SDG NARRATIVE

LAB NAME: CHEMTECH CONSULTING GROUP
CASE: 49391
SDG: BG595
CONTRACT: 68HERH20D0011
LAB CODE: CHM
CHEMTECH PROJECT: M2192
MODIFICATION REF. NUMBER: NA

Sample ID	EPA Sample ID	Test	pH
M2192-01	BG595		
M2192-01ME	BG595ME	VOC	
M2192-01RE	BG595RE	VOC	
M2192-02	BG596		
M2192-04MS	BG596MS		
M2192-05MSD	BG596MSD		
M2192-06	BG593		1.0
M2192-07	BG599		1.0

04 soil samples were delivered to the laboratory intact on 04/27/2021.
02 Water samples were delivered to the laboratory intact on 02/28/2021.

Test requested on the Chain of Custody was Trace Volatile Organic, Semivolatile Organic, Pesticide, and Aroclor by Method SFAM01.1.

Sample Tags were not received with the samples.

The temperature of the samples was measured using an I R Gun. The samples temperature was 2.3 degree Celsius for the samples received on 04/27/2021, 3.4 degree Celsius for the samples received on 04/28/2021.

Shipping Discrepancies and/or QC issues:
Issue 1: Sample tags were not received with samples at the laboratory. Sample tag numbers may or may not be listed on the TR/COC.

Resolutions 1: The laboratory will note the samples with the missing tags in the SDG Narrative and proceed with the analysis of the samples. The resolution will be applied to all samples received for this Case.

Issue2: The laboratory received two water blank samples on 4/28/2021, and the Case is complete. The laboratory would like to use sediment Sample BG596 for Laboratory QC for the remaining open SDG.

Resolution2: The laboratory should proceed per SFAM01.1, Exhibit A, Section 5.5.4.1.

Low Volatiles:

The analysis performed on instrument MSVOA_V were done using GC column DB-624UI 20m 0.18mm 1.0 um. Cat#121-1324UI
The analysis performed on instrument MSVOA_W were done using GC column RXI-624SIL MS 30m 0.25mm 1.4 um. Cat#13868. The analysis of VOCMS Group1 was based on method SFAM01.1_LOW.

The Holding Times were met for all analysis.
The Surrogate recoveries met the acceptable criteria except for
BG595 [1,2-Dichloropropane-d6 - 136%, Benzene-d6 - 138%],
BG595RE [1,2-Dichloropropane-d6 - 127%],
BG593 [1 and1-Dichloroethene-d2 - 57%]. As per method, up to three surrogates are allowed to fail. No corrective action was taken.

Instrument Performance Check met requirements.
The Retention Times were met for all samples.

The Internal Standards Areas met the acceptable requirements except for BG595, BG595RE. Sample BG595 which failed for Internal Standards. As an corrective action sample was reanalyzed and confirmed for failure.

The Tuning criteria met requirements.
The Initial Calibration met the requirements.

The Continuing Calibration (VSTD025112) file ID VW018936.D met the requirements except for Acetone (61%). As per method, up to two target analyte in CCV are allowed to exceed the %D values. Therefore no further corrective action was taken.

The Blank analysis indicated presence of Methylene chloride [5.2 ug/Kg] and Toluene [0.80 ug/Kg] FileID:VW018842.D (VBLK111) {VW0429SBL01} due to possible lab contamination.
The Blank analysis indicated presence of Toluene [0.66 ug/Kg] FileID:VW018869.D (VBLK112) {VW0430SBL01} due to possible lab contamination.
The Blank analysis indicated presence of Methylene chloride [5.8 ug/Kg] and Tetrachloroethene [0.82 ug/Kg] FileID:VW018930.D (VBLK115) {VW0505SBL01} due to possible lab contamination. As per method, less than the respective CRQL is allowed to fail for Toluene, Tetrachloroethene and less than 2 times the respective CRQL is allowed to fail for Methylene chloride. Therefore no further corrective action was taken.

