Time: 2:29p Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump baiter	Changed Method: _____
Sample Method:	baiter	Changed Method: _____

Static Water Level: 47.65 ft. Does well purge dry? ☐ Yes ☑ No

Well Depth:* 55.92 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 8.27 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 1.50 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16	2:10	0	48.20	5.89	0.221	25.78	<800	5.86	89
7/16	2:13	1.50	48.7	6.17	0.202	25.25	513	6.23	69
7/16	2:16	3.00	49.80	5.88	0.180	24.13	559	5.41	84
7/16	2:19	4.50	50.60	5.71	0.160	24.21	463	5.03	95
7/16	2:22	6.00	51.68	5.45	0.149	24.61	393	4.50	100
7/16	2:25	7.50	51.91	5.49	0.157	24.58	<800	3.92	87
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:
something is catching water level tape

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/17/15 Team Leader: _____

Well ID: ~~MW-10~~ MWA5 Sample Time: 7:13a Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 51.51 ft. Does well purge dry? ☐ Yes ☑ No

Well Depth:* 62.91 ft ☐

Water Column:** 11.4 ft

Well Diameter: 2" in

Well Volume:*** 1.9 (2.0) gals

* Check box if well depth measured, no check if used previous measured well depth

** Water Column = Measured Well Depth – Static Water Level

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

*** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	6:54	0	52.98	3.11	0.429	22.29	203	1.40	400
7/17	6:56	2	53.41	3.05	0.435	22.46	217	0.93	426
7/17	7:00	4	53.81	3.04	0.483	22.66	45.7	0.81	430
7/17	7:06	6	54.45	2.91	0.517	22.66	76.4	0.70	446
7/17	7:10	8	54.82	2.92	0.532	22.73	55.9	0.69	446
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/16/15 17 Team Leader:

Well ID: MWD-6 Sample Time: 7:43a Team Number:

Sample ID: Sample Team Members:

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method:
Sample Method:		Changed Method:

Static Water Level: 48.62 ft. Does well purge dry? ☑ Yes ☐ No

Well Depth:* 72.82 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 24.2 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 4.1 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16/15	9:40	52.55	0	3.88	2.38	22.45°C	<800	.47	117
7/16/15	9:44	65.51	4	3.98	2.33	22.31	418	0.89	91
7/16/15	9:48	70.30	8	3.97	2.35	22.78	0	0.88	~~+5~~ +93
Dry									
7/17	57ft								
		57	0	3.89	2.34	21.66		2.79	126
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: ft Hach Ferrous Iron Result: mg/L

Constructed Well Depth: ft Hach Dissolved Oxygen Result: mg/L

Well Stickup Height: ft Sample Mgmnt. Turbidity: NTUs

Purge Flow Rate: gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
[ ] / [ ] / [ ]

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID:
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 3:25pm 7/16 Team Leader: _____

Well ID: MWA-8 Sample Time: 3:25p Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	_____	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 41.57 ft. Does well purge dry? ☐ Yes ☑ No

Well Depth:* 58.85 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 17.28 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** ~~2,933.00~~ gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16	3:10	0	44.25	4.84	0.170	24.93	<800	8.65	234
7/16	3:13	3	45.35	4.03	0.099	22.87	<800	7.23	252
7/16	3:16	6	46.10	4.08	0.127	22.92	<800	7.10	256
7/16	3:19	9	46.89	3.88	0.086	22.93	226	6.92	274
7/16	3:22	12	48.22	3.76	0.079	22.9	119	6.90	286
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA HRSA Sample Date: ~~1:35pm~~ 7/16 Team Leader: _____

Well ID: MW-9 Sample Time: 1:35 pm Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 44.02 ft Does well purge dry? ☐ Yes ☒ No

Well Depth:* 49.11 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 5.09 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 0.8 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/16	1:20	0	45.31	4.65	0.129	28.56	<800	7.31	321
7/16	1:22	1	45.21	4.38	0.134	25.48	<800	5.69	301
7/16	1:24	2	45.25	~~4.53~~ 4.39	0.133	25.29	469	5.50	295
7/16	1:26	3	45.28	4.35	0.132	24.86	110	5.43	290
7/16	1:28	4	45.25	4.33	0.132	24.84	56.0	5.39	287
7/16	1:30	5	~~92~~ 45.32	4.30	0.131	24.48	41.2	5.46	286
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/17/15 Team Leader: _____

Well ID: MW-10 Sample Time: 9:45a Team Number: _____

Sample ID: _____ Sample Team Members _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 61.41 ft Does well purge dry? ☐ Yes ☑ No

Well Depth:* 64.35 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 2.94 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 0.5 gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	9:40		1.5	3.80	154	25.52	250	8.00	301
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

_____

_____

_____

_____

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7/17/15 Team Leader: _____

Well ID: MW-12 Sample Time: 2:54p Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	Pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 69.35 ft Does well purge dry? ☐ Yes ☐ No

Well Depth:* 82.06 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 12.71 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 2.16 (7.2) gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	2:32	69.65	0	3.74	0.166	23.97	<800	3.95	344
7/17	2:37	69.73	2.2	3.49	0.166	22.98	460	3.72	351
7/17	2:42	75.9	4.4	3.33	0.172	22.9	84.1	3.57	361
7/17	2:47	79.32	6.6	3.28	0.173	22.88	86.5	3.51	363
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
[ ] / [ ] / [ ]

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date: 7-17-15 Team Leader: _____

Well ID: MW-13 Sample Time: 8:50a Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 66.01 ft. Does well purge dry? ☐ Yes ☐ No

Well Depth:* 75.40 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 9.39 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	(2)	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 1.60 (2.5) gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	8:25	0	66.38	3.65	0.185	22.30	593	3.36	353
7/17	8:29	2	66.38	3.66	0.171	22.33	4800	3.12	343
7/17	8:33	4	66.38	3.27	0.176	22.22	146	3.04	362
7/17	8:37	6	66.38	3.21	0.176	22.10	86.6	3.02	369
7/17	8:41	8	66.38	3.23	0.177	22.09	38.7	3.00	371
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSRA Sample Date : 7/17 Team Leader : _____

Well ID : MW-14 Sample Time : 11:01a Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method :	Pump	Changed Method: _____
Sample Method :	_____	Changed Method: _____

Static Water Level: 70.47 ft. Does well purge dry? ☐ Yes ☐ No

Well Depth:* 83.25 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 12.78 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 2.17 (2.2) gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	10:36	~~70.84~~	~~2.2~~ 0	3.39	0.146	24.11	2800	4.35	315
7/17	10:40	70.71	2.2	3.29	0.148	23.45	2800	3.85	342
7/17	10:44	70.71	4.4	3.25	0.150	23.36	584	3.62	361
7/17	10:48	70.71	6.6	3.25	0.151	23.26	223	3.44	388
7/17	10:51	70.71	8.8	3.26	0.152	23.30	70.8	3.35	426
7/17	10:55	70.71	10.88	3.28	0.152	23.22	44.2	3.30	453
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: ~~MW-1 Mercer~~ MSRA Sample Date: 7/17/15 Team Leader: _____

Well ID: MW-15 Sample Time: 2:08 Team Number: _____

Sample ID: _____ Sample Team Members: _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method:	pump	Changed Method: _____
Sample Method:	_____	Changed Method: _____

Static Water Level: 50.78 ft. Does well purge dry? ☐ Yes ☒ No

Well Depth:* 64.1 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 13.2 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2 in

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Well Volume:*** 2.26 (2.3) gals *** Well Volume = Water Column x Volume Factor

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17	1:30	52.10	0	3.45	0.102	22.74	707	5.11	340
7/17	1:35	55.35	2.3	3.23	0.096	22.4	282	5.01	358
7/17	1:40	56.98	4.6	3.44	0.097	22.90	207	5.05	350
7/17	1:45	58.18	6.9	3.40	0.099	23.15	96.7	4.85	343
7/17	1:50	58.98	9.2	3.50	0.100	23.64	171	4.62	347
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
BB ☐ MS ☐
DUP ☐ MSD ☐

GEC

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Project No.: Mercer HSEA Sample Date : 7/17/15 Team Leader : _____

Well ID : MW-16 Sample Time : 1:00 Team Number: _____

Sample ID: _____ Sample Team Members _____

	(planned method)	(note changes to planned method in comments section below)
Purge Method :	Pump	Changed Method: _____
Sample Method :	bailer	Changed Method: _____

Static Water Level: 56.56 ft Does well purge dry? ☑ Yes ☐ No

Well Depth:* 59.20 ft ☐ * Check box if well depth measured, no check if used previous measured well depth

Water Column:** 2.64 ft ** Water Column = Measured Well Depth - Static Water Level

Well Diameter: 2" in

Well Volume:*** 1.34 gals *** Well Volume = Water Column x Volume Factor

Well Diameter (inches)	1	2	4	6	10	12
Volume Factor (gallons/feet)	0.04	0.17	0.66	1.50	4.08	5.88

Date	Time	Depth to water (ft. TOC)	Volume Removed (gals)	pH	Specific Conductance (mS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox Potential (mV)
7/17									
	1:00			4.19	.164	27.15	235	9.65	288
Final Readings									

Previous Readings:

*Prev. Measured Well Depth: _____ ft Hach Ferrous Iron Result: _____ mg/L

Constructed Well Depth: _____ ft Hach Dissolved Oxygen Result: _____ mg/L

Well Stickup Height: _____ ft Sample Mgmnt. Turbidity: _____ NTUs

Purge Flow Rate: _____ gal/min

Anticipated Volume Based On Readings From Previous Year
Volume Factor/Well Volume/Minimum Purge (gal)
_____ / _____ / _____

Purging/Sampling/Well Repair Comments:

Related QC Samples:
QC Sample ID: _____
EB ☐ MS ☐
DUP ☐ MSD ☐

APPENDIX E

GEC

COMMERCIAL SCENARIO
MWA-1 & MWA-2 DATA

GEC

MWA-1

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
x	75-07-0	Acetaldehyde		--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone		--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin		--	--	--			2.00E-03	X	
	75-05-8	Acetonitrile		--	--	--			6.00E-02	I	
	107-02-8	Acrolein		--	--	--			2.00E-05	I	
	79-10-7	Acrylic Acid		--	--	--			1.00E-03	I	
	107-13-1	Acrylonitrile		--	--	--	6.80E-05	I	2.00E-03	I	
	309-00-2	Aldrin		--	--	--	4.90E-03	I			
	107-18-6	Allyl Alcohol		--	--	--			1.00E-04	X	
	107-05-1	Allyl Chloride		--	--	--	6.00E-06	CA	1.00E-03	I	
	7664-41-7	Ammonia		--	--	--			1.00E-01	I	
	75-85-4	Amyl Alcohol, tert-		--	--	--			3.00E-03	X	
	12674-11-2	Aroclor 1016		--	--	--	2.00E-05	S			
	11104-28-2	Aroclor 1221		--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232		--	--	--	5.70E-04	S			
	53469-21-9	Aroclor 1242		--	--	--	5.70E-04	S			
	12672-29-6	Aroclor 1248		--	--	--	5.70E-04	S			
	11097-69-1	Aroclor 1254		--	--	--	5.70E-04	S			
	11096-82-5	Aroclor 1260		--	--	--	5.70E-04	S			
x	103-33-3	Azobenzene		--	--	--	3.10E-05	I			
	56-55-3	Benz[a]anthracene		--	--	--	1.10E-04	CA			Mut
	71-43-2	Benzene		--	--	--	7.80E-06	I	3.00E-02	I	
	100-44-7	Benzyl Chloride		--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-		--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether		--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether		--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether		--	--	--	6.20E-02	I			
	10294-34-5	Boron Trichloride		--	--	--			2.00E-02	P	
	7637-07-2	Boron Trifluoride		No HLC	--	--			1.30E-02	CA	
	107-04-0	Bromo-2-chloroethane, 1-		--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene		--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane		--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane		--	--	--	3.70E-05	CA			
	75-25-2	Bromoform		--	--	--	1.10E-06	I			
	74-83-9	Bromomethane		--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-		--	--	--	3.00E-05	I	2.00E-03	I	
	78-92-2	Butyl alcohol, sec-		--	--	--			3.00E+01	P	
	75-15-0	Carbon Disulfide		--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride		--	--	--	6.00E-06	I	1.00E-01	I	
	12789-03-6	Chlordane		--	--	--	1.00E-04	I	7.00E-04	I	
	7782-50-5	Chlorine		--	--	--			1.50E-04	A	
	10049-04-4	Chlorine Dioxide		--	--	--			2.00E-04	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-		--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-		--	--	--	3.00E-04	I	2.00E-02	I	
	108-90-7	Chlorobenzene		--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-		--	--	--			3.00E-01	P	
	75-45-6	Chlorodifluoromethane		--	--	--			5.00E+01	I	
	67-66-3	Chloroform		--	--	--	2.30E-05	I	9.80E-02	A	
	74-87-3	Chloromethane		--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether		--	--	--	6.90E-04	CA			
	76-06-2	Chloropicrin		--	--	--			4.00E-04	CA	
	8007-45-2	Coke Oven Emissions		--	--	--	6.20E-04	I			Mut
	98-82-8	Cumene		--	--	--			4.00E-01	I	
x	57-12-5	Cyanide (CN-)		--	--	--			8.00E-04	S	
	110-82-7	Cyclohexane		--	--	--			6.00E+00	I	
	108-94-1	Cyclohexanone		--	--	--			7.00E-01	P	
	110-83-8	Cyclohexene		--	--	--			1.00E+00	X	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	72-55-9	DDE, p,p'-		--	--	--	9.70E-05	CA			
	96-12-8	Dibromo-3-chloropropane, 1,2-		--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane		--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-		--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)		--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-		--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-		--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-		--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-		--	--	--			2.00E-01	H	
	106-46-7	Dichlorobenzene, 1,4-		--	--	--	1.10E-05	CA	8.00E-01	I	
	75-71-8	Dichlorodifluoromethane		--	--	--			1.00E-01	X	
	75-34-3	Dichloroethane, 1,1-		--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-		--	--	--	2.60E-05	I	7.00E-03	P	
	75-35-4	Dichloroethylene, 1,1-		--	--	--			2.00E-01	I	
	78-87-5	Dichloropropane, 1,2-		--	--	--	1.00E-05	CA	4.00E-03	I	
	542-75-6	Dichloropropene, 1,3-		--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene		--	--	--			3.00E-04	X	
	75-37-6	Difluoroethane, 1,1-		--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole		--	--	--	1.30E-05	CA			
	108-20-3	Diisopropyl Ether		--	--	--			7.00E-01	P	
	68-12-2	Dimethylformamide		--	--	--			3.00E-02	I	
	57-14-7	Dimethylhydrazine, 1,1-		--	--	--			2.00E-06	X	
	540-73-8	Dimethylhydrazine, 1,2-		--	--	--	1.60E-01	CA			
	513-37-1	Dimethylvinylchloride		--	--	--	1.30E-05	CA			
	123-91-1	Dioxane, 1,4-		--	--	--	5.00E-06	I	3.00E-02	I	
	106-89-8	Epichlorohydrin		--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-		--	--	--			2.00E-02	I	
	111-15-9	Ethoxyethanol Acetate, 2-		--	--	--			6.00E-02	P	
	110-80-5	Ethoxyethanol, 2-		--	--	--			2.00E-01	I	
	141-78-6	Ethyl Acetate		--	--	--			7.00E-02	P	
	75-00-3	Ethyl Chloride (Chloroethane)		--	--	--			1.00E+01	I	
	97-63-2	Ethyl Methacrylate		--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene		--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide		--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine		--	--	--	1.90E-02	CA			
	50-00-0	Formaldehyde		--	--	--	1.30E-05	I	9.80E-03	A	
	64-18-6	Formic Acid		--	--	--			3.00E-04	X	
	98-01-1	Furfural		--	--	--			5.00E-02	H	
	765-34-4	Glycidyl		--	--	--			1.00E-03	H	
	76-44-8	Heptachlor		--	--	--	1.30E-03	I			
	1024-57-3	Heptachlor Epoxide		--	--	--	2.60E-03	I			
	39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)		--	--	--	1.10E-03	E	1.30E-03	E	
	118-74-1	Hexachlorobenzene		--	--	--	4.60E-04	I			
	38380-08-4	Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)		--	--	--	1.10E-03	E	1.30E-03	E	
	69782-90-7	Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)		--	--	--	1.10E-03	E	1.30E-03	E	
	52663-72-6	Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)		--	--	--	1.10E-03	E	1.30E-03	E	
	32774-16-6	Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)		--	--	--	1.10E+00	E	1.30E-06	E	
	87-68-3	Hexachlorobutadiene		--	--	--	2.20E-05	I			
	77-47-4	Hexachlorocyclopentadiene		--	--	--			2.00E-04	I	
x	67-72-1	Hexachloroethane		--	--	--	1.10E-05	CA	3.00E-02	I	
	822-06-0	Hexamethylene Diisocyanate, 1,6-		--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-		--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-		--	--	--			3.00E-02	I	
	302-01-2	Hydrazine		--	--	--	4.90E-03	I	3.00E-05	P	
	7647-01-0	Hydrogen Chloride		--	--	--			2.00E-02	I	
	74-90-8	Hydrogen Cyanide		--	--	--			8.00E-04	I	
	7664-39-3	Hydrogen Fluoride		--	--	--			1.40E-02	CA	

