SDG NARRATIVE

LAB NAME: CHEMTECH CONSULTING GROUP
CASE: 49666
SDG: C0AA0
CONTRACT: 68HERH20D0011
LAB CODE: CHM
CHEMTECH PROJECT: M4126
MODIFICATION REF. NUMBER: NA

Sample ID	EPA Sample ID	Test	pH
M4126-01	C0AA0		
M4126-02	C0AA1		
M4126-03	C0AA2		
M4126-04	C0AA4		
M4126-05	C0AA5		
M4126-06	C0AA6		
M4126-07	C0AA7		
M4126-08	C0AA8		
M4126-09	C0AA9		
M4126-10	C0AB0		
M4126-11	C0AB1		
M4126-12	C0AB2		
M4126-14	C0AB4		
M4126-15	C0AC8		
M4126-16	C0AD1		
M4126-16DL	C0AD1DL	Pest	
M4126-16ME	C0AD1ME	VOC	
M4126-16RE	C0AD1RE	VOC	
M4126-17	C0AC7		1.0
M4126-18	C0AD0		1.0
M4126-21MS	C0AD1MS		
M4126-22MSD	C0AD1MSD		

1 Water samples were delivered to the laboratory intact on 10/07/2021.
18 Soil samples were delivered to the laboratory intact on 10/07/2021.

Test requested on the Chain of Custody was Volatile Organic, Semivolatile Organic and Pesticide 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 2.8, 3.3 degree Celsius for the samples received on 10/07/2021.

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.

Samples/analyses listed on COC but not received at laboratory
Issue 2: Sample C0AB3 was not received with the shipment. The laboratory would like to confirm if they should disregard this sample from the COC.

Resolution 2: Per Region 3, the laboratory will make note of the issue in the SDG Narrative and proceed with the analysis of the samples.

Insufficient/inappropriate designation of laboratory QC
Issue 3: Laboratory QC is scheduled for PEST analysis; however, no sample is designated on the COC for QC and the laboratory would like to know when they can expect the next shipment with QC.

Resolution 3: Per Region 3, the laboratory will select a sample that is not a PE Sample or a Rinsate Blank to use as laboratory QC. The laboratory can use samples C0AD1 and C0AC9 for QC for their two SDGs. Please note the issue in the SDG Narrative and proceed with the analysis of the samples.

Issue 4:"Lab has received soil samples for Pesticides analysis. Lab has analyzed undiluted samples C0AA1, C0AA2, C0AA4, C0AA5, C0AB4, C0AD1 (associated MS/MSD) for Pesticides analysis. Samples are reviewed preliminary as it was observed that all the samples have unusual chromatogram and samples are having huge unknown peaks at and/or same retention time of the surrogates. Due to unknown matrix interference, surrogates recoveries are outside the QC limits as you can see attached quant reports for chromatograms and surrogates summary form for your reference. In this case, Lab will not re-extract these samples for surrogate failure due to interference therefore lab will report undiluted pesticides analysis with surrogate failure in hardcopy and SEDD. Also, sample C0AD1 is found positive with high concentration of target analytes detected and required dilution therefore lab will report both the analysis for the sample in hardcopy and SEDD. Please note that there is no any other QC failure associated to these analysis.

Resolution 3: "Please inform the laboratory the Region is in agreement with their approach, to the issue, as noted below; have the laboratory make note of the issue in their SDG Narrative and proceed with the analysis of the samples."

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_U 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 VOC-SFAM was based on method SFAM01.1_LOW.

The Holding Times were met for all analysis.
The Surrogate recoveries met the acceptable criteria except for
C0AD1 [1,1,2,2-Tetrachloroethane-d2 - 178%, 1,2-Dichloropropane-d6 - 452%, 2-Hexanone-d5 - 261%, Benzene-d6 - 358%, Chloroethane-d5 - 160%, Toluene-d8 - 188%, trans-1,3-Dichloropropene-d4 - 135%, Vinyl Chloride-d3 - 153%],
C0AD1ME [Chloroethane-d5 - 23%],
C0AD1RE [1,1,2,2-Tetrachloroethane-d2 - 221%, 1,1-Dichloroethene-d2 - 127%, 1,2-Dichloroethane-d4 - 142%, 1,2-Dichloropropane-d6 - 675%, 2-Butanone-d5 - 179%, 2-Hexanone-d5 - 432%, Benzene-d6 - 465%, Chloroethane-d5 - 223%, Chloroform-d - 175%, Toluene-d8 - 210%, trans-1,3-Dichloropropene-d4 - 156% and Vinyl Chloride-d3 - 184%]. As per method, up to three surrogates are allowed to fail. No corrective action was taken except Sample C0AD1 which failed for Surrogate recoveries. as corrective action sample was reanalyzed.

The Internal Standards Areas met the acceptable requirements except for C0AD1, C0AD1RE. Samples were Internal Standards recoveries failed, as corrective action sample was reanalyzed and analyzed Medium Level all analysis reported.

