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Date: September 18, 2019

To: Rob Ede
Hahn and Associates Inc.

From: Jeanne Peterson
Project Manager, AQA

Subject: Data Validation
Gasco Mult 802 Decommissioning
Apex Laboratories, LLC Work Order A9E0832

SUMMARY

Level II (i.e., EPA Stage 2A) data validation was performed on the data for one solid sample prepared and analyzed using approved procedures for methods SW846 8260C (VOCs), SW846 8260C SPLP (SPLP VOCs), SW846 8270D SIM (PAHs), SW846 8270D SIM SPLP (SPLP PAHs), NWTPH-Gx (gasoline range organics [GRO]), and NWTPH-Dx (diesel and oil). Data were reported for all requested analytes.

The analytical data were evaluated in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999) and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February 1994) (NFG, collectively), and the applicable methods.

In general, the data are valid as reported. No data were rejected. Other qualifiers were applied to the data as specified in the Data Qualifiers section below.

See attached data validation spreadsheets for supporting documentation on the data review and validation.

SAMPLES

The sample included in this validation is listed below.

Sample ID	APEX Sample ID	Analysis	Matrix
2708-190523-013	A9E0832-01	VOCs, SPLP VOCs, PAHs, SPLP PAHs, GRO, DRO	Solid

DATA QUALIFIERS (see following sections for detailed explanations)

Sample ID	Method	Analyte	Qualifier	Qualifier Code	Reason for Qualification
2708-190523-013	8260C	Methylene chloride	UJ	2, 10	Improper preservation and low laboratory control sample recovery
		Benzene Ethylbenzene Napthalene Toluene 1,2,4-Trimethylbenzene m,p-Xylene o-Xylene	J	2	Improper preservation
		All target analytes *except*: Benzene Ethylbenzene Napthalene Toluene 1,2,4-Trimethylbenzene m,p-Xylene o-Xylene Methylene chloride	UJ	2	Improper preservation
	8270D SIM	Naphthalene	J	10	High laboratory control sample recovery
	NWTPH-Gx	Gasoline Range Organics	J	2	Improper preservation

DISCUSSION

Sample Shipping/Receiving

All COC, analysis request, and sample receipt documentation was complete and correct with the following exception.

The sample receipt section of the COCs was not completed; the information was documented on the Cooler Receipt Form.

Extra analyses were requested by email dated 05/30/2019.

Holding Times and Preservation

The sample was properly preserved and analyzed within the prescribed holding times with the following exceptions.

Methods 8260C and NWTPH-Gx

Sample 2708-190522-011 was stored at temperatures up to 17°C for approximately 48 hours. The associated sample results that were detects were **qualified J**, and the associated sample results that were non-detects were **qualified UJ** based on professional judgment.

Blanks

Methods 8260C, 8260C SPLP, 8270D SIM, NWTPH-Gx, and NWTPH-Dx

No target analytes were detected in the method blanks. Field blanks were not collected with the sample in this work order.

Method 8270D SPLP

Naphthalene was detected in the method blank. The associated sample result was a detect >10X the method blank value and, therefore, was not qualified.

Surrogates

All surrogate recoveries were within laboratory QC acceptance criteria with the following exceptions.

Method 8270D SIM

The surrogates were diluted out of sample 2708-190523-013 (10000X). No sample results were qualified.

Method 8270D SPLP

The surrogates were diluted out of sample 2708-190523-013 (1000X). No sample results were qualified.

Method NWTPH-Dx

The surrogate was diluted out of sample 2708-190523-013 (100X). No sample results were qualified.

Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

The LCS/LCSD analyses met laboratory QC acceptance criteria with the following exceptions.

Method 8260C

The LCS recovery was < the lower acceptance limit but ≥30% for methylene chloride. The associated sample result was a non-detect and, therefore, was **qualified UJ**.

Method 8270D SIM

The LCS recovery was > the upper acceptance limit for naphthalene. The associated sample result was a detect and, therefore, was **qualified J**.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met laboratory QC acceptance criteria with the following exceptions.