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7783-06-4	Hydrogen Sulfide		--	--	--			2.00E-03	I	
67-63-0	Isopropanol		--	--	--			2.00E-01	P	
7439-97-6	Mercury (elemental)		--	--	--			3.00E-04	I	
126-98-7	Methacrylonitrile		--	--	--			3.00E-02	P	
67-56-1	Methanol		--	--	--			2.00E+01	I	
110-49-6	Methoxyethanol Acetate, 2-		--	--	--			1.00E-03	P	
109-86-4	Methoxyethanol, 2-		--	--	--			2.00E-02	I	
96-33-3	Methyl Acrylate		--	--	--			2.00E-02	P	
78-93-3	Methyl Ethyl Ketone (2-Butanone)		--	--	--			5.00E+00	I	
60-34-4	Methyl Hydrazine		--	--	--	1.00E-03	X	2.00E-05	X	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)		--	--	--			3.00E+00	I	
624-83-9	Methyl Isocyanate		--	--	--			1.00E-03	CA	
80-62-6	Methyl Methacrylate		--	--	--			7.00E-01	I	
25013-15-4	Methyl Styrene (Mixed Isomers)		--	--	--			4.00E-02	H	
1634-04-4	Methyl tert-Butyl Ether (MTBE)		--	--	--	2.60E-07	CA	3.00E+00	I	
75-09-2	Methylene Chloride		--	--	--	1.00E-08	I	6.00E-01	I	Mut
2385-85-5	Mirex		--	--	--	5.10E-03	CA			
64742-95-6	Naphtha, High Flash Aromatic (HFAN)		No HLC	--	--			1.00E-01	P	
91-20-3	Naphthalene		--	--	--	3.40E-05	CA	3.00E-03	I	
13463-39-3	Nickel Carbonyl		No HLC	--	--	2.60E-04	CA	1.40E-05	CA	
98-95-3	Nitrobenzene		--	--	--	4.00E-05	I	9.00E-03	I	
75-52-5	Nitromethane		--	--	--	8.80E-06	P	5.00E-03	P	
79-46-9	Nitropropane, 2-		--	--	--	2.70E-03	H	2.00E-02	I	
62-75-9	Nitrosodimethylamine, N-		--	--	--	1.40E-02	I	4.00E-05	X	Mut
924-16-3	Nitroso-di-N-butylamine, N-		--	--	--	1.60E-03	I			
10595-95-6	Nitrosomethylethylamine, N-		--	--	--	6.30E-03	CA			
111-84-2	Nonane, n-		--	--	--			2.00E-02	P	
32598-14-4	Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)		--	--	--	1.10E-03	E	1.30E-03	E	
74472-37-0	Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)		--	--	--	1.10E-03	E	1.30E-03	E	
31508-00-6	Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)		--	--	--	1.10E-03	E	1.30E-03	E	
65510-44-3	Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)		--	--	--	1.10E-03	E	1.30E-03	E	
57465-28-8	Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)		--	--	--	3.80E+00	E	4.00E-07	E	
109-66-0	Pentane, n-		--	--	--			1.00E+00	P	
75-44-5	Phosgene		--	--	--			3.00E-04	I	
7803-51-2	Phosphine		--	--	--			3.00E-04	I	
123-38-6	Propionaldehyde		--	--	--			8.00E-03	I	
103-65-1	Propyl benzene		--	--	--			1.00E+00	X	
115-07-1	Propylene		--	--	--			3.00E+00	CA	
107-98-2	Propylene Glycol Monomethyl Ether		--	--	--			2.00E+00	I	
75-56-9	Propylene Oxide		--	--	--	3.70E-06	I	3.00E-02	I	
100-42-5	Styrene		--	--	--			1.00E+00	I	
7446-11-9	Sulfur Trioxide		No HLC	--	--			1.00E-03	CA	
1746-01-6	TCDD, 2,3,7,8-		--	--	--	3.80E+01	CA	4.00E-08	CA	
70362-50-4	Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)		--	--	--	1.10E-02	E	1.30E-04	E	
630-20-6	Tetrachloroethane, 1,1,1,2-		--	--	--	7.40E-06	I			
79-34-5	Tetrachloroethane, 1,1,2,2-		--	--	--	5.80E-05	CA			
127-18-4	Tetrachloroethylene	2.6E+02	7.16E+01	1.5E-06	4.1E-01	2.60E-07	I	4.00E-02	I	
811-97-2	Tetrafluoroethane, 1,1,1,2-		--	--	--			8.00E+01	I	
109-99-9	Tetrahydrofuran		--	--	--			2.00E+00	I	
7550-45-0	Titanium Tetrachloride		No HLC	--	--			1.00E-04	A	
108-88-3	Toluene		--	--	--			5.00E+00	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-		--	--	--			3.00E+01	H	
120-82-1	Trichlorobenzene, 1,2,4-		--	--	--			2.00E-03	P	
71-55-6	Trichloroethane, 1,1,1-		--	--	--			5.00E+00	I	
79-00-5	Trichloroethane, 1,1,2-		--	--	--	1.60E-05	I	2.00E-04	X	
79-01-6	Trichloroethylene	1.2E+02	1.89E+01	6.3E-06	**2.2E+00**	4.10E-06	I	2.00E-03	I	Mut
75-69-4	Trichlorofluoromethane		--	--	--			7.00E-01	H	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
96-18-4	Trichloropropane, 1,2,3-		--	--	--			3.00E-04	I	Mut
96-19-5	Trichloropropene, 1,2,3-		--	--	--			3.00E-04	P	
121-44-8	Triethylamine		--	--	--			7.00E-03	I	
526-73-8	Trimethylbenzene, 1,2,3-		--	--	--			5.00E-03	P	
95-63-6	Trimethylbenzene, 1,2,4-		--	--	--			7.00E-03	P	TCE
108-05-4	Vinyl Acetate		--	--	--			2.00E-01	I	
593-60-2	Vinyl Bromide		--	--	--	3.20E-05	H	3.00E-03	I	
75-01-4	Vinyl Chloride		--	--	--	4.40E-06	I	1.00E-01	I	Mut
108-38-3	Xylene, m-		--	--	--			1.00E-01	S	
95-47-6	Xylene, o-		--	--	--			1.00E-01	S	
106-42-3	Xylene, P-		--	--	--			1.00E-01	S	
1330-20-7	Xylenes		--	--	--			1.00E-01	I	
140-88-5	Ethyl Acrylate		--	--	--			8.00E-03	P	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	25
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	25
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	250
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater (-)	AFgw_R_GW	0.0005	AFgw_C_GW	0.0005	AFgw_GW	0.0005
Sub-Slab and Exterior Soil Gas (-)	AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	0.00E+00
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

MWA-2

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
x	75-07-0	Acetaldehyde		--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone		--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin		--	--	--			2.00E-03	X	
	75-05-8	Acetonitrile		--	--	--			6.00E-02	I	
	107-02-8	Acrolein		--	--	--			2.00E-05	I	
	79-10-7	Acrylic Acid		--	--	--			1.00E-03	I	
	107-13-1	Acrylonitrile		--	--	--	6.80E-05	I	2.00E-03	I	
	309-00-2	Aldrin		--	--	--	4.90E-03	I			
	107-18-6	Allyl Alcohol		--	--	--			1.00E-04	X	
	107-05-1	Allyl Chloride		--	--	--	6.00E-06	CA	1.00E-03	I	
	7664-41-7	Ammonia		--	--	--			1.00E-01	I	
	75-85-4	Amyl Alcohol, tert-		--	--	--			3.00E-03	X	
	12674-11-2	Aroclor 1016		--	--	--	2.00E-05	S			
	11104-28-2	Aroclor 1221		--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232		--	--	--	5.70E-04	S			
	53469-21-9	Aroclor 1242		--	--	--	5.70E-04	S			
	12672-29-6	Aroclor 1248		--	--	--	5.70E-04	S			
	11097-69-1	Aroclor 1254		--	--	--	5.70E-04	S			
	11096-82-5	Aroclor 1260		--	--	--	5.70E-04	S			
x	103-33-3	Azobenzene		--	--	--	3.10E-05	I			
	56-55-3	Benz[a]anthracene		--	--	--	1.10E-04	CA			Mut
	71-43-2	Benzene		--	--	--	7.80E-06	I	3.00E-02	I	
	100-44-7	Benzyl Chloride		--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-		--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether		--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether		--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether		--	--	--	6.20E-02	I			
	10294-34-5	Boron Trichloride		--	--	--			2.00E-02	P	
	7637-07-2	Boron Trifluoride		No HLC	--	--			1.30E-02	CA	
	107-04-0	Bromo-2-chloroethane, 1-		--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene		--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane		--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane		--	--	--	3.70E-05	CA			
	75-25-2	Bromoform		--	--	--	1.10E-06	I			
	74-83-9	Bromomethane		--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-		--	--	--	3.00E-05	I	2.00E-03	I	
	78-92-2	Butyl alcohol, sec-		--	--	--			3.00E+01	P	
	75-15-0	Carbon Disulfide		--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride		--	--	--	6.00E-06	I	1.00E-01	I	
	12789-03-6	Chlordane		--	--	--	1.00E-04	I	7.00E-04	I	
	7782-50-5	Chlorine		--	--	--			1.50E-04	A	
	10049-04-4	Chlorine Dioxide		--	--	--			2.00E-04	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-		--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-		--	--	--	3.00E-04	I	2.00E-02	I	
	108-90-7	Chlorobenzene		--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-		--	--	--			3.00E-01	P	
	75-45-6	Chlorodifluoromethane		--	--	--			5.00E+01	I	
	67-66-3	Chloroform		--	--	--	2.30E-05	I	9.80E-02	A	
	74-87-3	Chloromethane		--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether		--	--	--	6.90E-04	CA			
	76-06-2	Chloropicrin		--	--	--			4.00E-04	CA	
	8007-45-2	Coke Oven Emissions		--	--	--	6.20E-04	I			Mut
	98-82-8	Cumene		--	--	--			4.00E-01	I	
x	57-12-5	Cyanide (CN-)		--	--	--			8.00E-04	S	
	110-82-7	Cyclohexane		--	--	--			6.00E+00	I	
	108-94-1	Cyclohexanone		--	--	--			7.00E-01	P	
	110-83-8	Cyclohexene		--	--	--			1.00E+00	X	

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Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	72-55-9	DDE, p,p'-		--	--	--	9.70E-05	CA			
	96-12-8	Dibromo-3-chloropropane, 1,2-		--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane		--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-		--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)		--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-		--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-		--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-		--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-		--	--	--			2.00E-01	H	
	106-46-7	Dichlorobenzene, 1,4-		--	--	--	1.10E-05	CA	8.00E-01	I	
	75-71-8	Dichlorodifluoromethane		--	--	--			1.00E-01	X	
	75-34-3	Dichloroethane, 1,1-		--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-		--	--	--	2.60E-05	I	7.00E-03	P	
	75-35-4	Dichloroethylene, 1,1-		--	--	--			2.00E-01	I	
	78-87-5	Dichloropropane, 1,2-		--	--	--	1.00E-05	CA	4.00E-03	I	
	542-75-6	Dichloropropene, 1,3-		--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene		--	--	--			3.00E-04	X	
	75-37-6	Difluoroethane, 1,1-		--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole		--	--	--	1.30E-05	CA			
	108-20-3	Diisopropyl Ether		--	--	--			7.00E-01	P	
	68-12-2	Dimethylformamide		--	--	--			3.00E-02	I	
	57-14-7	Dimethylhydrazine, 1,1-		--	--	--			2.00E-06	X	
	540-73-8	Dimethylhydrazine, 1,2-		--	--	--	1.60E-01	CA			
	513-37-1	Dimethylvinylchloride		--	--	--	1.30E-05	CA			
	123-91-1	Dioxane, 1,4-		--	--	--	5.00E-06	I	3.00E-02	I	
	106-89-8	Epichlorohydrin		--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-		--	--	--			2.00E-02	I	
	111-15-9	Ethoxyethanol Acetate, 2-		--	--	--			6.00E-02	P	
	110-80-5	Ethoxyethanol, 2-		--	--	--			2.00E-01	I	
	141-78-6	Ethyl Acetate		--	--	--			7.00E-02	P	
	75-00-3	Ethyl Chloride (Chloroethane)		--	--	--			1.00E+01	I	
	97-63-2	Ethyl Methacrylate		--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene		--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide		--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine		--	--	--	1.90E-02	CA			
	50-00-0	Formaldehyde		--	--	--	1.30E-05	I	9.80E-03	A	
	64-18-6	Formic Acid		--	--	--			3.00E-04	X	
	98-01-1	Furfural		--	--	--			5.00E-02	H	
	765-34-4	Glycidyl		--	--	--			1.00E-03	H	
	76-44-8	Heptachlor		--	--	--	1.30E-03	I			
	1024-57-3	Heptachlor Epoxide		--	--	--	2.60E-03	I			
	39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)		--	--	--	1.10E-03	E	1.30E-03	E	
	118-74-1	Hexachlorobenzene		--	--	--	4.60E-04	I			
	38380-08-4	Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)		--	--	--	1.10E-03	E	1.30E-03	E	
	69782-90-7	Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)		--	--	--	1.10E-03	E	1.30E-03	E	
	52663-72-6	Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)		--	--	--	1.10E-03	E	1.30E-03	E	
	32774-16-6	Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)		--	--	--	1.10E+00	E	1.30E-06	E	
	87-68-3	Hexachlorobutadiene		--	--	--	2.20E-05	I			
	77-47-4	Hexachlorocyclopentadiene		--	--	--			2.00E-04	I	
x	67-72-1	Hexachloroethane		--	--	--	1.10E-05	CA	3.00E-02	I	
	822-06-0	Hexamethylene Diisocyanate, 1,6-		--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-		--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-		--	--	--			3.00E-02	I	
	302-01-2	Hydrazine		--	--	--	4.90E-03	I	3.00E-05	P	
	7647-01-0	Hydrogen Chloride		--	--	--			2.00E-02	I	
	74-90-8	Hydrogen Cyanide		--	--	--			8.00E-04	I	
	7664-39-3	Hydrogen Fluoride		--	--	--			1.40E-02	CA	