The Storage blank the presence of Methylene chloride [5.7 ug/Kg] and Toluene [0.66ug/Kg] and Tetrachloroethene [0.88 ug/Kg] File ID indicate: VW018931.D {VHBLK001} lab contamination.
The Storage blank the presence of Methylene chloride [1.5 ug/L] File ID indicate: VV021269.D {VHBLK002} lab contamination.

As per method, less than the respective CRQL is allowed to fail for Toluene, Tetrachloroethene and less than 2 times the respective CRQL is allowed to fail for Methylene chloride. Therefore no further corrective action was taken.

See **Manual Integration report f**or the manual integration information at the end of the case narrative.

Calculation:
Low/Med Water Level Calculation

$$\text{Concentration in ug/L} = \frac{(Ax)\,(Is)\,(DF)}{(Ais)\,(RRF)\,(Vo)}$$

Where,
Ax = Area of the characteristic ion (EICP) for the compound to be measured.
Ais = Area of the characteristic ion (EICP) for the internal standard.
Amount of internal standard added in ng.
RRF = Mean Relative Response Factor from the initial calibration standard.
Vo = Total volume of water purged, in mL.
DF = Dilution Factor

Low/Med Level Soil/Sediment Calculation

$$\text{Concentration in ug/Kg dry Weight basis)} = \frac{(A_x)(I_s)(D_f)}{(Ais)(RRF)(Ws)(D)}$$

Where,
Ax = Area for the compound to be measured
Ais = Area for the specific internal standard
Is = Amount of internal standard added in Nano grams (ng)
RRF = Relative response factor of the calibration standard.
Df = Dilution factor
Ws= Weight of sample

$$D = \frac{100 - \%\text{moisture}}{100}$$

Medium-Level Soil/Sediment Concentration

$$\text{Concentration}(\mu g/Kg = \frac{(Ax)(Iis)(AVt)(1000)(DF)}{(Ais)\overline{RRF}(Va)(Ws)(S)}$$

Where

Ax	=	Area for the compound to be measured
Ais	=	Area for the specific internal standard
Is	=	Amount of internal standard added in nanograms (ng)
S	=	% Solids/100
$\overline{RRF}$	=	Mean Relative Response Factor from the ambient temperature purge of the initial calibration standard
AV_t	=	Adjusted total volume of the methanol extract plus soil water in mL determined by: $AV_t = V_t + \{W_s - [W_s(S)]$. Where Vt = total volume of methanol extract in mL. This volume is typically 5.0

mL, even though only 0.1 mL is transferred to the vial in Section 10.2.3.6. The quantity derived from {Ws - [Ws(S)]} is the soil water volume and is expressed in mL.

Va = Volume of the aliquot of the sample methanol extract (i.e., sample extract not including the methanol added to equal 100 µL), in µL added to reagent water for purging

Ws = Weight of soil/sediment extracted, in g

DF = Dilution Factor. The DF for analysis of soil/sediment sample extracts for volatiles by the medium-level method is defined as the ratio of the volume (µL) taken from the extract used to make the dilution plus the clean solvent added for the dilution (µL), to the volume taken from the extract used to make the dilution. For example, if 10 µL of the extract was taken and added to 90 µL of clean solvent, then ration would be (10 µL + 90 µL/10 µL)= a DF of 10.

Calculation for sample **BG596** for **Acetone :**

Ax= 37787
Is= 250
RRF= 0.064
DF=1
Ais= 649524
Ws= 4.14
D= 0.607

$$\text{Concentration in ug/KG} = \frac{(37787)(250)(1)}{(649524)(0.064)(4.14)(0.607)}$$

$$= 90.43 \text{ ug/Kg}$$

Reported Results = 90 ug/Kg

Relative Response Factor = **Dichlorodifluoromethane**: RUN **VW04/29/2021** for **2.5** ppb

$$RRF = \frac{\text{Area of compound}}{\text{Area of Internal Standard}} \times \frac{\text{Conc. of Internal Standard}}{\text{Conc. of Compound}}$$

$$RRF = \frac{14573}{661910} \times \frac{25}{2.5}$$

RRF= 0.220

Semivolatiles :

The samples were analyzed on instrument BNA_M using GC Column ZB-GR Semi Volatiles Guardian which is 30 meters, 0.25 mm ID, 0.5 um df, Catalog # 7HG-G027-17-GGA.