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

The Tuning criteria met requirements.
The Initial Calibration met the requirements.
The %RSD met requirement for initial Calibration except for Dichlorodifluoromethane (31.2%) for the initial calibration dated 10/08/2021 with W instrument, As per method, the %RSD up to two Compounds are allowed to fail to meet the minimum criteria as long as the compound meets the maximum of 40% RSD. No further corrective action was taken.

The Continuing Calibration met the requirements.

The Blank analysis indicated presence of Toluene [34ug/Kg] FileID:VU045284.D (VBLK028) {VU1012MBL01} due to possible lab contamination. As per method, less than the respective CRQL is allowed to fail for Toluene. Therefore, no further corrective action was taken.

The storage blank did not indicate the presence of lab contamination.

The Sample #C0AD1ME have the concentration of target compound below Method detection limits, therefore it is not reported as Hit in Form1.

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.

Example sample **C0AD1ME** for **Trichloroethene:**

Ax = 4847

Ais = 278754

Is = 250

S = 70.2/100 = 0.702

$\overline{RRF}$ = 0.445

AV_t = 11.13

Va = 100

Ws = 3.79

DF = 1

Avt = 10+ [3.79 - (3.79 X 70.2/100)] = 11.13

$$\text{Concentration}(\mu g/Kg) = \frac{(4847)(250)(11.13)(1000)(1)}{(278754)(0.445)(100)(3.79)(0.702)}$$

Final Reported results = 410ug/Kg

Relative Response Factor = **Dichlorodifluoromethane**: RUN **VW10/08/2021** for **2.5** ppb

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

$$RRF = \frac{2151}{219300} \times \frac{25}{2.5}$$

RRF= 0.098

Semivolatiles :

The samples were analyzed on instrument BNA_P 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 10/12/2021; the analysis of SVOC-SFAM was based on method SFAM01.1.

The Holding Times were met for all analysis.
The Surrogate recoveries met the acceptable criteria except for,
C0AA0 [4,6-Dinitro-2-methylphenol-d2 - 7%],
C0AA2 [4,6-Dinitro-2-methylphenol-d2 - 8%, 4-Methylphenol-d8 - 9%],
C0AA5 [1,4-Dioxane-d8 - 13%],
C0AA6 [4,6-Dinitro-2-methylphenol-d2 - 6%, 4-Methylphenol-d8 - 7%, Benzo(a)pyrene-d12 - 8%],
C0AA7 [4,6-Dinitro-2-methylphenol-d2 - 5%, 4-Methylphenol-d8 - 9%, Benzo(a)pyrene-d12 - 9%] and
C0AA9 [1,4-Dioxane-d8 - 14%, 4,6-Dinitro-2-methylphenol-d2 - 6%]. 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 {PB139839BS} recoveries met the requirements for all compounds.
The Blank analysis did not indicate the presence of lab contamination.
The Tuning criteria met requirements.
The Initial Calibration met the acceptable requirements.
The Continuous Calibration met the acceptable requirements.

The Samples C00A1, C0AA2, C0AA7, C0AB4 and C0AD1 have the concentration of target compound below Method detection limits; therefore it is not reported as Hit in Form1.

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

Concentration of SOIL Sample:

Concentration ug/Kg,

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

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 C0AA1 for Pyrene.

Ax = 189662
Ais = 1125913
Is = 20
Vi = 1
Vt = 500
Wt = 30.0
Df = 1
RRF = 1.251
GPC = 2
D= 0.770

Concentration

$$\text{(dry weight basis) ug/Kg} = \frac{(189662)\,(20)\,(500)\,(1)\,(2)}{(1125913)\,(1.251)\,(1)\,(30.0)\,(0.770)}$$

$$= 120 \text{ ug/Kg.}$$

RRF Calculation of standard 20 ppb for Naphthalene with P instrument for method 10/14/2021.