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7783-06-4	Hydrogen Sulfide		--	--	--			2.00E-03	I	
67-63-0	Isopropanol		--	--	--			2.00E-01	P	
7439-97-6	Mercury (elemental)		--	--	--			3.00E-04	I	
126-98-7	Methacrylonitrile		--	--	--			3.00E-02	P	
67-56-1	Methanol		--	--	--			2.00E+01	I	
110-49-6	Methoxyethanol Acetate, 2-		--	--	--			1.00E-03	P	
109-86-4	Methoxyethanol, 2-		--	--	--			2.00E-02	I	
96-33-3	Methyl Acrylate		--	--	--			2.00E-02	P	
78-93-3	Methyl Ethyl Ketone (2-Butanone)		--	--	--			5.00E+00	I	
60-34-4	Methyl Hydrazine		--	--	--	1.00E-03	X	2.00E-05	X	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)		--	--	--			3.00E+00	I	
624-83-9	Methyl Isocyanate		--	--	--			1.00E-03	CA	
80-62-6	Methyl Methacrylate		--	--	--			7.00E-01	I	
25013-15-4	Methyl Styrene (Mixed Isomers)		--	--	--			4.00E-02	H	
1634-04-4	Methyl tert-Butyl Ether (MTBE)		--	--	--	2.60E-07	CA	3.00E+00	I	
75-09-2	Methylene Chloride		--	--	--	1.00E-08	I	6.00E-01	I	Mut
2385-85-5	Mirex		--	--	--	5.10E-03	CA			
64742-95-6	Naphtha, High Flash Aromatic (HFAN)		No HLC	--	--			1.00E-01	P	
91-20-3	Naphthalene		--	--	--	3.40E-05	CA	3.00E-03	I	
13463-39-3	Nickel Carbonyl		No HLC	--	--	2.60E-04	CA	1.40E-05	CA	
98-95-3	Nitrobenzene		--	--	--	4.00E-05	I	9.00E-03	I	
75-52-5	Nitromethane		--	--	--	8.80E-06	P	5.00E-03	P	
79-46-9	Nitropropane, 2-		--	--	--	2.70E-03	H	2.00E-02	I	
62-75-9	Nitrosodimethylamine, N-		--	--	--	1.40E-02	I	4.00E-05	X	Mut
924-16-3	Nitroso-di-N-butylamine, N-		--	--	--	1.60E-03	I			
10595-95-6	Nitrosomethylethylamine, N-		--	--	--	6.30E-03	CA			
111-84-2	Nonane, n-		--	--	--			2.00E-02	P	
32598-14-4	Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)		--	--	--	1.10E-03	E	1.30E-03	E	
74472-37-0	Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)		--	--	--	1.10E-03	E	1.30E-03	E	
31508-00-6	Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)		--	--	--	1.10E-03	E	1.30E-03	E	
65510-44-3	Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)		--	--	--	1.10E-03	E	1.30E-03	E	
57465-28-8	Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)		--	--	--	3.80E+00	E	4.00E-07	E	
109-66-0	Pentane, n-		--	--	--			1.00E+00	P	
75-44-5	Phosgene		--	--	--			3.00E-04	I	
7803-51-2	Phosphine		--	--	--			3.00E-04	I	
123-38-6	Propionaldehyde		--	--	--			8.00E-03	I	
103-65-1	Propyl benzene		--	--	--			1.00E+00	X	
115-07-1	Propylene		--	--	--			3.00E+00	CA	
107-98-2	Propylene Glycol Monomethyl Ether		--	--	--			2.00E+00	I	
75-56-9	Propylene Oxide		--	--	--	3.70E-06	I	3.00E-02	I	
100-42-5	Styrene		--	--	--			1.00E+00	I	
7446-11-9	Sulfur Trioxide		No HLC	--	--			1.00E-03	CA	
1746-01-6	TCDD, 2,3,7,8-		--	--	--	3.80E+01	CA	4.00E-08	CA	
70362-50-4	Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)		--	--	--	1.10E-02	E	1.30E-04	E	
630-20-6	Tetrachloroethane, 1,1,1,2-		--	--	--	7.40E-06	I			
79-34-5	Tetrachloroethane, 1,1,2,2-		--	--	--	5.80E-05	CA			
127-18-4	Tetrachloroethylene	2.9E+02	7.99E+01	1.7E-06	4.6E-01	2.60E-07	I	4.00E-02	I	
811-97-2	Tetrafluoroethane, 1,1,1,2-		--	--	--			8.00E+01	I	
109-99-9	Tetrahydrofuran		--	--	--			2.00E+00	I	
7550-45-0	Titanium Tetrachloride		No HLC	--	--			1.00E-04	A	
108-88-3	Toluene		--	--	--			5.00E+00	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-		--	--	--			3.00E+01	H	
120-82-1	Trichlorobenzene, 1,2,4-		--	--	--			2.00E-03	P	
71-55-6	Trichloroethane, 1,1,1-		--	--	--			5.00E+00	I	
79-00-5	Trichloroethane, 1,1,2-		--	--	--	1.60E-05	I	2.00E-04	X	
79-01-6	Trichloroethylene	1.3E+02	2.05E+01	6.9E-06	**2.3E+00**	4.10E-06	I	2.00E-03	I	Mut
75-69-4	Trichlorofluoromethane		--	--	--			7.00E-01	H	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
96-18-4	Trichloropropane, 1,2,3-		--	--	--			3.00E-04	I	Mut
96-19-5	Trichloropropene, 1,2,3-		--	--	--			3.00E-04	P	
121-44-8	Triethylamine		--	--	--			7.00E-03	I	
526-73-8	Trimethylbenzene, 1,2,3-		--	--	--			5.00E-03	P	
95-63-6	Trimethylbenzene, 1,2,4-		--	--	--			7.00E-03	P	TCE
108-05-4	Vinyl Acetate		--	--	--			2.00E-01	I	
593-60-2	Vinyl Bromide		--	--	--	3.20E-05	H	3.00E-03	I	
75-01-4	Vinyl Chloride		--	--	--	4.40E-06	I	1.00E-01	I	Mut
108-38-3	Xylene, m-		--	--	--			1.00E-01	S	
95-47-6	Xylene, o-		--	--	--			1.00E-01	S	
106-42-3	Xylene, P-		--	--	--			1.00E-01	S	
1330-20-7	Xylenes		--	--	--			1.00E-01	I	
140-88-5	Ethyl Acrylate		--	--	--			8.00E-03	P	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	25
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	25
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	250
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater (-)	AFgw_R_GW	0.0005	AFgw_C_GW	0.0005	AFgw_GW	0.0005
Sub-Slab and Exterior Soil Gas (-)	AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	0.00E+00
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

RESIDENTIAL SCENARIO
MW-10, MW-13 & MW-14 DATA

GEC

MW-10

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
x	75-07-0	Acetaldehyde		--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone		--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin		--	--	--			2.00E-03	X	
	75-05-8	Acetonitrile		--	--	--			6.00E-02	I	
	107-02-8	Acrolein		--	--	--			2.00E-05	I	
	79-10-7	Acrylic Acid		--	--	--			1.00E-03	I	
	107-13-1	Acrylonitrile		--	--	--	6.80E-05	I	2.00E-03	I	
	309-00-2	Aldrin		--	--	--	4.90E-03	I			
	107-18-6	Allyl Alcohol		--	--	--			1.00E-04	X	
	107-05-1	Allyl Chloride		--	--	--	6.00E-06	CA	1.00E-03	I	
	7664-41-7	Ammonia		--	--	--			1.00E-01	I	
	75-85-4	Amyl Alcohol, tert-		--	--	--			3.00E-03	X	
	12674-11-2	Aroclor 1016		--	--	--	2.00E-05	S			
	11104-28-2	Aroclor 1221		--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232		--	--	--	5.70E-04	S			
	53469-21-9	Aroclor 1242		--	--	--	5.70E-04	S			
	12672-29-6	Aroclor 1248		--	--	--	5.70E-04	S			
	11097-69-1	Aroclor 1254		--	--	--	5.70E-04	S			
	11096-82-5	Aroclor 1260		--	--	--	5.70E-04	S			
x	103-33-3	Azobenzene		--	--	--	3.10E-05	I			
	56-55-3	Benz[a]anthracene		--	--	--	1.10E-04	CA			Mut
	71-43-2	Benzene		--	--	--	7.80E-06	I	3.00E-02	I	
	100-44-7	Benzyl Chloride		--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-		--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether		--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether		--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether		--	--	--	6.20E-02	I			
	10294-34-5	Boron Trichloride		--	--	--			2.00E-02	P	
	7637-07-2	Boron Trifluoride		No HLC	--	--			1.30E-02	CA	
	107-04-0	Bromo-2-chloroethane, 1-		--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene		--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane		--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane		--	--	--	3.70E-05	CA			
	75-25-2	Bromoform		--	--	--	1.10E-06	I			
	74-83-9	Bromomethane		--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-		--	--	--	3.00E-05	I	2.00E-03	I	
	78-92-2	Butyl alcohol, sec-		--	--	--			3.00E+01	P	
	75-15-0	Carbon Disulfide		--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride		--	--	--	6.00E-06	I	1.00E-01	I	
	12789-03-6	Chlordane		--	--	--	1.00E-04	I	7.00E-04	I	
	7782-50-5	Chlorine		--	--	--			1.50E-04	A	
	10049-04-4	Chlorine Dioxide		--	--	--			2.00E-04	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-		--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-		--	--	--	3.00E-04	I	2.00E-02	I	
	108-90-7	Chlorobenzene		--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-		--	--	--			3.00E-01	P	
	75-45-6	Chlorodifluoromethane		--	--	--			5.00E+01	I	
	67-66-3	Chloroform		--	--	--	2.30E-05	I	9.80E-02	A	
	74-87-3	Chloromethane		--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether		--	--	--	6.90E-04	CA			
	76-06-2	Chloropicrin		--	--	--			4.00E-04	CA	
	8007-45-2	Coke Oven Emissions		--	--	--	6.20E-04	I			Mut
	98-82-8	Cumene		--	--	--			4.00E-01	I	
x	57-12-5	Cyanide (CN-)		--	--	--			8.00E-04	S	
	110-82-7	Cyclohexane		--	--	--			6.00E+00	I	
	108-94-1	Cyclohexanone		--	--	--			7.00E-01	P	
	110-83-8	Cyclohexene		--	--	--			1.00E+00	X	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	72-55-9	DDE, p,p'-		--	--	--	9.70E-05	CA			
	96-12-8	Dibromo-3-chloropropane, 1,2-		--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane		--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-		--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)		--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-		--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-		--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-		--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-		--	--	--			2.00E-01	H	
	106-46-7	Dichlorobenzene, 1,4-		--	--	--	1.10E-05	CA	8.00E-01	I	
	75-71-8	Dichlorodifluoromethane		--	--	--			1.00E-01	X	
	75-34-3	Dichloroethane, 1,1-		--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-		--	--	--	2.60E-05	I	7.00E-03	P	
	75-35-4	Dichloroethylene, 1,1-		--	--	--			2.00E-01	I	
	78-87-5	Dichloropropane, 1,2-		--	--	--	1.00E-05	CA	4.00E-03	I	
	542-75-6	Dichloropropene, 1,3-		--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene		--	--	--			3.00E-04	X	
	75-37-6	Difluoroethane, 1,1-		--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole		--	--	--	1.30E-05	CA			
	108-20-3	Diisopropyl Ether		--	--	--			7.00E-01	P	
	68-12-2	Dimethylformamide		--	--	--			3.00E-02	I	
	57-14-7	Dimethylhydrazine, 1,1-		--	--	--			2.00E-06	X	
	540-73-8	Dimethylhydrazine, 1,2-		--	--	--	1.60E-01	CA			
	513-37-1	Dimethylvinylchloride		--	--	--	1.30E-05	CA			
	123-91-1	Dioxane, 1,4-		--	--	--	5.00E-06	I	3.00E-02	I	
	106-89-8	Epichlorohydrin		--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-		--	--	--			2.00E-02	I	
	111-15-9	Ethoxyethanol Acetate, 2-		--	--	--			6.00E-02	P	
	110-80-5	Ethoxyethanol, 2-		--	--	--			2.00E-01	I	
	141-78-6	Ethyl Acetate		--	--	--			7.00E-02	P	
	75-00-3	Ethyl Chloride (Chloroethane)		--	--	--			1.00E+01	I	
	97-63-2	Ethyl Methacrylate		--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene		--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide		--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine		--	--	--	1.90E-02	CA			
	50-00-0	Formaldehyde		--	--	--	1.30E-05	I	9.80E-03	A	
	64-18-6	Formic Acid		--	--	--			3.00E-04	X	
	98-01-1	Furfural		--	--	--			5.00E-02	H	
	765-34-4	Glycidyl		--	--	--			1.00E-03	H	
	76-44-8	Heptachlor		--	--	--	1.30E-03	I			
	1024-57-3	Heptachlor Epoxide		--	--	--	2.60E-03	I			
	39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)		--	--	--	1.10E-03	E	1.30E-03	E	
	118-74-1	Hexachlorobenzene		--	--	--	4.60E-04	I			
	38380-08-4	Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)		--	--	--	1.10E-03	E	1.30E-03	E	
	69782-90-7	Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)		--	--	--	1.10E-03	E	1.30E-03	E	
	52663-72-6	Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)		--	--	--	1.10E-03	E	1.30E-03	E	
	32774-16-6	Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)		--	--	--	1.10E+00	E	1.30E-06	E	
	87-68-3	Hexachlorobutadiene		--	--	--	2.20E-05	I			
	77-47-4	Hexachlorocyclopentadiene		--	--	--			2.00E-04	I	
x	67-72-1	Hexachloroethane		--	--	--	1.10E-05	CA	3.00E-02	I	
	822-06-0	Hexamethylene Diisocyanate, 1,6-		--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-		--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-		--	--	--			3.00E-02	I	
	302-01-2	Hydrazine		--	--	--	4.90E-03	I	3.00E-05	P	
	7647-01-0	Hydrogen Chloride		--	--	--			2.00E-02	I	
	74-90-8	Hydrogen Cyanide		--	--	--			8.00E-04	I	
	7664-39-3	Hydrogen Fluoride		--	--	--			1.40E-02	CA	