Semis volatile Organic sample for Soil was extracted by Method SFAM01.1 on 04/30/2021. The analysis of SVOC was based on method SFAM01.1.

The Holding Times were met for all analysis.

The Surrogate recoveries met the acceptable criteria except for BG595 [4,6-Dinitro-2-methylphenol-d2 - 9%,], BG593 [4-Nitrophenol-d4 - 8%,] and BG599 [4-Nitrophenol-d4 - 9%, Pyrene-d10 - 133%,], As per method four surrogates are allowed to fail. Therefore no further corrective action was taken.
The Internal Standards Areas met the acceptable requirements.
The Retention Times were acceptable for all samples.
The Blank Spike for {PB136083BS} recoveries met the requirements for all compounds.
The Blank Spike for {PB136093BS} recoveries met the requirements for all compounds.
The Blank analysis did not indicate the presence of lab contamination.

The %RSD met requirement for initial Calibration except for, 2-Nitroaniline (28.7%), 2,4- for the initial calibration with dated 05/04/2021 with instrument M. As per method, the %RSD of 4 compounds can be failed within 40% Therefore no corrective action was required.
The %RSD met requirement for initial Calibration except for Nitrobenzene (20.5%), 2-Nitroaniline (35.1%), Nitrobenzene-d5 (23.3%), 2,4-Dichlorophenol-d3 (21.4%), for the initial calibration with dated 05/07/2021 with instrument M. As per method, the %RSD of 4 compounds can be failed within 40% Therefore no corrective action was required.

The Continuous Calibration (SSTD020032) File ID BM029941.D met the requirements except for Fluoranthene, As per method four compounds are allowed to fail, not exceed 40%. No further corrective action was taken.

The Tuning criteria met requirements.

See **Manual Integration report** for the manual integration information at the end of the case narrative.

Concentration of Water Sample:

$$\text{Concentration ug/L} = \frac{(Ax)\,(Is)\,(Vt)\,(DF)\,(GPC)}{(Ais)\,(\overline{RRF})\,(Vo)\,(Vi)}$$

Where,
Ax = Area of the characteristic ion for the compound to be measured.
Ais = Area of the characteristic ion for the internal standard.
Is = Amount of internal standard injected in ng.
Vo = Volume of water extracted in mL.
Vi = Volume of extract injected in uL.
Vt = Volume of the concentrated extract in uL
RRF = Mean Relative Response Factor determined from the initial calibration standard.
GPC = $\frac{Vin}{}$ = GPC factor (If no GPC is performed, GPC=1)
Vout = Volume of extract collected after GPC cleanup.

Concentration of SOIL Sample:

Concentration ug/Kg,
(dry weight basis) = $\frac{(Ax)\ (Is)\ (Vt)\ (DF)\ (GPC)}{(Ais)\ (\overline{RRF})\ (Vi)\ (Wt)\ (D)}$

Where,
Ax = Area of the characteristic ion for the compound to be measured.
Ais = Area of the characteristic ion for the internal standard.
Is = Amount of internal standard injected in ng.
Vi = Volume of extract injected in microliters (uL)
Vt = Volume of concentrated extract in microliters (uL)
Wt = Weight of the original sample extracted in g
Df = Dilution factor

$\overline{RRF}$ = Mean Relative Response Factor determined from the initial calibration standard.
GPC = $\frac{Vin}{Vout}$ = GPC factor (If no GPC is performed, GPC=1)
Vout = Volume of extract collected after GPC cleanup.
D = % dry weight or $\frac{100 - \%Moisture}{100}$

Example calculation of BG595 for Dimethylphthalate:

Ax = 86056
Ais = 626623
Is = 20
Vi = 1
Vt = 500
Wt = 30.1
Df = 1
RRF = 1.552
GPC = 2
D=0.463