Method 8260C

The MS recovery was < the lower acceptance limit but ≥30% for methylene chloride. The MS analysis was performed on a non-project sample; therefore, no sample results were qualified based on professional judgment.

Methods 8270D SIM, 8270D SIM SPLP, NWTPH-Gx, and NWTPH-Dx

An MS analysis was not performed with the sample in this work order; therefore, matrix-specific accuracy data were not available.

Laboratory Duplicate

The laboratory duplicate analyses (LCS/LCSD, MS/MSD, and/or sample/duplicate) were within laboratory QC acceptance criteria with the following exceptions.

Method 8260C

The laboratory duplicate relative percent differences (RPDs) were > the acceptance limit for multiple target analytes. The laboratory duplicate analysis was performed on a non-project sample; therefore, no sample results from this data package were qualified based on professional judgment.

Methods 8260C SPLP and NWTPH-Dx

It should be noted that the laboratory duplicate analysis was performed on a project sample from another data package.

Method NWTPH-Gx

The laboratory duplicate RPD was > the acceptance limit for GRO. The laboratory duplicate analysis was performed on a non-project sample; therefore, no sample results were qualified based on professional judgment.

Field Duplicate

A field duplicate was not collected with the sample in this data package.

Reporting Limits

All reporting limits (RLs) were properly reported. Sample 2708-190523-013 was diluted 10000X for VOCs and GRO, 500X for naphthalene and 50X for all remaining 8260 SPLP target analytes, 10000X for PAHs, 1000X for 8270 SPLP, and 100X for DRO. Reporting limits were adjusted accordingly.

Other QC

Method 8270D SIM

The laboratory noted that peak separation of structural isomers was insufficient for accurate quantification of benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene for sample 2708-190523-013. Because this could not be verified with a Level II data package, the sample results were not qualified by the validator; however, the end user of the results should be aware that the results were considered to be estimated.

Method NWTPH-Dx

The laboratory noted that no fuel pattern was detected for sample 2708-190523-013. The diesel result represents carbon range C12 to C24, and the oil result represents >C24 to C40. Because this could not be verified with a Level II data package, the sample results were not qualified by the validator; however, the end user of the results should be aware that the results were considered to be estimated.

No other specific issues that affect data quality were identified.

Hahn Data Validation Summary Worksheet

SDG#: A9E0832	Laboratory: Apex	Validator: Jeanne Peterson	Validation Date: 08/28/2019
Site: Mult 802 Decommissioning	COC#: 1		Validation Level: ☒ II ☐ III
Matrix: Solid	# of Samples: 2**	Tracking docs present: See sample receipt and log-in documentation	
COCs present: Yes	COCs signed: Yes	COCs dated: Yes	Sample Container Integrity: OK

Analyses:
☒ VOCs ☐ SVOCs ☒ PAHs ☒ GRO ☒ DRO ☐ Pests ☐ PCBs ☐ Metals ☐ Gen Chem ☐ Cyanide
☐ Other: VPH/EPH

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
2708-190523-012	A9E0832-01	All	Placed on hold by client.

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
2708-190523-013	A9E0832-02	8260	*	05/23/2019	05/31/2019	06/04/2019	NA	NA
2708-190523-013	A9E0832-02	NWTPH-Gx	*	05/23/2019	05/31/2019	06/04/2019	NA	NA

Comments: Samples collected 05/23/2019;
Temp and containers not completed on COC; documented on Cooler Receipt Form.
*Samples were stored at temperatures up to17°C for approximately 48 hours.
**Only one sample analyzed; COC not marked for analysis.
Extra analyses were requested by email dated 05/30/2019.