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7783-06-4	Hydrogen Sulfide		--	--	--			2.00E-03	I	
67-63-0	Isopropanol		--	--	--			2.00E-01	P	
7439-97-6	Mercury (elemental)		--	--	--			3.00E-04	I	
126-98-7	Methacrylonitrile		--	--	--			3.00E-02	P	
67-56-1	Methanol		--	--	--			2.00E+01	I	
110-49-6	Methoxyethanol Acetate, 2-		--	--	--			1.00E-03	P	
109-86-4	Methoxyethanol, 2-		--	--	--			2.00E-02	I	
96-33-3	Methyl Acrylate		--	--	--			2.00E-02	P	
78-93-3	Methyl Ethyl Ketone (2-Butanone)		--	--	--			5.00E+00	I	
60-34-4	Methyl Hydrazine		--	--	--	1.00E-03	X	2.00E-05	X	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)		--	--	--			3.00E+00	I	
624-83-9	Methyl Isocyanate		--	--	--			1.00E-03	CA	
80-62-6	Methyl Methacrylate		--	--	--			7.00E-01	I	
25013-15-4	Methyl Styrene (Mixed Isomers)		--	--	--			4.00E-02	H	
1634-04-4	Methyl tert-Butyl Ether (MTBE)		--	--	--	2.60E-07	CA	3.00E+00	I	
75-09-2	Methylene Chloride		--	--	--	1.00E-08	I	6.00E-01	I	Mut
2385-85-5	Mirex		--	--	--	5.10E-03	CA			
64742-95-6	Naphtha, High Flash Aromatic (HFAN)		No HLC	--	--			1.00E-01	P	
91-20-3	Naphthalene		--	--	--	3.40E-05	CA	3.00E-03	I	
13463-39-3	Nickel Carbonyl		No HLC	--	--	2.60E-04	CA	1.40E-05	CA	
98-95-3	Nitrobenzene		--	--	--	4.00E-05	I	9.00E-03	I	
75-52-5	Nitromethane		--	--	--	8.80E-06	P	5.00E-03	P	
79-46-9	Nitropropane, 2-		--	--	--	2.70E-03	H	2.00E-02	I	
62-75-9	Nitrosodimethylamine, N-		--	--	--	1.40E-02	I	4.00E-05	X	Mut
924-16-3	Nitroso-di-N-butylamine, N-		--	--	--	1.60E-03	I			
10595-95-6	Nitrosomethylethylamine, N-		--	--	--	6.30E-03	CA			
111-84-2	Nonane, n-		--	--	--			2.00E-02	P	
32598-14-4	Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)		--	--	--	1.10E-03	E	1.30E-03	E	
74472-37-0	Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)		--	--	--	1.10E-03	E	1.30E-03	E	
31508-00-6	Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)		--	--	--	1.10E-03	E	1.30E-03	E	
65510-44-3	Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)		--	--	--	1.10E-03	E	1.30E-03	E	
57465-28-8	Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)		--	--	--	3.80E+00	E	4.00E-07	E	
109-66-0	Pentane, n-		--	--	--			1.00E+00	P	
75-44-5	Phosgene		--	--	--			3.00E-04	I	
7803-51-2	Phosphine		--	--	--			3.00E-04	I	
123-38-6	Propionaldehyde		--	--	--			8.00E-03	I	
103-65-1	Propyl benzene		--	--	--			1.00E+00	X	
115-07-1	Propylene		--	--	--			3.00E+00	CA	
107-98-2	Propylene Glycol Monomethyl Ether		--	--	--			2.00E+00	I	
75-56-9	Propylene Oxide		--	--	--	3.70E-06	I	3.00E-02	I	
100-42-5	Styrene		--	--	--			1.00E+00	I	
7446-11-9	Sulfur Trioxide		No HLC	--	--			1.00E-03	CA	
1746-01-6	TCDD, 2,3,7,8-		--	--	--	3.80E+01	CA	4.00E-08	CA	
70362-50-4	Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)		--	--	--	1.10E-02	E	1.30E-04	E	
630-20-6	Tetrachloroethane, 1,1,1,2-		--	--	--	7.40E-06	I			
79-34-5	Tetrachloroethane, 1,1,2,2-		--	--	--	5.80E-05	CA			
127-18-4	Tetrachloroethylene	2.0E+01	5.51E+00	5.1E-07	1.3E-01	2.60E-07	I	4.00E-02	I	
811-97-2	Tetrafluoroethane, 1,1,1,2-		--	--	--			8.00E+01	I	
109-99-9	Tetrahydrofuran		--	--	--			2.00E+00	I	
7550-45-0	Titanium Tetrachloride		No HLC	--	--			1.00E-04	A	
108-88-3	Toluene		--	--	--			5.00E+00	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-		--	--	--			3.00E+01	H	
120-82-1	Trichlorobenzene, 1,2,4-		--	--	--			2.00E-03	P	
71-55-6	Trichloroethane, 1,1,1-		--	--	--			5.00E+00	I	
79-00-5	Trichloroethane, 1,1,2-		--	--	--	1.60E-05	I	2.00E-04	X	
79-01-6	Trichloroethylene		--	--	--	4.10E-06	I	2.00E-03	I	Mut
75-69-4	Trichlorofluoromethane		--	--	--			7.00E-01	H	

OSWER VAPOR INTRUSION ASSESSMENT
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Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
96-18-4	Trichloropropane, 1,2,3-		--	--	--			3.00E-04	I	Mut
96-19-5	Trichloropropene, 1,2,3-		--	--	--			3.00E-04	P	
121-44-8	Triethylamine		--	--	--			7.00E-03	I	
526-73-8	Trimethylbenzene, 1,2,3-		--	--	--			5.00E-03	P	
95-63-6	Trimethylbenzene, 1,2,4-		--	--	--			7.00E-03	P	TCE
108-05-4	Vinyl Acetate		--	--	--			2.00E-01	I	
593-60-2	Vinyl Bromide		--	--	--	3.20E-05	H	3.00E-03	I	
75-01-4	Vinyl Chloride		--	--	--	4.40E-06	I	1.00E-01	I	Mut
108-38-3	Xylene, m-		--	--	--			1.00E-01	S	
95-47-6	Xylene, o-		--	--	--			1.00E-01	S	
106-42-3	Xylene, P-		--	--	--			1.00E-01	S	
1330-20-7	Xylenes		--	--	--			1.00E-01	I	
140-88-5	Ethyl Acrylate		--	--	--			8.00E-03	P	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	26
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	26
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	350
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	AFgw_R_GW	0.0005	AFgw_C_GW	0.0005	AFgw_GW	0.0005
Sub-Slab and Exterior Soil Gas	AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	1.00E-06
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

OSWER VAPOR INTRUSION ASSESSMENT

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Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

MW-13

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
x	75-07-0	Acetaldehyde		--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone		--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin		--	--	--			2.00E-03	X	
	75-05-8	Acetonitrile		--	--	--			6.00E-02	I	
	107-02-8	Acrolein		--	--	--			2.00E-05	I	
	79-10-7	Acrylic Acid		--	--	--			1.00E-03	I	
	107-13-1	Acrylonitrile		--	--	--	6.80E-05	I	2.00E-03	I	
	309-00-2	Aldrin		--	--	--	4.90E-03	I			
	107-18-6	Allyl Alcohol		--	--	--			1.00E-04	X	
	107-05-1	Allyl Chloride		--	--	--	6.00E-06	CA	1.00E-03	I	
	7664-41-7	Ammonia		--	--	--			1.00E-01	I	
	75-85-4	Amyl Alcohol, tert-		--	--	--			3.00E-03	X	
	12674-11-2	Aroclor 1016		--	--	--	2.00E-05	S			
	11104-28-2	Aroclor 1221		--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232		--	--	--	5.70E-04	S			
	53469-21-9	Aroclor 1242		--	--	--	5.70E-04	S			
	12672-29-6	Aroclor 1248		--	--	--	5.70E-04	S			
	11097-69-1	Aroclor 1254		--	--	--	5.70E-04	S			
	11096-82-5	Aroclor 1260		--	--	--	5.70E-04	S			
x	103-33-3	Azobenzene		--	--	--	3.10E-05	I			
	56-55-3	Benz[a]anthracene		--	--	--	1.10E-04	CA			Mut
	71-43-2	Benzene		--	--	--	7.80E-06	I	3.00E-02	I	
	100-44-7	Benzyl Chloride		--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-		--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether		--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether		--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether		--	--	--	6.20E-02	I			
	10294-34-5	Boron Trichloride		--	--	--			2.00E-02	P	
	7637-07-2	Boron Trifluoride		No HLC	--	--			1.30E-02	CA	
	107-04-0	Bromo-2-chloroethane, 1-		--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene		--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane		--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane		--	--	--	3.70E-05	CA			
	75-25-2	Bromoform		--	--	--	1.10E-06	I			
	74-83-9	Bromomethane		--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-		--	--	--	3.00E-05	I	2.00E-03	I	
	78-92-2	Butyl alcohol, sec-		--	--	--			3.00E+01	P	
	75-15-0	Carbon Disulfide		--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride		--	--	--	6.00E-06	I	1.00E-01	I	
	12789-03-6	Chlordane		--	--	--	1.00E-04	I	7.00E-04	I	
	7782-50-5	Chlorine		--	--	--			1.50E-04	A	
	10049-04-4	Chlorine Dioxide		--	--	--			2.00E-04	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-		--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-		--	--	--	3.00E-04	I	2.00E-02	I	
	108-90-7	Chlorobenzene		--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-		--	--	--			3.00E-01	P	
	75-45-6	Chlorodifluoromethane		--	--	--			5.00E+01	I	
	67-66-3	Chloroform		--	--	--	2.30E-05	I	9.80E-02	A	
	74-87-3	Chloromethane		--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether		--	--	--	6.90E-04	CA			
	76-06-2	Chloropicrin		--	--	--			4.00E-04	CA	
	8007-45-2	Coke Oven Emissions		--	--	--	6.20E-04	I			Mut
	98-82-8	Cumene		--	--	--			4.00E-01	I	
x	57-12-5	Cyanide (CN-)		--	--	--			8.00E-04	S	
	110-82-7	Cyclohexane		--	--	--			6.00E+00	I	
	108-94-1	Cyclohexanone		--	--	--			7.00E-01	P	
	110-83-8	Cyclohexene		--	--	--			1.00E+00	X	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	72-55-9	DDE, p,p'-		--	--	--	9.70E-05	CA			
	96-12-8	Dibromo-3-chloropropane, 1,2-		--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane		--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-		--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)		--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-		--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-		--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-		--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-		--	--	--			2.00E-01	H	
	106-46-7	Dichlorobenzene, 1,4-		--	--	--	1.10E-05	CA	8.00E-01	I	
	75-71-8	Dichlorodifluoromethane		--	--	--			1.00E-01	X	
	75-34-3	Dichloroethane, 1,1-		--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-		--	--	--	2.60E-05	I	7.00E-03	P	
	75-35-4	Dichloroethylene, 1,1-		--	--	--			2.00E-01	I	
	78-87-5	Dichloropropane, 1,2-		--	--	--	1.00E-05	CA	4.00E-03	I	
	542-75-6	Dichloropropene, 1,3-		--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene		--	--	--			3.00E-04	X	
	75-37-6	Difluoroethane, 1,1-		--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole		--	--	--	1.30E-05	CA			
	108-20-3	Diisopropyl Ether		--	--	--			7.00E-01	P	
	68-12-2	Dimethylformamide		--	--	--			3.00E-02	I	
	57-14-7	Dimethylhydrazine, 1,1-		--	--	--			2.00E-06	X	
	540-73-8	Dimethylhydrazine, 1,2-		--	--	--	1.60E-01	CA			
	513-37-1	Dimethylvinylchloride		--	--	--	1.30E-05	CA			
	123-91-1	Dioxane, 1,4-		--	--	--	5.00E-06	I	3.00E-02	I	
	106-89-8	Epichlorohydrin		--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-		--	--	--			2.00E-02	I	
	111-15-9	Ethoxyethanol Acetate, 2-		--	--	--			6.00E-02	P	
	110-80-5	Ethoxyethanol, 2-		--	--	--			2.00E-01	I	
	141-78-6	Ethyl Acetate		--	--	--			7.00E-02	P	
	75-00-3	Ethyl Chloride (Chloroethane)		--	--	--			1.00E+01	I	
	97-63-2	Ethyl Methacrylate		--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene		--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide		--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine		--	--	--	1.90E-02	CA			
	50-00-0	Formaldehyde		--	--	--	1.30E-05	I	9.80E-03	A	
	64-18-6	Formic Acid		--	--	--			3.00E-04	X	
	98-01-1	Furfural		--	--	--			5.00E-02	H	
	765-34-4	Glycidyl		--	--	--			1.00E-03	H	
	76-44-8	Heptachlor		--	--	--	1.30E-03	I			
	1024-57-3	Heptachlor Epoxide		--	--	--	2.60E-03	I			
	39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)		--	--	--	1.10E-03	E	1.30E-03	E	
	118-74-1	Hexachlorobenzene		--	--	--	4.60E-04	I			
	38380-08-4	Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)		--	--	--	1.10E-03	E	1.30E-03	E	
	69782-90-7	Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)		--	--	--	1.10E-03	E	1.30E-03	E	
	52663-72-6	Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)		--	--	--	1.10E-03	E	1.30E-03	E	
	32774-16-6	Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)		--	--	--	1.10E+00	E	1.30E-06	E	
	87-68-3	Hexachlorobutadiene		--	--	--	2.20E-05	I			
	77-47-4	Hexachlorocyclopentadiene		--	--	--			2.00E-04	I	
x	67-72-1	Hexachloroethane		--	--	--	1.10E-05	CA	3.00E-02	I	
	822-06-0	Hexamethylene Diisocyanate, 1,6-		--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-		--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-		--	--	--			3.00E-02	I	
	302-01-2	Hydrazine		--	--	--	4.90E-03	I	3.00E-05	P	
	7647-01-0	Hydrogen Chloride		--	--	--			2.00E-02	I	
	74-90-8	Hydrogen Cyanide		--	--	--			8.00E-04	I	
	7664-39-3	Hydrogen Fluoride		--	--	--			1.40E-02	CA	