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

$$= 907568/853401 \times 20/20$$

$$= 1.063 \text{ (Reported RRF)}$$

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 10/12/2021 and analyzed on 10/16, 10/20/2021. 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 except for
C0AA1 [Decachlorobiphenyl(1) - 173%, Tetrachloro-m-xylene(1) - 201%, Tetrachloro-m-xylene(2) - 677%],
C0AA2 [Decachlorobiphenyl(1) - 4336%, Decachlorobiphenyl(2) - 594%, Tetrachloro-m-xylene(1) - 12949%, Tetrachloro-m-xylene(2) - 27985%],
C0AA4 [Decachlorobiphenyl(1) - 3526%, Decachlorobiphenyl(2) - 173%, Tetrachloro-m-xylene(1) - 8212%, Tetrachloro-m-xylene(2) - 11218%],
C0AA5 [Decachlorobiphenyl(1) - 739%, Decachlorobiphenyl(2) - 353%, Tetrachloro-m-xylene(1) - 2509%, Tetrachloro-m-xylene(2) - 21309%],
C0AA6 [Tetrachloro-m-xylene(1) - 248%, Tetrachloro-m-xylene(2) - 564%],
C0AB4 [Decachlorobiphenyl(1) - 5370%, Tetrachloro-m-xylene(1) - 8423%, Tetrachloro-m-xylene(2) - 11002%],
C0AD1 [Decachlorobiphenyl(1) - 2573%, Decachlorobiphenyl(2) - 541%, Tetrachloro-m-xylene(1) - 6204%, Tetrachloro-m-xylene(2) - 30600%],
C0AD1DL [Decachlorobiphenyl(1) - 2877%, Decachlorobiphenyl(2) - 600%, Tetrachloro-m-xylene(1) - 6285%, Tetrachloro-m-xylene(2) - 118659%],
C0AD1MS [Decachlorobiphenyl(1) - 2416%, Decachlorobiphenyl(2) - 713%, Tetrachloro-m-xylene(1) - 6489%, Tetrachloro-m-xylene(2) - 30817%],
C0AD1MSD [Decachlorobiphenyl(1) - 2950%, Decachlorobiphenyl(2) - 844%, Tetrachloro-m-xylene(1) - 7589% and Tetrachloro-m-xylene(2) - 32027%]. The SOW allows one surrogate to fail to meet the criteria per column. ((Please See Section 11.3.6 of Exhibit D Pesticide Analysis). Samples C0AA1, C0AA2, C0AA4, C0AA5, C0AB4, C0AD1, C0AD1MS, and COAD1MSD due to unknown matrix interference, surrogates recoveries are outside the QC limits. In this case, Lab not re-extracts these samples for surrogate failure due to interference therefore lab reported undiluted pesticides analysis with surrogate failure in hardcopy and SEDD. Please see EPA communication after SDG Narrative.

C0AD1MS met the requirements except for gamma-BHC (Lindane), Heptachlor, Aldrin, 4,4'-DDT on both columns, Dieldrin on the first column and many compounds and “f” flag for some compounds due to sample matrix interference. it was observed that all the samples have unusual chromatogram and samples are having huge unknown peaks at and/or same retention time of the surrogates. No corrective action is required for failure to meet the MS/MSD criteria by the SOW. (Section 12.2.5.5 of Exhibit D Pesticide Analysis).

C0AD1MSD met the requirements except for gamma-BHC (Lindane), Heptachlor, Aldrin, Endrin on both columns, Dieldrin, 4,4'-DDT on the first column and many compounds and “f” flag for some compounds due to sample matrix interference. it was observed that all the samples have unusual chromatogram and samples are having huge unknown peaks at and/or same retention time of the surrogates. No corrective action is required for failure to meet the MS/MSD criteria by the SOW. (Section 12.2.5.5 of Exhibit D Pesticide Analysis).

The RPD met the requirements except for Endrin on both columns and 4,4'-DDT on the second column due to sample matrix interference. No corrective action is required for failure to meet the MS/MSD criteria by the SOW.

The Instrument Blank analysis FileID: PD066291.D(PIBLK106) indicated presence of 4,4-DDE, Aldrin,beta-BHC,cis-Chlordane,delta-BHC,Endosulfan II,Endosulfan sulfate,Endrin aldehyde,Endrin ketone,Heptachlor epoxide and trans-Chlordane due to possible lab contamination. However it is below CRQL.(Please See Section 12.1.4.5.3 of Exhibit D Pesticide Analysis).
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 %RSD met requirement for initial Calibration except for beta-BHC (28.44%) in first column for the initial calibration dated 10/13/2021 with ECD_D instrument. (Please See Section 9.3.5.9 of Exhibit D Pesticide Analysis).
The Individual Mix A met the requirements.
The Individual Mix B met the requirements.
The PEM met the requirement.
Sample C0AD1 was diluted due to high concentration.

Samples C0AA0, C0AA1, C0AA2, C0AA4, C0AA5, C0AA6, C0AA7, C0AA8, C0AA9, C0AB0, C0AB4, C0AC8, C0AD1, C0AD1DL, C0AD1MS and C0AD1MSD failed to meet the %D for the results between the two columns Criteria.

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).

$$D = \%\text{ dry weight or } \frac{100 - \%\text{Moisture}}{100}$$

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

DF = Dilution Factor.

Example of Endrin calculation

Calibration Factor Calculation Endrin in the first column

Calibration factor (CF) = peak area / Mass injected in ng

= 23992020 / 10ng

= 2399200

Mean Calibration Factor = average of 5 point calibration factor

= 2377330

Sample **C0AA2**

Ax = 43938116
CF = 2377330
Ws =30.0
Vi = 1.0
Vt = 5000
DF = 1.0
GPC = 2.0
D = 0.771

Concentration ug/Kg (Dry weight basis) = (Ax) (Vt) (DF) (GPC) / (CF) (Vi) (Ws) (D)

= (43938116) (5000) (1.0) (2.0) / (2377330)(1.0)(30.0)(0.771)

= 7.99

Reported Results = 8.0 ug/kg

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.