Hahn Level III GCMS Worksheet

SDG: A9E0832	Method: 8260C	Matrix: Solid	Lab Sample ID: A9E0723-02
Seq/Batch #s: --/9060533			

Tuning: ☐ Pass ☐ Fail TICs Required? ☐ Yes ☒ No *(lab limits)* *(lab limits)*

Analyte (outliers)	**Calibration**				**Method Blank**	**5X (10X) Method Blank**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**LAB DUP RPD**	**TB**		
	RF ≥0.05	**RSD/r²** ≤30% ≥0.990	**ICV[1] %D** ±25%	**CCV %D** ±25%										
9060533														
MeCl2					✓	NA	71	68	NA	NA	**	NA		

Surrogate Recovery Outliers *(method/lab limits)*

Sample ID	DBFM	1,4-DCB	Tol-d8	4-BFB	**Sample ID**	DBFM	1,4-DCB	Tol-d8	4-BFB
None									

IS Outliers *(-50% to +100% of CCV)*

Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**
NA												

Comments: HTs OK.
9060533: MB, LCS, -02, unknown Dup1, unknown Dup2, unknown MS
**Multiple outliers; performed on unknown sample; no data qualified.
Sample -02 diluted 10000X

Hahn Level III GCMS Worksheet

SDG: A9E0832	Method: 8260C SPLP	Matrix: Leachate	Lab Sample ID: A9E0832-02
Seq/Batch #s: --/9060554 (l)/9060589 (a)			

Tuning: ☐ Pass ☐ Fail TICs Required? ☐ Yes ☒ No *(lab limits)* *(lab limits)*

Analyte (outliers)	**Calibration**				**Method Blank**	**5X (10X) Method Blank**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**LAB DUP RPD**			
	RF ≥0.05	**RSD/r²** ≤30% ≥0.990	**ICV[1] %D** ±25%	**CCV %D** ±25%										
Trichlorofluoromethane (MS 500X)					✓	NA	✓	133	NA	NA	✓			
Naphthalene (MS RE1 50X)					✓	NA	✓	-20*	NA	NA	✓			

Surrogate Recovery Outliers *(method/lab limits)*

Sample ID	DBFM	1,4-DCB	Tol-d8	4-BFB	**Sample ID**	DBFM	1,4-DCB	Tol-d8	4-BFB
None									

IS Outliers *(-50% to +100% of CCV)*

Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**
NA												

Comments: HTs OK.

MB, LCS, -02, A9E0723-01 Dup, A9E0832-02 MS (naphthalene only), A9E0832-02 MS RE1 (all target analytes except naphthalene)

*Parent sample conc >4X spike amount

Sample -02 diluted 500X for naphthalene and 50X for all remaining target analytes.

NOTE: MS outliers not associated with target analytes in that dilution; no results affected; not qualified.

Hahn Level III GCMS Worksheet

SDG: A9E0832	Method: 8270D SIM	Matrix: Solid	Lab Sample IDs: A9E0832-02
Seq/Batch #s: --/9060490			

Tuning: ☐ Pass ☐ Fail TICs Required? ☐ Yes ☒ No *(lab limits)* *(lab limits)*

Analyte (outliers)	Calibration				Method Blank	5X (10X) Method Blank	LCS %R	LCSD %R	LCS/D RPD	MS %R	MSD %R	MS/D RPD	Lab Dup RPD		
	RF ≥0.05	RSD/r^2 ≤30%	ICV %D ±25%	CCV %D ±25%											
Naphthalene					✓	NA	150	NA	NA	NA	NA	NA	✓		

Surrogate Recovery Outliers *(lab limits)*

Sample ID	Nitrobenzene-d5	2-Fluorobiphenyl	Phenol-d6	p-Terphenyl-d14	2-Fluorophenol	2,4,6-Tribromophenol
-02 10000X	DO	DO	DO	DO	DO	DO
A9E0785-01 Dup 10000X	DO	DO	DO	DO	DO	DO

IS Outliers *(-50% to +100% of CCV)*

Sample ID	Acen-d10	RT	Chry-d12	RT	Per-d12	RT	Dibenz-d14	RT	Area	RT	Area	RT
NA												

Comments: HTs OK. DO = Diluted out

MB, LCS, -02, A9E0785-01 Dup

Sample -02 diluted 10000X for all target compounds

Sample -02: The benzo(a)anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and chrysene results are estimated; peak separation for structural isomers is insufficient for accurate quantification.