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

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Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7783-06-4	Hydrogen Sulfide		--	--	--			2.00E-03	I	
67-63-0	Isopropanol		--	--	--			2.00E-01	P	
7439-97-6	Mercury (elemental)		--	--	--			3.00E-04	I	
126-98-7	Methacrylonitrile		--	--	--			3.00E-02	P	
67-56-1	Methanol		--	--	--			2.00E+01	I	
110-49-6	Methoxyethanol Acetate, 2-		--	--	--			1.00E-03	P	
109-86-4	Methoxyethanol, 2-		--	--	--			2.00E-02	I	
96-33-3	Methyl Acrylate		--	--	--			2.00E-02	P	
78-93-3	Methyl Ethyl Ketone (2-Butanone)		--	--	--			5.00E+00	I	
60-34-4	Methyl Hydrazine		--	--	--	1.00E-03	X	2.00E-05	X	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)		--	--	--			3.00E+00	I	
624-83-9	Methyl Isocyanate		--	--	--			1.00E-03	CA	
80-62-6	Methyl Methacrylate		--	--	--			7.00E-01	I	
25013-15-4	Methyl Styrene (Mixed Isomers)		--	--	--			4.00E-02	H	
1634-04-4	Methyl tert-Butyl Ether (MTBE)		--	--	--	2.60E-07	CA	3.00E+00	I	
75-09-2	Methylene Chloride		--	--	--	1.00E-08	I	6.00E-01	I	Mut
2385-85-5	Mirex		--	--	--	5.10E-03	CA			
64742-95-6	Naphtha, High Flash Aromatic (HFAN)		No HLC	--	--			1.00E-01	P	
91-20-3	Naphthalene		--	--	--	3.40E-05	CA	3.00E-03	I	
13463-39-3	Nickel Carbonyl		No HLC	--	--	2.60E-04	CA	1.40E-05	CA	
98-95-3	Nitrobenzene		--	--	--	4.00E-05	I	9.00E-03	I	
75-52-5	Nitromethane		--	--	--	8.80E-06	P	5.00E-03	P	
79-46-9	Nitropropane, 2-		--	--	--	2.70E-03	H	2.00E-02	I	
62-75-9	Nitrosodimethylamine, N-		--	--	--	1.40E-02	I	4.00E-05	X	Mut
924-16-3	Nitroso-di-N-butylamine, N-		--	--	--	1.60E-03	I			
10595-95-6	Nitrosomethylethylamine, N-		--	--	--	6.30E-03	CA			
111-84-2	Nonane, n-		--	--	--			2.00E-02	P	
32598-14-4	Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)		--	--	--	1.10E-03	E	1.30E-03	E	
74472-37-0	Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)		--	--	--	1.10E-03	E	1.30E-03	E	
31508-00-6	Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)		--	--	--	1.10E-03	E	1.30E-03	E	
65510-44-3	Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)		--	--	--	1.10E-03	E	1.30E-03	E	
57465-28-8	Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)		--	--	--	3.80E+00	E	4.00E-07	E	
109-66-0	Pentane, n-		--	--	--			1.00E+00	P	
75-44-5	Phosgene		--	--	--			3.00E-04	I	
7803-51-2	Phosphine		--	--	--			3.00E-04	I	
123-38-6	Propionaldehyde		--	--	--			8.00E-03	I	
103-65-1	Propyl benzene		--	--	--			1.00E+00	X	
115-07-1	Propylene		--	--	--			3.00E+00	CA	
107-98-2	Propylene Glycol Monomethyl Ether		--	--	--			2.00E+00	I	
75-56-9	Propylene Oxide		--	--	--	3.70E-06	I	3.00E-02	I	
100-42-5	Styrene		--	--	--			1.00E+00	I	
7446-11-9	Sulfur Trioxide		No HLC	--	--			1.00E-03	CA	
1746-01-6	TCDD, 2,3,7,8-		--	--	--	3.80E+01	CA	4.00E-08	CA	
70362-50-4	Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)		--	--	--	1.10E-02	E	1.30E-04	E	
630-20-6	Tetrachloroethane, 1,1,1,2-		--	--	--	7.40E-06	I			
79-34-5	Tetrachloroethane, 1,1,2,2-		--	--	--	5.80E-05	CA			
127-18-4	Tetrachloroethylene	1.2E+02	3.31E+01	3.1E-06	7.9E-01	2.60E-07	I	4.00E-02	I	
811-97-2	Tetrafluoroethane, 1,1,1,2-		--	--	--			8.00E+01	I	
109-99-9	Tetrahydrofuran		--	--	--			2.00E+00	I	
7550-45-0	Titanium Tetrachloride		No HLC	--	--			1.00E-04	A	
108-88-3	Toluene		--	--	--			5.00E+00	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-		--	--	--			3.00E+01	H	
120-82-1	Trichlorobenzene, 1,2,4-		--	--	--			2.00E-03	P	
71-55-6	Trichloroethane, 1,1,1-		--	--	--			5.00E+00	I	
79-00-5	Trichloroethane, 1,1,2-		--	--	--	1.60E-05	I	2.00E-04	X	
79-01-6	Trichloroethylene	4.0E+01	6.32E+00	**2.6E-05**	**3.0E+00**	4.10E-06	I	2.00E-03	I	Mut
75-69-4	Trichlorofluoromethane		--	--	--			7.00E-01	H	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
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Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
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CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
96-18-4	Trichloropropane, 1,2,3-		--	--	--			3.00E-04	I	Mut
96-19-5	Trichloropropene, 1,2,3-		--	--	--			3.00E-04	P	
121-44-8	Triethylamine		--	--	--			7.00E-03	I	
526-73-8	Trimethylbenzene, 1,2,3-		--	--	--			5.00E-03	P	
95-63-6	Trimethylbenzene, 1,2,4-		--	--	--			7.00E-03	P	TCE
108-05-4	Vinyl Acetate		--	--	--			2.00E-01	I	
593-60-2	Vinyl Bromide		--	--	--	3.20E-05	H	3.00E-03	I	
75-01-4	Vinyl Chloride		--	--	--	4.40E-06	I	1.00E-01	I	Mut
108-38-3	Xylene, m-		--	--	--			1.00E-01	S	
95-47-6	Xylene, o-		--	--	--			1.00E-01	S	
106-42-3	Xylene, P-		--	--	--			1.00E-01	S	
1330-20-7	Xylenes		--	--	--			1.00E-01	I	
140-88-5	Ethyl Acrylate		--	--	--			8.00E-03	P	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	26
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	26
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	350
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	AFgw_R_GW	0.0005	AFgw_C_GW	0.0005	AFgw_GW	0.0005
Sub-Slab and Exterior Soil Gas	AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	1.00E-06
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

MW-14

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
x	75-07-0	Acetaldehyde		--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone		--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin		--	--	--			2.00E-03	X	
	75-05-8	Acetonitrile		--	--	--			6.00E-02	I	
	107-02-8	Acrolein		--	--	--			2.00E-05	I	
	79-10-7	Acrylic Acid		--	--	--			1.00E-03	I	
	107-13-1	Acrylonitrile		--	--	--	6.80E-05	I	2.00E-03	I	
	309-00-2	Aldrin		--	--	--	4.90E-03	I			
	107-18-6	Allyl Alcohol		--	--	--			1.00E-04	X	
	107-05-1	Allyl Chloride		--	--	--	6.00E-06	CA	1.00E-03	I	
	7664-41-7	Ammonia		--	--	--			1.00E-01	I	
	75-85-4	Amyl Alcohol, tert-		--	--	--			3.00E-03	X	
	12674-11-2	Aroclor 1016		--	--	--	2.00E-05	S			
	11104-28-2	Aroclor 1221		--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232		--	--	--	5.70E-04	S			
	53469-21-9	Aroclor 1242		--	--	--	5.70E-04	S			
	12672-29-6	Aroclor 1248		--	--	--	5.70E-04	S			
	11097-69-1	Aroclor 1254		--	--	--	5.70E-04	S			
	11096-82-5	Aroclor 1260		--	--	--	5.70E-04	S			
x	103-33-3	Azobenzene		--	--	--	3.10E-05	I			
	56-55-3	Benz[a]anthracene		--	--	--	1.10E-04	CA			Mut
	71-43-2	Benzene		--	--	--	7.80E-06	I	3.00E-02	I	
	100-44-7	Benzyl Chloride		--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-		--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether		--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether		--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether		--	--	--	6.20E-02	I			
	10294-34-5	Boron Trichloride		--	--	--			2.00E-02	P	
	7637-07-2	Boron Trifluoride		No HLC	--	--			1.30E-02	CA	
	107-04-0	Bromo-2-chloroethane, 1-		--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene		--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane		--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane		--	--	--	3.70E-05	CA			
	75-25-2	Bromoform		--	--	--	1.10E-06	I			
	74-83-9	Bromomethane		--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-		--	--	--	3.00E-05	I	2.00E-03	I	
	78-92-2	Butyl alcohol, sec-		--	--	--			3.00E+01	P	
	75-15-0	Carbon Disulfide		--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride		--	--	--	6.00E-06	I	1.00E-01	I	
	12789-03-6	Chlordane		--	--	--	1.00E-04	I	7.00E-04	I	
	7782-50-5	Chlorine		--	--	--			1.50E-04	A	
	10049-04-4	Chlorine Dioxide		--	--	--			2.00E-04	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-		--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-		--	--	--	3.00E-04	I	2.00E-02	I	
	108-90-7	Chlorobenzene		--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-		--	--	--			3.00E-01	P	
	75-45-6	Chlorodifluoromethane		--	--	--			5.00E+01	I	
	67-66-3	Chloroform		--	--	--	2.30E-05	I	9.80E-02	A	
	74-87-3	Chloromethane		--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether		--	--	--	6.90E-04	CA			
	76-06-2	Chloropicrin		--	--	--			4.00E-04	CA	
	8007-45-2	Coke Oven Emissions		--	--	--	6.20E-04	I			Mut
	98-82-8	Cumene		--	--	--			4.00E-01	I	
x	57-12-5	Cyanide (CN-)		--	--	--			8.00E-04	S	
	110-82-7	Cyclohexane		--	--	--			6.00E+00	I	
	108-94-1	Cyclohexanone		--	--	--			7.00E-01	P	
	110-83-8	Cyclohexene		--	--	--			1.00E+00	X	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

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Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	72-55-9	DDE, p,p'-		--	--	--	9.70E-05	CA			
	96-12-8	Dibromo-3-chloropropane, 1,2-		--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane		--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-		--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)		--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-		--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-		--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-		--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-		--	--	--			2.00E-01	H	
	106-46-7	Dichlorobenzene, 1,4-		--	--	--	1.10E-05	CA	8.00E-01	I	
	75-71-8	Dichlorodifluoromethane		--	--	--			1.00E-01	X	
	75-34-3	Dichloroethane, 1,1-		--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-		--	--	--	2.60E-05	I	7.00E-03	P	
	75-35-4	Dichloroethylene, 1,1-		--	--	--			2.00E-01	I	
	78-87-5	Dichloropropane, 1,2-		--	--	--	1.00E-05	CA	4.00E-03	I	
	542-75-6	Dichloropropene, 1,3-		--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene		--	--	--			3.00E-04	X	
	75-37-6	Difluoroethane, 1,1-		--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole		--	--	--	1.30E-05	CA			
	108-20-3	Diisopropyl Ether		--	--	--			7.00E-01	P	
	68-12-2	Dimethylformamide		--	--	--			3.00E-02	I	
	57-14-7	Dimethylhydrazine, 1,1-		--	--	--			2.00E-06	X	
	540-73-8	Dimethylhydrazine, 1,2-		--	--	--	1.60E-01	CA			
	513-37-1	Dimethylvinylchloride		--	--	--	1.30E-05	CA			
	123-91-1	Dioxane, 1,4-		--	--	--	5.00E-06	I	3.00E-02	I	
	106-89-8	Epichlorohydrin		--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-		--	--	--			2.00E-02	I	
	111-15-9	Ethoxyethanol Acetate, 2-		--	--	--			6.00E-02	P	
	110-80-5	Ethoxyethanol, 2-		--	--	--			2.00E-01	I	
	141-78-6	Ethyl Acetate		--	--	--			7.00E-02	P	
	75-00-3	Ethyl Chloride (Chloroethane)		--	--	--			1.00E+01	I	
	97-63-2	Ethyl Methacrylate		--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene		--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide		--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine		--	--	--	1.90E-02	CA			
	50-00-0	Formaldehyde		--	--	--	1.30E-05	I	9.80E-03	A	
	64-18-6	Formic Acid		--	--	--			3.00E-04	X	
	98-01-1	Furfural		--	--	--			5.00E-02	H	
	765-34-4	Glycidyl		--	--	--			1.00E-03	H	
	76-44-8	Heptachlor		--	--	--	1.30E-03	I			
	1024-57-3	Heptachlor Epoxide		--	--	--	2.60E-03	I			
	39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)		--	--	--	1.10E-03	E	1.30E-03	E	
	118-74-1	Hexachlorobenzene		--	--	--	4.60E-04	I			
	38380-08-4	Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)		--	--	--	1.10E-03	E	1.30E-03	E	
	69782-90-7	Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)		--	--	--	1.10E-03	E	1.30E-03	E	
	52663-72-6	Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)		--	--	--	1.10E-03	E	1.30E-03	E	
	32774-16-6	Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)		--	--	--	1.10E+00	E	1.30E-06	E	
	87-68-3	Hexachlorobutadiene		--	--	--	2.20E-05	I			
	77-47-4	Hexachlorocyclopentadiene		--	--	--			2.00E-04	I	
x	67-72-1	Hexachloroethane		--	--	--	1.10E-05	CA	3.00E-02	I	
	822-06-0	Hexamethylene Diisocyanate, 1,6-		--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-		--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-		--	--	--			3.00E-02	I	
	302-01-2	Hydrazine		--	--	--	4.90E-03	I	3.00E-05	P	
	7647-01-0	Hydrogen Chloride		--	--	--			2.00E-02	I	
	74-90-8	Hydrogen Cyanide		--	--	--			8.00E-04	I	
	7664-39-3	Hydrogen Fluoride		--	--	--			1.40E-02	CA	