Concentration

(dry weight basis) ug/Kg = $\frac{(86056)\ (20)\ (500)\ (1)\ (2)}{(626623)\ (1.552)\ (1)\ (30.1)\ (0.463)}$

= 130 ug/Kg

RRF Calculation of standard 20 ppb for Naphthalene with M instrument for method 05/07/2021

RRF= Area of compound / Area of Internal Standard X Conc. of Internal Standard / Conc. of Compound

= 684064/ 646228 X 20/8

= 1.059 (Reported RRF)

Pesticides:

The analyses for Pesticides were performed on instrument ECD D. The front column is ZB-Multi-Residue-2 which is 30 meters, 0.32 mm ID, 0.2 um df. The rear column ZB-Multi-Residue-1 which is 30 meters, 0.32 mm ID, 0.50 um df.

The sample was analyzed on a single injection dual column system. To distinguish the second column analysis from the first column a -2 suffix was added to the file id on the form 1. These refer to forms were both columns are reported. Form 1s for the IBLK and ALCS are referenced as IBLK(1)/IBLK(2), MS(1)/MS(2), MSD(1)/MSD(2) and PLCS01(1)/PLCS01(2) respectively.

Pesticide sample was extracted by method SFAM01.1 on 04/29, 04/30/2021 and analyzed on 04/30/2021. The sample was extracted and analyzed within contractual holding time.

The soil sample was subjected to Florisil and GPC Cleanup.
The Surrogate recoveries met the acceptable criteria.
BG596MS met the requirements.
BG596MSD met the requirements.
The RPD met the requirements.
The Blank analysis did not indicate the presence of lab contamination.
Blank and Laboratory Control Sample met the requirements.
Retention Times met the requirements.
Florisil check met the requirements.
Resolution Check met the requirements.
The Retention Times were acceptable for all samples.
The Initial Calibration met the requirements.
The Individual Mix A met the requirements.
The Individual Mix B met the requirements.
The PEM met the requirement.

Samples BG595, BG596, BG596MS and BG596MSD failed to meet the %D for the results between the two columns Criteria.

See **Manual Integration report** for the manual integration information at the end of the case narrative.

Calculation for the Concentration in Water Samples

$$\text{Concentration ug/L} = \frac{(Ax)\,(Vt)\,(DF)\,(GPC)}{(CF)\,(Vo)\,(Vi)}$$

Where,
Ax = Response (peak area or height) of the compound to be measured.
CF = Mean Calibration Factor from the initial calibration (area/ng).
Vo = Volume of water extracted in mL.

Vi = Volume of extract injected in uL.
Vt = Volume of the concentrated extract in uL

GPC = Vin = GPC factor (If no GPC is performed, GPC=1)
Vout
Vin = Volume of extract loaded onto GPC column.

Vout = Volume of extract collected after GPC cleanup.

Calculation for the Concentration in Soil Samples

$$\text{Concentration ug/Kg (Dry weight basis)} = \frac{(Ax)\,(Vt)\,(DF)\,(GPC)}{(CF)\,(Vi)\,(Ws)\,(D)}$$

Where,
Ax = Response (peak area or height) of the compound to be measured.
CF = Mean Calibration Factor from the initial calibration (area/ng).
Vt = Volume of the concentrated extract in uL
Vi = Volume of extract injected (uL). (If a single injection is made onto two columns, use ½ the volume in the syringe as the volume injected onto each column).
Ws = Weight of sample extracted (g).
D = % dry weight or $\frac{100 - \%\text{Moisture}}{100}$
GPC = Vin = GPC factor (If no GPC is performed, GPC=1)
Vout
DF = Dilution Factor.