Hahn Level III GCMS Worksheet

SDG: A9E0832	Method: 8270D SIM SPLP	Matrix: Leachate	Lab Sample IDs: A9E0832-02
Seq/Batch #s: --/9060621 (l)/9060758 (p)			

Tuning: ☐ Pass ☐ Fail TICs Required? ☐ Yes ☒ No *(lab limits)* *(lab limits)*

Analyte (outliers)	**Calibration**				**Method Blank**	**5X (10X) Method Blank**	**LCS %R**	**LCSD %R**	**LCS/D RPD**	**MS %R**	**MSD %R**	**MS/D RPD**	**Lab Dup RPD**		
	RF ≥0.05	**RSD/r²** ≤30%	**ICV %D** ±25%	**CCV %D** ±25%											
Naphthalene					0.00194	(0.0194)	✓	✓	✓	NA	NA	NA	NA		

Surrogate Recovery Outliers *(lab limits)*

Sample ID	**Nitrobenzene-d5**	**2-Fluorobiphenyl**	**Phenol-d6**	**p-Terphenyl-d14**	**2-Fluorophenol**	**2,4,6-Tribromophenol**
-02	NA	[122] DO	NA	[117] DO	NA	NA

IS Outliers *(-50% to +100% of CCV)*

Sample ID	**Acen-d10**	**RT**	**Chry-d12**	**RT**	**Per-d12**	**RT**	**Dibenz-d14**	**RT**	**Area**	**RT**	**Area**	**RT**
NA												

Comments: HTs OK. DO = Diluted out
MB, LCS/LCSD, -02
Samples -02 diluted 1000X

Hahn Level III NWTPH-GX Worksheet

SDG: A9E0832	Matrix: Solid	Lab Sample IDs: A9E0832-02
Seq./Batch #s: --/9060533		

Tuning: ☒ Pass ☐ Fail

Analyte (outliers)	Calibration			Method Blank	5X Blank	LCS %R	MS %R	MSD %R	MS/D RPD	Lab Dup1 RPD	
	r^2 ≥0.990	ICV/CCV %D ±20%	RT Windows ±20%			*(lab limits)*		*(lab limits)*			
GRO (Dup 1)				✓	NA	✓	NA	NA	NA	**	

Surrogate Outliers *(50-150%)*

Sample ID	Surrogate	%R	Sample ID	Surrogate	%R	Sample ID	Surrogate	%R
None								

IS Outliers *(-50% to +100% of CCV)*

Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
NA											

Comments: HT out
MB, LCS, -02, unknown Dup1, unknown Dup2
Sample -02 diluted 10000X
**Dup RPD out; performed on unknown sample; no data qualified.

Hahn Level III NWTPH-DX Worksheet

SDG: A9E0832	Matrix: Solid	Lab Sample IDs: A9E0832-02
Seq./Batch #s: --/9060517		

Analyte (outliers)	Calibration			Method Blank	5X Blank	LCS/ LCSD %R *(lab limits)*	MS %R *(lab limits)*	MSD %R	MS/D RPD	LCSD %R	LAB RPD
	r^2 ≥0.990	ICV/CCV %D ±15%	RT Windows								
None							NA	NA	NA	NA	

Surrogate Outliers *(50-150%)*

Sample ID	Surrogate	%R	Sample ID	Surrogate	%R	Sample ID	Surrogate	%R
-02 (100X)	o-Terphenyl	DO						
Dup (100X)	o-Terphenyl	DO						

Comments: HTs OK. DO = Diluted out
MB, LCS, -02, A9E0723-03 Dup
Sample -02 diluted 100X
Sample -02: F17 No fuel pattern was detected. The diesel result represents carbon range C12 to C24, and the oil result represents >C24 to C40.