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CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7783-06-4	Hydrogen Sulfide		--	--	--			2.00E-03	I	
67-63-0	Isopropanol		--	--	--			2.00E-01	P	
7439-97-6	Mercury (elemental)		--	--	--			3.00E-04	I	
126-98-7	Methacrylonitrile		--	--	--			3.00E-02	P	
67-56-1	Methanol		--	--	--			2.00E+01	I	
110-49-6	Methoxyethanol Acetate, 2-		--	--	--			1.00E-03	P	
109-86-4	Methoxyethanol, 2-		--	--	--			2.00E-02	I	
96-33-3	Methyl Acrylate		--	--	--			2.00E-02	P	
78-93-3	Methyl Ethyl Ketone (2-Butanone)		--	--	--			5.00E+00	I	
60-34-4	Methyl Hydrazine		--	--	--	1.00E-03	X	2.00E-05	X	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)		--	--	--			3.00E+00	I	
624-83-9	Methyl Isocyanate		--	--	--			1.00E-03	CA	
80-62-6	Methyl Methacrylate		--	--	--			7.00E-01	I	
25013-15-4	Methyl Styrene (Mixed Isomers)		--	--	--			4.00E-02	H	
1634-04-4	Methyl tert-Butyl Ether (MTBE)		--	--	--	2.60E-07	CA	3.00E+00	I	
75-09-2	Methylene Chloride		--	--	--	1.00E-08	I	6.00E-01	I	Mut
2385-85-5	Mirex		--	--	--	5.10E-03	CA			
64742-95-6	Naphtha, High Flash Aromatic (HFAN)		No HLC	--	--			1.00E-01	P	
91-20-3	Naphthalene		--	--	--	3.40E-05	CA	3.00E-03	I	
13463-39-3	Nickel Carbonyl		No HLC	--	--	2.60E-04	CA	1.40E-05	CA	
98-95-3	Nitrobenzene		--	--	--	4.00E-05	I	9.00E-03	I	
75-52-5	Nitromethane		--	--	--	8.80E-06	P	5.00E-03	P	
79-46-9	Nitropropane, 2-		--	--	--	2.70E-03	H	2.00E-02	I	
62-75-9	Nitrosodimethylamine, N-		--	--	--	1.40E-02	I	4.00E-05	X	Mut
924-16-3	Nitroso-di-N-butylamine, N-		--	--	--	1.60E-03	I			
10595-95-6	Nitrosomethylethylamine, N-		--	--	--	6.30E-03	CA			
111-84-2	Nonane, n-		--	--	--			2.00E-02	P	
32598-14-4	Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)		--	--	--	1.10E-03	E	1.30E-03	E	
74472-37-0	Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)		--	--	--	1.10E-03	E	1.30E-03	E	
31508-00-6	Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)		--	--	--	1.10E-03	E	1.30E-03	E	
65510-44-3	Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)		--	--	--	1.10E-03	E	1.30E-03	E	
57465-28-8	Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)		--	--	--	3.80E+00	E	4.00E-07	E	
109-66-0	Pentane, n-		--	--	--			1.00E+00	P	
75-44-5	Phosgene		--	--	--			3.00E-04	I	
7803-51-2	Phosphine		--	--	--			3.00E-04	I	
123-38-6	Propionaldehyde		--	--	--			8.00E-03	I	
103-65-1	Propyl benzene		--	--	--			1.00E+00	X	
115-07-1	Propylene		--	--	--			3.00E+00	CA	
107-98-2	Propylene Glycol Monomethyl Ether		--	--	--			2.00E+00	I	
75-56-9	Propylene Oxide		--	--	--	3.70E-06	I	3.00E-02	I	
100-42-5	Styrene		--	--	--			1.00E+00	I	
7446-11-9	Sulfur Trioxide		No HLC	--	--			1.00E-03	CA	
1746-01-6	TCDD, 2,3,7,8-		--	--	--	3.80E+01	CA	4.00E-08	CA	
70362-50-4	Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)		--	--	--	1.10E-02	E	1.30E-04	E	
630-20-6	Tetrachloroethane, 1,1,1,2-		--	--	--	7.40E-06	I			
79-34-5	Tetrachloroethane, 1,1,2,2-		--	--	--	5.80E-05	CA			
127-18-4	Tetrachloroethylene	2.9E+01	7.99E+00	7.4E-07	1.9E-01	2.60E-07	I	4.00E-02	I	
811-97-2	Tetrafluoroethane, 1,1,1,2-		--	--	--			8.00E+01	I	
109-99-9	Tetrahydrofuran		--	--	--			2.00E+00	I	
7550-45-0	Titanium Tetrachloride		No HLC	--	--			1.00E-04	A	
108-88-3	Toluene		--	--	--			5.00E+00	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-		--	--	--			3.00E+01	H	
120-82-1	Trichlorobenzene, 1,2,4-		--	--	--			2.00E-03	P	
71-55-6	Trichloroethane, 1,1,1-		--	--	--			5.00E+00	I	
79-00-5	Trichloroethane, 1,1,2-		--	--	--	1.60E-05	I	2.00E-04	X	
79-01-6	Trichloroethylene		--	--	--	4.10E-06	I	2.00E-03	I	Mut
75-69-4	Trichlorofluoromethane		--	--	--			7.00E-01	H	

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
96-18-4	Trichloropropane, 1,2,3-		--	--	--			3.00E-04	I	Mut
96-19-5	Trichloropropene, 1,2,3-		--	--	--			3.00E-04	P	
121-44-8	Triethylamine		--	--	--			7.00E-03	I	
526-73-8	Trimethylbenzene, 1,2,3-		--	--	--			5.00E-03	P	
95-63-6	Trimethylbenzene, 1,2,4-		--	--	--			7.00E-03	P	TCE
108-05-4	Vinyl Acetate		--	--	--			2.00E-01	I	
593-60-2	Vinyl Bromide		--	--	--	3.20E-05	H	3.00E-03	I	
75-01-4	Vinyl Chloride		--	--	--	4.40E-06	I	1.00E-01	I	Mut
108-38-3	Xylene, m-		--	--	--			1.00E-01	S	
95-47-6	Xylene, o-		--	--	--			1.00E-01	S	
106-42-3	Xylene, P-		--	--	--			1.00E-01	S	
1330-20-7	Xylenes		--	--	--			1.00E-01	I	
140-88-5	Ethyl Acrylate		--	--	--			8.00E-03	P	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	26
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	26
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	350
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	AFgw_R_GW	0.0005	AFgw_C_GW	0.0005	AFgw_GW	0.0005
Sub-Slab and Exterior Soil Gas	AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	1.00E-06
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

APPENDIX F

GEC

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Mercer University
Trianlge
Run Name

Data Input Instructions:
115 → 1. Enter value directly....or
or
0.02 ← 2. Calculate by filling in gray cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	49.7	(ft/yr)
or			
Hydraulic Conductivity	K	1.5E-03	(cm/sec)
Hydraulic Gradient	i	0.008	(ft/ft)
Effective Porosity	n	0.25	(-)

2. DISPERSION

Alpha x*	95.5	(ft)	Calc.
(Alpha y) / (Alpha x)*	0.1	(-)	
(Alpha z) / (Alpha x)*	1.E-99	(-)	

3. ADSORPTION

Retardation Factor* → R
or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	3.90	(-)
TCE	130	(L/kg)	1.88	(-)
DCE	125	(L/kg)	1.85	(-)
VC	30	(L/kg)	1.20	(-)
ETH	302	(L/kg)	3.05	(-)
Common R (used in model)* =			**1.88**	

4. BIOTRANSFORMATION

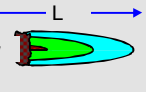
-1st Order Decay Coefficient*

	λ (1/yr)		half-life (yrs)	Yield
Zone 1				
PCE → TCE	0.800	←		0.79
TCE → DCE	0.300	←		0.74
DCE → VC	0.100	←		0.64
VC → ETH	0.400	←		0.45
Zone 2	λ (1/yr)		half-life (yrs)	
PCE → TCE	0.000	←		
TCE → DCE	0.000	←		
DCE → VC	0.000	←		
VC → ETH	0.000	←		

λ HELP

5. GENERAL

Simulation Time*	33	(yr)	
Modeled Area Width*	700	(ft)	
Modeled Area Length*	1200	(ft)	
Zone 1 Length*	1200	(ft)	
Zone 2 Length*	0	(ft)	Zone 2= L - Zone 1



6. SOURCE DATA

TYPE: Continuous / Spatially-Varying

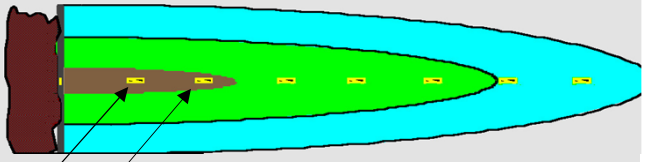
Source Options

Source Thickness in Sat. Zone* 45 (ft)

	Y1	Y2	Y3
Width* (ft)	25	60	130

Conc. (mg/L)*	C1	C2	C3	k_s* (1/yr)
PCE	.29	0.120	0.086	0
TCE	.13	0.040	0.035	0
DCE	.048	0.015	0.017	0
VC				0
ETH				0

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	.26	.29	.12	.029							
TCE Conc. (mg/L)	.12	.13	.04								
DCE Conc. (mg/L)	.045	.048	.015								
VC Conc. (mg/L)											
ETH Conc. (mg/L)											
Distance from Source (ft)	0	25	375	675							
Date Data Collected	2015										

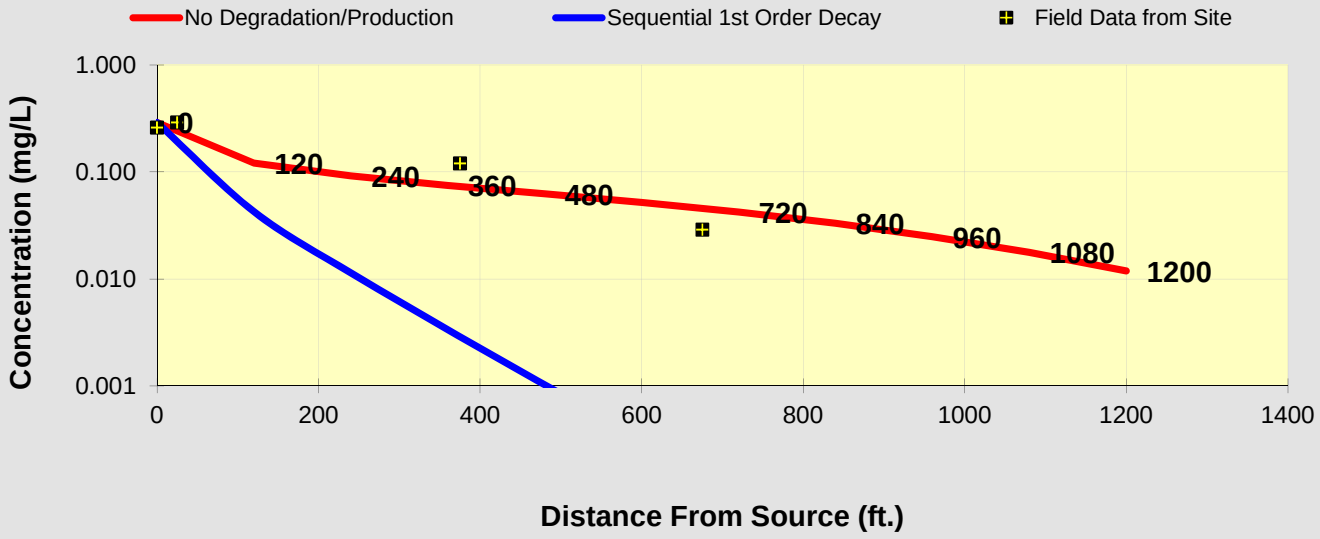
8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | **RUN ARRAY** | ***Help*** | Restore | RESET | ***SEE*** | Paste

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

PCE	Distance from Source (ft)										
	0	120	240	360	480	600	720	840	960	1080	1200
No Degradation	0.290	0.121	0.092	0.075	0.062	0.052	0.042	0.033	0.025	0.018	0.012
Biotransformation	0.2900	0.043	0.011	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000

	Monitoring Well Locations (ft)										
	0	25	375	675							
Field Data from Site	0.260	0.290	0.120	0.029							



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

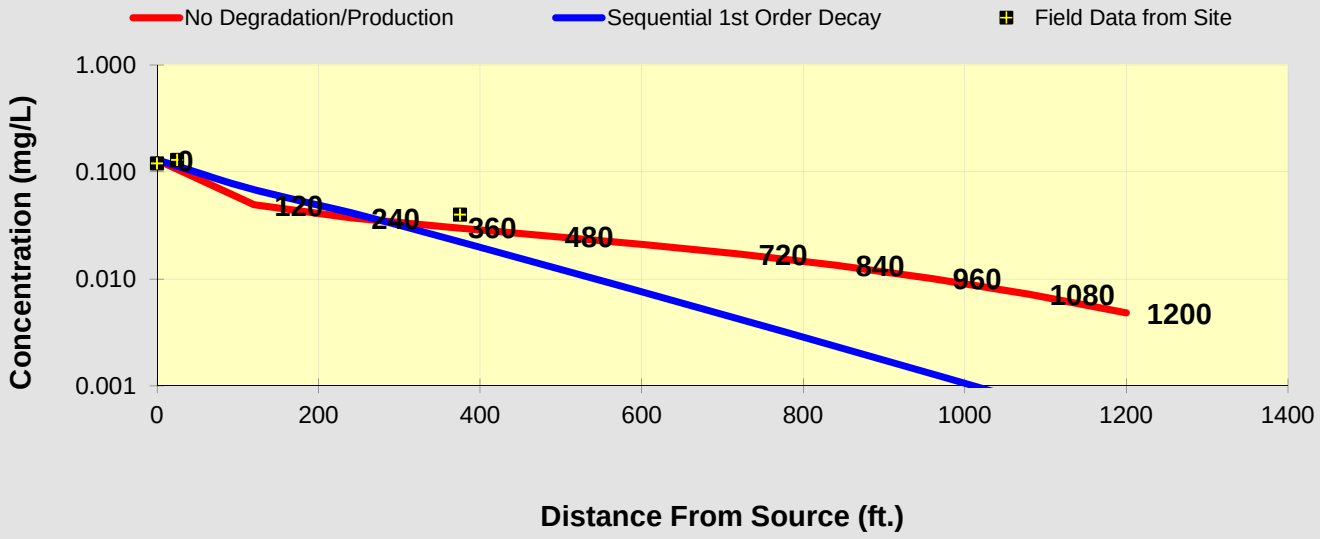
To All

To Array

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	120	240	360	480	600	720	840	960	1080	1200
No Degradation	0.130	0.049	0.037	0.030	0.025	0.021	0.017	0.013	0.010	0.007	0.005
Biotransformation	0.1300	0.068	0.042	0.024	0.014	0.008	0.004	0.002	0.001	0.001	0.000

	Monitoring Well Locations (ft)										
	0	25	375	675							
Field Data from Site	0.120	0.130	0.040								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