Example of 4,4'-DDE calculation
Calibration Factor Calculation 4,4'-DDE in the first column

$$\text{Calibration factor (CF)} = \frac{\text{peak area}}{\text{Mass injected in ng}}$$

$$= \frac{11906220}{10\text{ng}}$$

$$= 1190620$$

Mean Calibration Factor = average of 5 point calibration factor

$$= 1237560$$

Sample **BG595**
Ax = 1057901
CF = 1237560
Ws =30.1
Vi = 1.0

Vt = 5000

DF = 1.0
GPC = 2.0
D = 0.463

Concentration ug/Kg (Dry weight basis) = $\frac{(Ax)\ (Vt)\ (DF)\ (GPC)}{(CF)\ (Vi)\ (Ws)\ (D)}$

$= \frac{(1057901)\ (5000)\ (1.0)\ (2.0)}{(1237560)(1.0)(30.1)(0.463)}$

$= 0.613$

Reported Results = 0.61 ug/kg

Aroclors:

The analyses were performed on instrument GCECD_Q. The front column is ZB-MR1 which is 30 meters, 0.32 mm ID, 0.5 um df, Catalogue # 7HM-G016-17. The rear column is ZB-MR2 which is 30 meters, 0.32 mm ID, 0.25 µm; Catalogue # 7HM-G017-11.

The sample was analyzed on a single injection dual column system. To distinguish the second column analysis from the first column a -2 suffix was added to the file id on the form 1. These refer to forms were both columns are reported. Form 1s for the IBLK and ALCS are referenced as IBLK(1)/IBLK(2), MS(1)/MS(2), MSD(1)/MSD(2), and ALCS01(1)/ALCS01(2) respectively.

Aroclor sample was extracted by Method SFAM01.1 on 04/29, 04/30/2021 and analyzed on 04/30/2021. All the samples were subjected to a Sulfuric acid cleanup. The sample was extracted and analyzed within contractual holding time.

The Surrogate recoveries met the acceptable criteria.
BG596MS met the requirements.
BG596MSD met the requirements.
The RPD met the requirements.
The Laboratory Control Sample met requirements.
The Blank analysis did not indicate the presence of lab contamination.
The Initial Calibration met the requirements.
The Continuing Calibrations met the requirements.
The Retention Times met requirements.

See **Manual Integration report** for the manual integration information at the end of the Case narrative.

Calculation for Concentration in Water Samples:

$$\text{Concentration ug/L} = \frac{(Ax)\,(Vt)\,(DF)\,(GPC)}{(CF)\,(Vo)\,(Vi)}$$

Where,
Ax = Response (peak area or height) of the compound to be measured.
CF = Mean Calibration Factor from the initial calibration (area/ng).
Vo = Volume of water extracted in mL.
Vi = Volume of extract injected in uL.
Vt = Volume of the concentrated extract in uL
GPC = $\frac{Vin}{Vout}$ = GPC factor (If no GPC is performed, GPC=1)
Vin = Volume of extract loaded onto GPC column.
Vout = Volume of extract collected after GPC cleanup.
DF = Dilution Factor

Calculation for Concentration in Soil samples:

$$\text{Concentration ug/Kg (Dry weight basis)} = \frac{(Ax)\,(Vt)\,(DF)\,(GPC)}{(CF)\,(Vi)\,(Ws)\,(D)}$$

Where,
Ax = Response (peak area or height) of the compound to be measured.
CF = Mean Calibration Factor from the initial calibration (area/ng).
Vt = Volume of the concentrated extract in uL

Vi = Volume of extract injected (uL). (If a single injection is made onto two columns, use ½ the volume in the syringe as the volume injected onto each column).
Ws = Weight of sample extracted (g).
D = % dry weight or $\frac{100 - \%Moisture}{100}$

GPC = $\frac{Vin}{Vout}$ = GPC factor (If no GPC is performed, GPC=1)
DF = Dilution Factor

Example of AR1260 calculation for Peak 1

$$\text{Calibration factor Peak 1 100ppb ISTD Column1} = \frac{\text{peak area}}{\text{Mass injected ng}}$$

$$= \frac{122843962}{0.100}$$

= 1228439620 calibration factor for Peak 1 100ppb

Average of 5 peaks = 1151292448

No target **Aroclors** were detected in the samples.

I certify that the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. The laboratory manager or his designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Signature _____ Name: Nimisha Pandya.

Date: _____ Title: Document Control Officer.