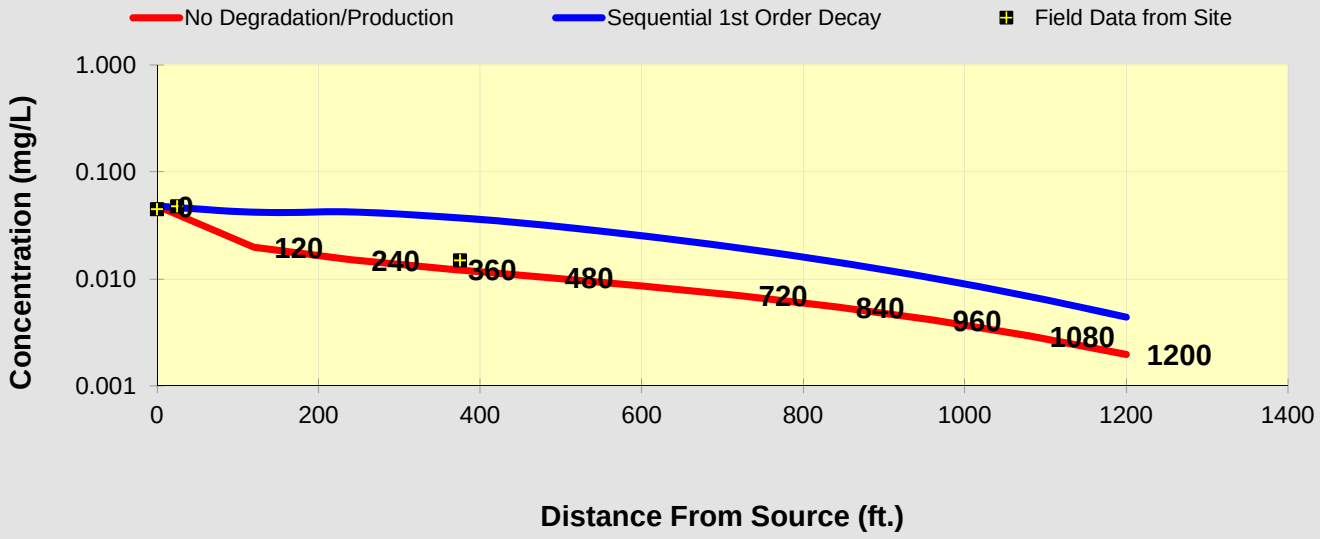
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	120	240	360	480	600	720	840	960	1080	1200
No Degradation	0.048	0.020	0.015	0.012	0.010	0.009	0.007	0.006	0.004	0.003	0.002
Biotransformation	0.0480	0.042	0.042	0.038	0.032	0.025	0.020	0.014	0.010	0.007	0.004

Monitoring Well Locations (ft)

	0	25	375	675							
Field Data from Site	0.045	0.048	0.015								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

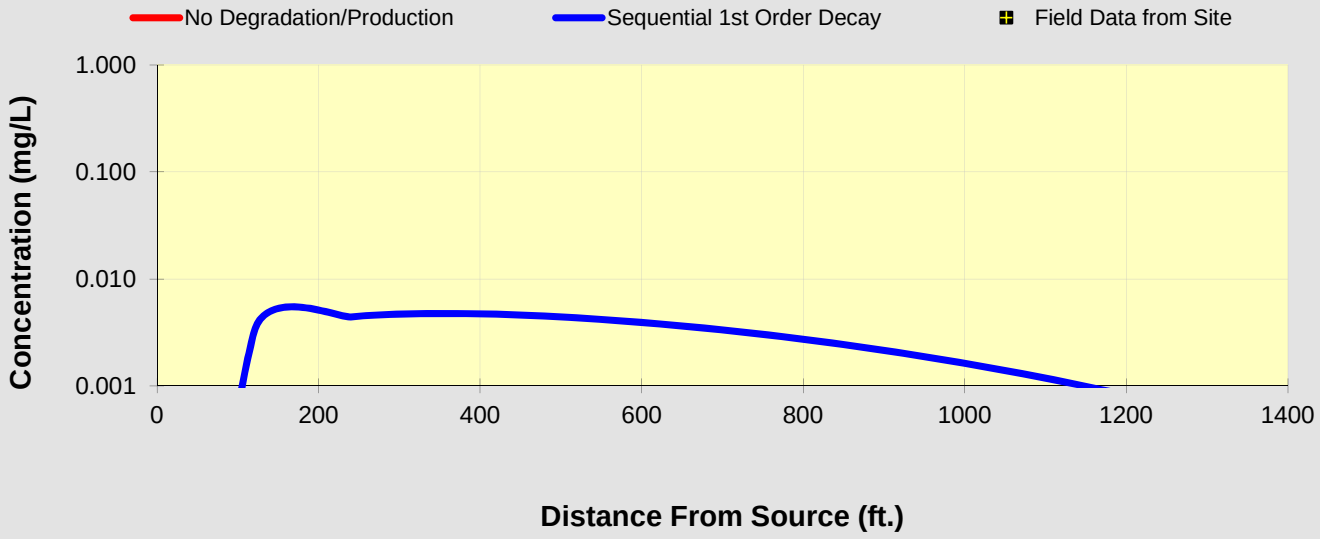
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	120	240	360	480	600	720	840	960	1080	1200
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.003	0.004	0.005	0.005	0.004	0.003	0.002	0.002	0.001	0.001

Monitoring Well Locations (ft)

	0	25	375	675							
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

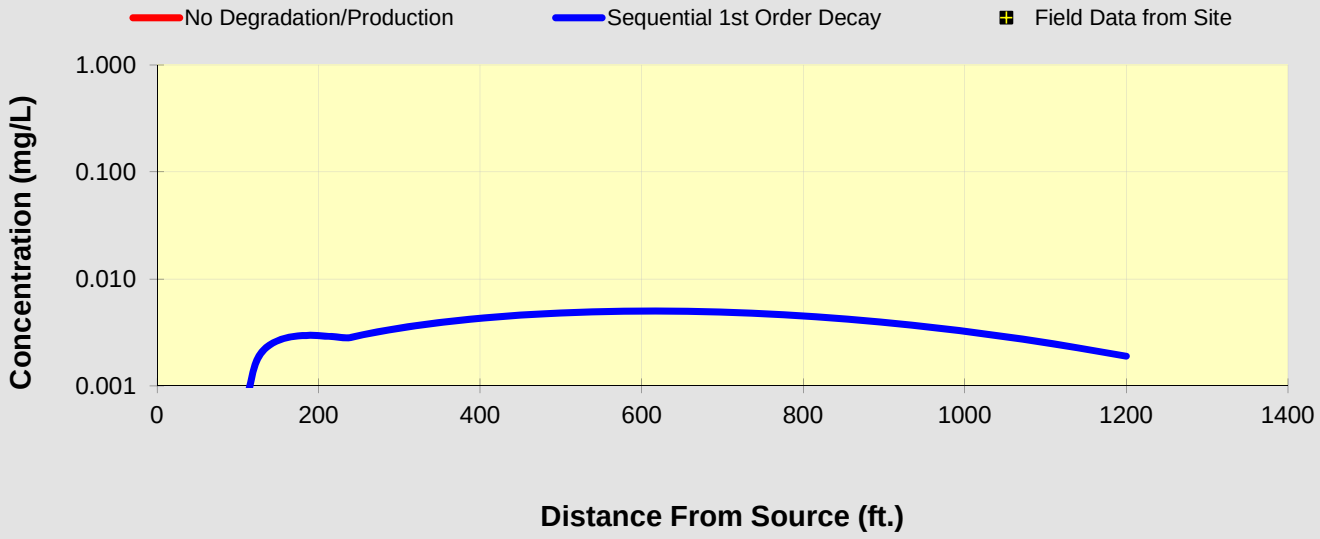
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

ETH	0	120	240	360	480	600	720	840	960	1080	1200
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.001	0.003	0.004	0.005	0.005	0.005	0.004	0.004	0.003	0.002

Monitoring Well Locations (ft)

	0	25	375	675							
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Mercer University
Trianlge
Run Name

Data Input Instructions:
115 → 1. Enter value directly....or
or
0.02 2. Calculate by filling in gray cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	49.7	(ft/yr)
or			
Hydraulic Conductivity	K	1.5E-03	(cm/sec)
Hydraulic Gradient	i	0.008	(ft/ft)
Effective Porosity	n	0.25	(-)

2. DISPERSION

Alpha x*	95.5	(ft)	Calc.
(Alpha y) / (Alpha x)*	0.1	(-)	
(Alpha z) / (Alpha x)*	1.E-99	(-)	

3. ADSORPTION

Retardation Factor* → R
or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	3.90	(-)
TCE	130	(L/kg)	1.88	(-)
DCE	125	(L/kg)	1.85	(-)
VC	30	(L/kg)	1.20	(-)
ETH	302	(L/kg)	3.05	(-)
Common R (used in model)* =			**1.88**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

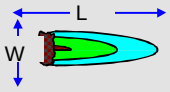
Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	0.800		0.79
TCE → DCE	0.300		0.74
DCE → VC	0.100		0.64
VC → ETH	0.400		0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	

λ HELP

5. GENERAL

Simulation Time*	33	(yr)	
Modeled Area Width*	700	(ft)	
Modeled Area Length*	2500	(ft)	
Zone 1 Length*	2500	(ft)	
Zone 2 Length*	0	(ft)	Zone 2= L - Zone 1



6. SOURCE DATA

TYPE: Continuous Spatially-Varying

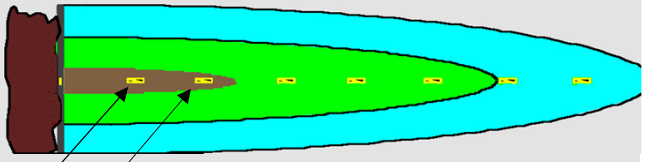
Source Options

Source Thickness in Sat. Zone* 45 (ft)

	Y1	Y2	Y3
Width* (ft)	25	60	130

Conc. (mg/L)*	C1	C2	C3	k_s* (1/yr)
PCE	.29	0.120	0.086	0
TCE	.13	0.040	0.035	0
DCE	.048	0.015	0.017	0
VC				0
ETH				0

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

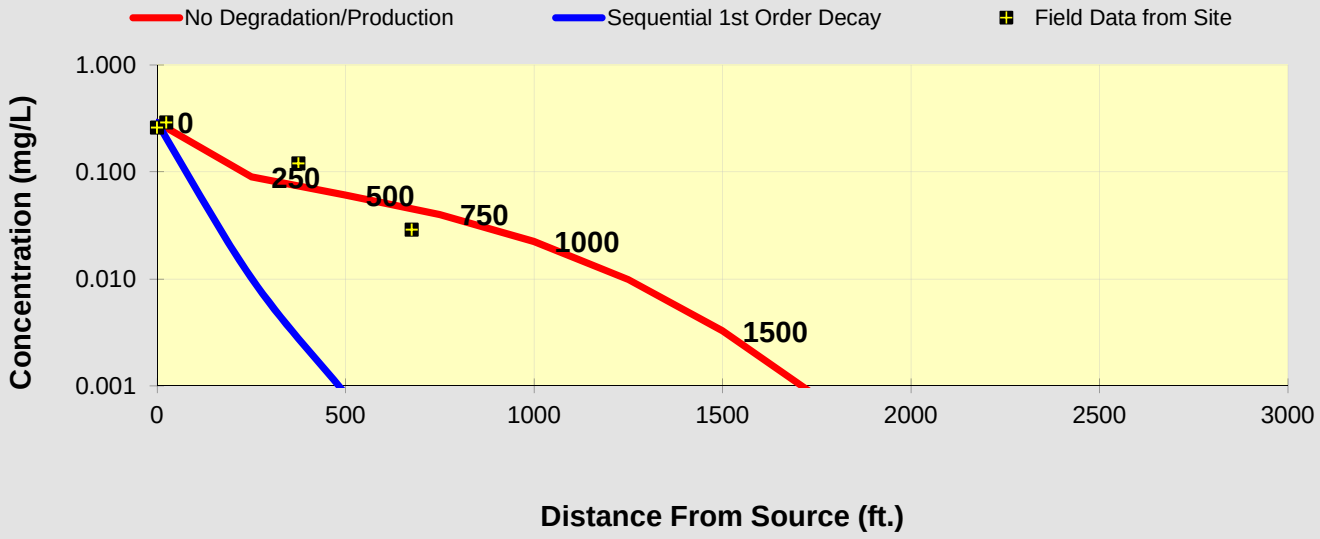
PCE Conc. (mg/L)	.26	.29	.12	.029							
TCE Conc. (mg/L)	.12	.13	.04								
DCE Conc. (mg/L)	.045	.048	.015								
VC Conc. (mg/L)											
ETH Conc. (mg/L)											
Distance from Source (ft)	0	25	375	675							
Date Data Collected	2015										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore | RESET | SEE | Paste

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

PCE	Distance from Source (ft)										
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
No Degradation	0.290	0.090	0.061	0.040	0.022	0.010	0.003	0.001	0.000	0.000	0.000
Biotransformation	0.2900	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Monitoring Well Locations (ft)										
	0	25	375	675							
Field Data from Site	0.260	0.290	0.120	0.029							



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

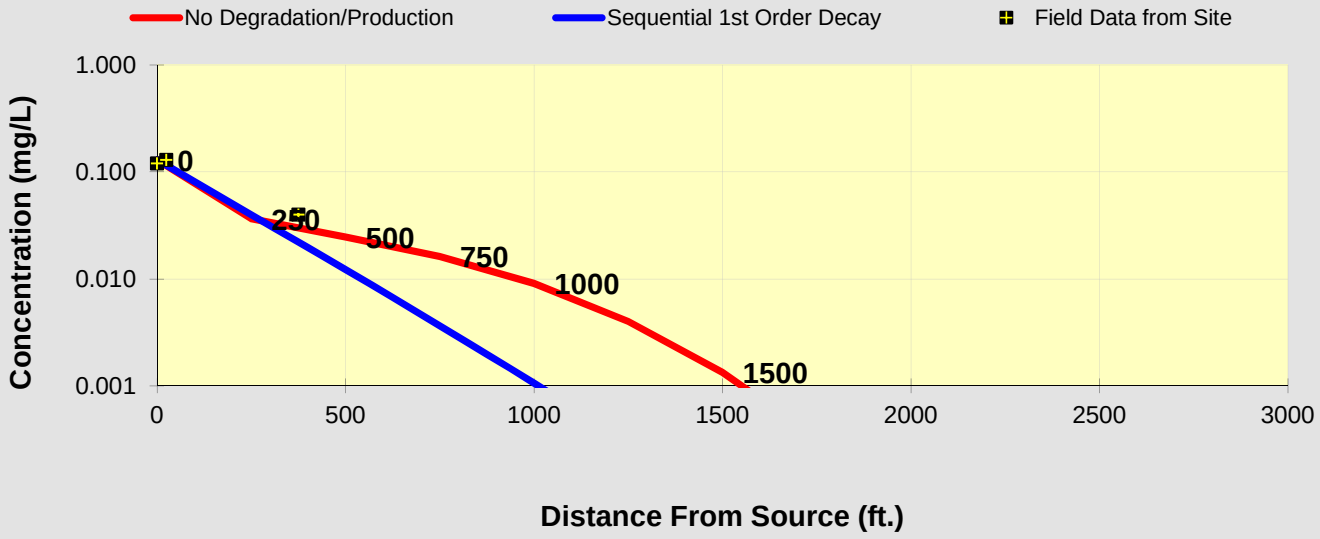
Return to Input

To All

To Array

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

TCE	Distance from Source (ft)										
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
No Degradation	0.130	0.037	0.025	0.016	0.009	0.004	0.001	0.000	0.000	0.000	0.000
Biotransformation	0.1300	0.040	0.012	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	Monitoring Well Locations (ft)										
	0	25	375	675							
Field Data from Site	0.120	0.130	0.040								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

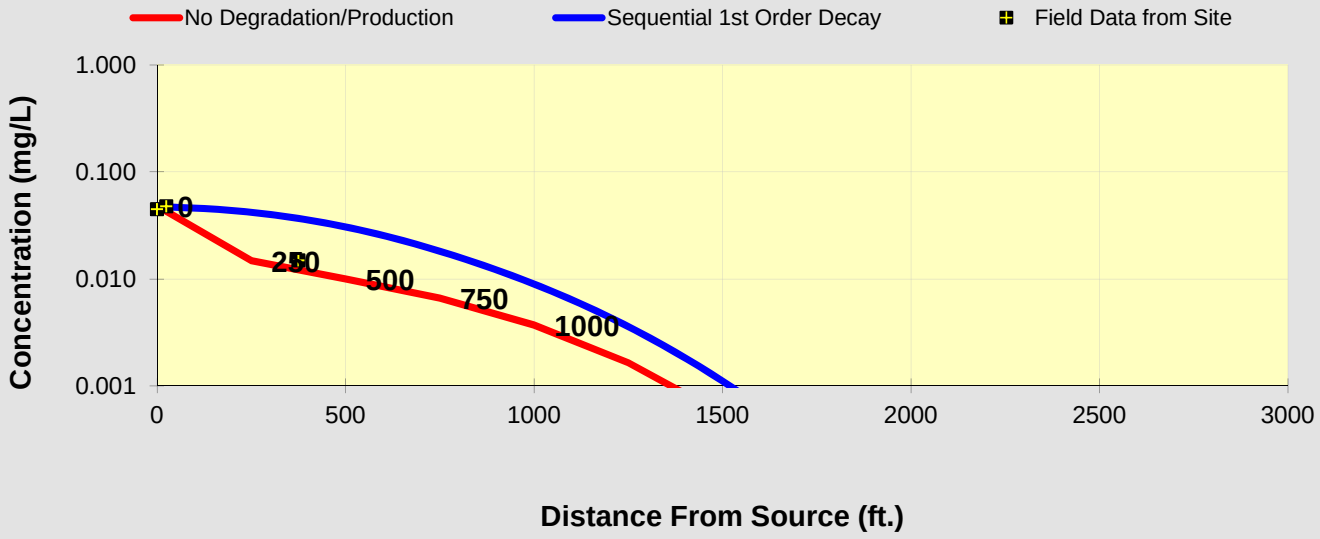
Return to Input

To All

To Array

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

DCE	Distance from Source (ft)										
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
No Degradation	0.048	0.015	0.010	0.007	0.004	0.002	0.001	0.000	0.000	0.000	0.000
Biotransformation	0.0480	0.042	0.031	0.018	0.009	0.004	0.001	0.000	0.000	0.000	0.000
	Monitoring Well Locations (ft)										
	0	25	375	675							
Field Data from Site	0.045	0.048	0.015								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

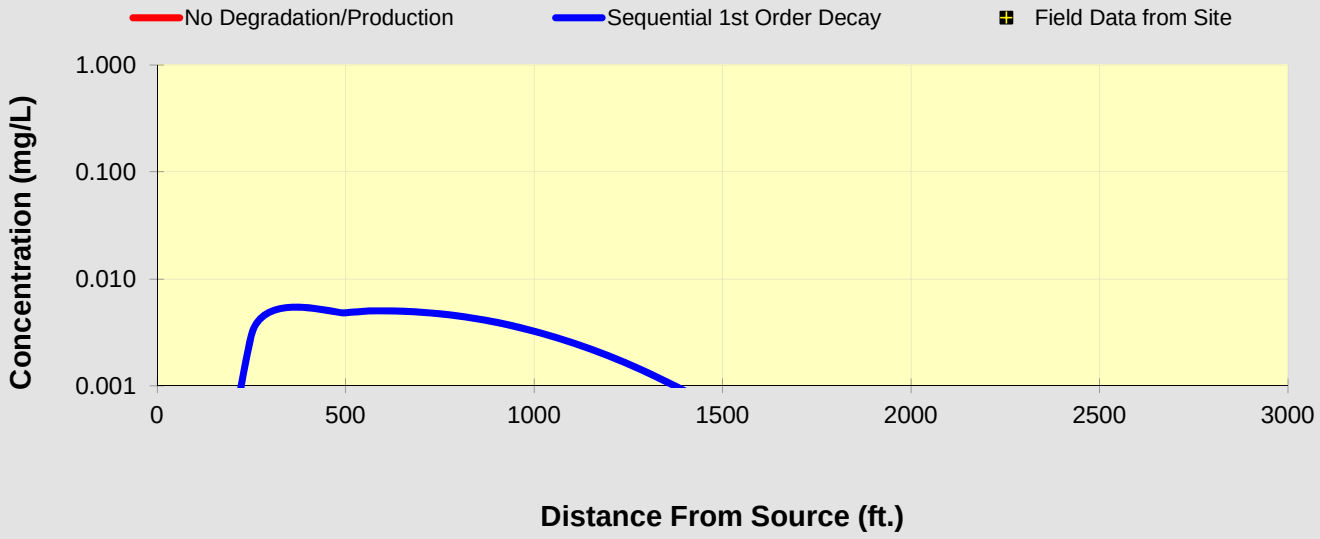
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

ETH	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.003	0.005	0.005	0.003	0.002	0.001	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	25	375	675							
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

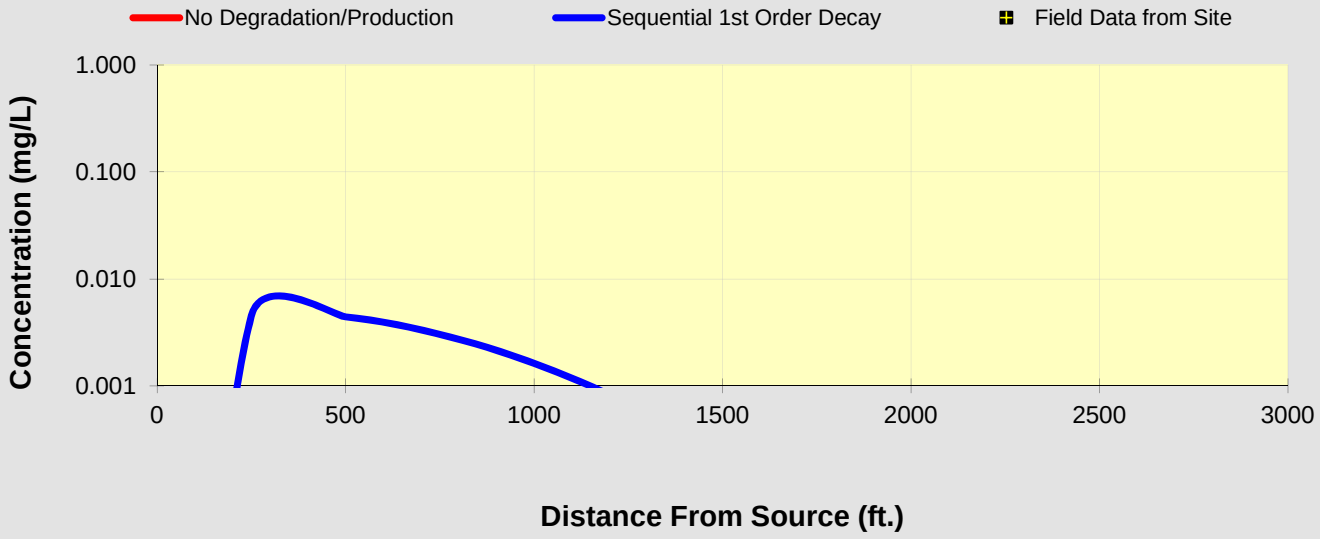
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.004	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	25	375	675							
Field Data from Site											



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

33.0 Years

Log ⟺ Linear

Return to Input

To All

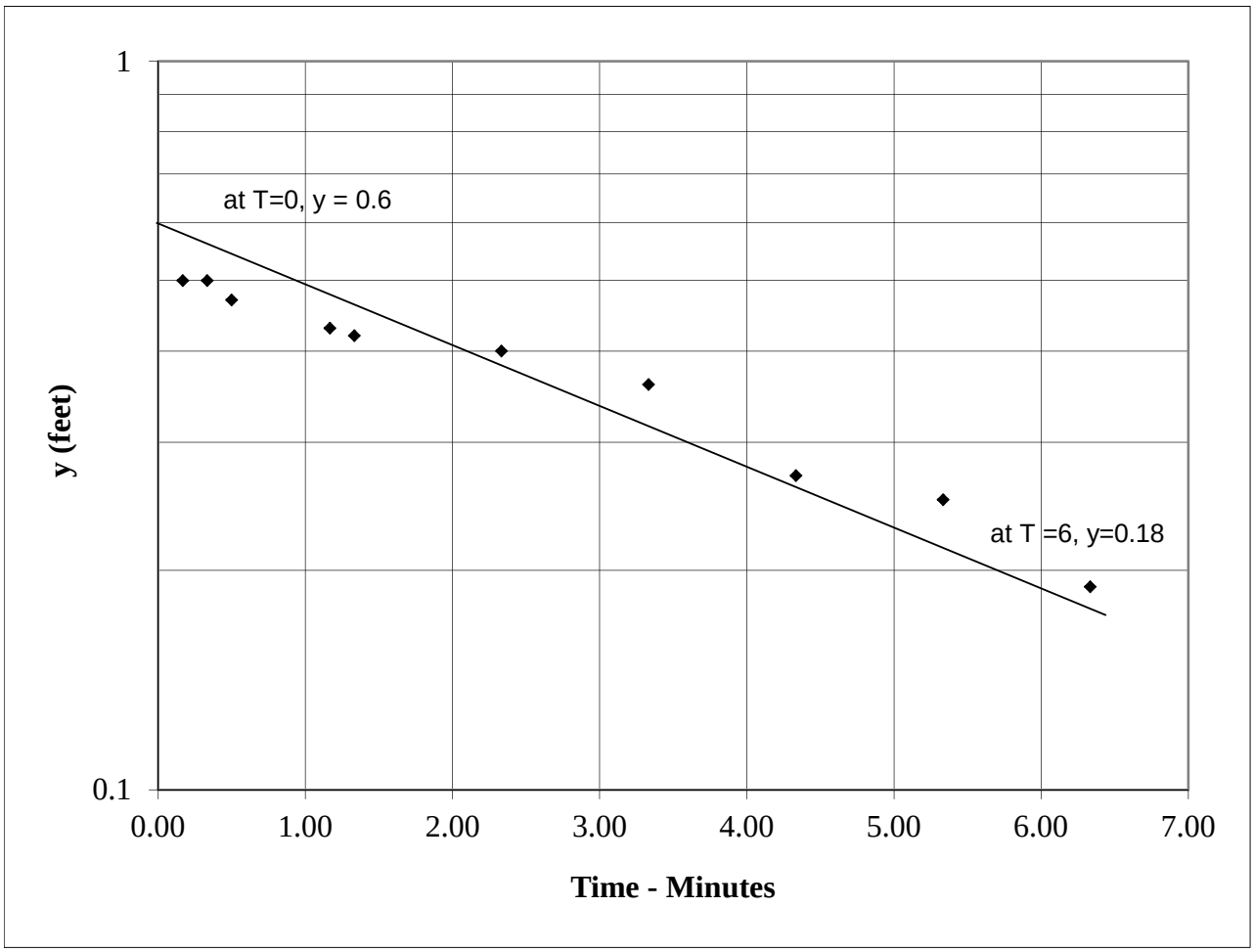
To Array

SLUG TEST DATA SHEET

Site Name		Mercer Triangle	
Date of Test		August 18, 2015	
Monitoring Well ID:		MWA-1	
Total Well Depth (TD):		40	feet
Screen Length(L):		15	feet
Depth to Water(DW):		31.5	feet
Height of Water Column(H):		8.5	feet
Well Diameter:		2	inches
Borehole Diameter:		8	inches
Depth to Confining Unit (BGS)		50	feet
L/Rw =		22.5	
(from graph)	A=	2.9	
	B =	0.55	
	C =	2.7	
(from plot)	At T = 0, y_0 =	0.6	feet
	T =	6	minutes
	y_T =	0.18	feet

Hydraulic Conductivity, k =	**1.5E-03**	**cm/sec**
	4.33	**ft/day**

FIELD DATA		
Time (secs)	**Time (min)**	**Δy**
0	0.00	0
10	0.17	0.5
20	0.33	0.5
30	0.50	0.47
70	1.17	0.43
80	1.33	0.42
140	2.33	0.4
200	3.33	0.36
260	4.33	0.27
320	5.33	0.25
380	6.33	0.19



APPENDIX G

GEC

Invoice

GEC
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC
514 Hillcrest Industrial Blvd
Macon, GA 31204
Phone: 478-757-1606 Fax: 478-757-1608

Russell Vullo
Mercer University
1400 Coleman Avenue
Macon, GA 31207

June 03, 2015
Invoice No: 000026351

Project 090698.210 Mercer HSRA MCE-02-0596

Mercer Triangle HSRA Evaluation- From 9/2014 to 6/2015

Personnel	Hours	Rate	Amount
Registered Engineer	4.75	$ 120.00	$ 570.00
Staff Engineer	12	$ 90.00	$ 1,080.00
Engineering Aide	69.25	$ 45.00	$ 3,116.25
Administrative Asst.	0.25	$ 35.00	$ 8.75

Drilling/Well Installation	Units	Cost	Amount
Drill Rig Mobilations, LS	1	$ 350.00	$ 350.00
Monitoring well, per foot	62	$ 38.00	$ 2,356.00
Well cover, ea.	1	$ 150.00	$ 150.00

Miscellaneous	Units	Cost	Amount
Analytical Services (Cost + 15%)	1	$ 1,368.75	$ 1,368.75
Mileage, per mile	40	$ 0.75	$ 30.00
Sampling supplies, per well	13	$ 25.00	$ 325.00

Total Invoice **$ 9,354.75**

Invoice

GEC
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC
514 Hillcrest Industrial Blvd
Macon, GA 31204
Phone 478-757-1606 Fax: 478-757-1608
www.geconsultants.com

August 20, 2015
Invoice No: 000027023

Russell Vullo
Mercer University
1400 Coleman Avenue
Macon, GA 31207

Project 090698.340 Mercer HSRA - 2013- 2014

Professional Services

Professional Personnel

	Hours	Rate	Amount	
Registered Engineer	3.00	120.00	360.00	
Staff Engineer	25.50	90.00	2,295.00	
Environmental Technician	2.00	60.00	120.00	
Engineering Aide	8.00	45.00	360.00	
Environmental Specialist	21.50	60.00	1,290.00	
Senior Environmental Technician	20.50	60.00	1,230.00	
Total Labor				**5,655.00**

Consultants

Analytical Environmental Services, Inc

7/23/2015	Analytical Environmental Services, Inc	MERCER HSRA	1,270.75	
	Total Consultants			**1,270.75**

Total this Invoice **$6,925.75**