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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 A9E0723 Rev 1

SUMMARY

Level II (i.e., EPA Stage 2A) data validation was performed on the data for four solid samples prepared and analyzed using approved procedures for method SW846 8260C (VOCs) and one solid sample prepared and analyzed using approved procedures for methods SW846 8260C TCLP (TCLP VOCs), SW846 8260C SPLP (SPLP VOCs), SW846 8270D (SVOCs), SW846 8270D SPLP (SPLP SVOCs), NWTPH-Gx (gasoline range organics [GRO]), NWTPH-Dx (diesel and oil), and SW846 6020A (metals by ICPMS). 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 samples included in this validation are listed below.

Sample ID	APEX Sample ID	Analysis	Matrix
2708-190521-007	A9E0723-01	VOCs, TCLP VOCs, SPLP VOCs, SVOCs, SPLP SVOCs, Total Metals	Solid
2708-190521-008	A9E0723-02	VOCs	Solid
2708-190521-009	A9E0723-03	VOCs, GRO, DRO	Solid
2708-190521-010	A9E0723-04	VOCs	Solid

DATA QUALIFIERS (see following sections for detailed explanations)

Sample ID	Method	Analyte	Qualifier	Qualifier Code	Reason for Qualification
2708-190521-007	8260C	Methylene chloride	UJ	10	Low laboratory control sample recovery
	8260C TCLP	Chloromethane	UJ	10	Low laboratory control sample recovery
	8270D	Naphthalene	J	10	High laboratory control sample recovery
	8270D SPLP	Phenol	J	9	Poor duplicate precision
		1,3-Dichlorobenzene 1,4-Dichlorobenzene Hexachlorobutadiene Hexachlorocyclopentadiene Hexachloroethane	UJ	9	Poor duplicate precision
	6020A	Iron	J	8, 9	High matrix spike recovery and poor duplicate precision
		Lead	J	9	Poor duplicate precision
2708-190521-008	8260C	Methylene chloride	UJ	10	Low laboratory control sample recovery

Sample ID	Method	Analyte	Qualifier	Qualifier Code	Reason for Qualification
2708-190521-009	8260C	Benzene Ethylbenzene Styrene Toluene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene m,p-Xylene o-Xylene Naphthalene	J	2	Improper preservation
		All target analytes *except*: Benzene Ethylbenzene Styrene Toluene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene m,p-Xylene o-Xylene Naphthalene Methylene chloride	UJ	2	Improper preservation
		Methylene chloride	UJ	2,10	Improper preservation and low laboratory control sample recovery
	NWTPH-Gx	Gasoline Range Organics	J	2	Improper preservation
2708-190521-010	8260C	Chloroethane 1,1-Dichloroethene Methylene chloride	UJ	10	Low laboratory control sample recovery

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 samples were properly preserved and analyzed within the prescribed holding times with the following exceptions.

Methods 8260C and NWTPH-Gx

Sample 2708-190521-009 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.

Method 8270D SPLP

Samples 2708-190521-007 and 2708-190521-007 RE1 were analyzed one day beyond the specified holding time. Sample 2708-190521-007 had been frozen to extend the holding time. No sample results were qualified based on professional judgment (see worksheet).

Blanks

Methods 8260C, 8260C TCLP, 8260C SPLP, 8270D, NWTPH-Gx, NWTPH-Dx, 6020A

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

Method 8270D SPLP

2-Methylphenol; 1,4-methylphenol; naphthalene; and phenol were detected in the method blank. The associated sample results were detects >10X the method blank value and, therefore, were not qualified.

Surrogates

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

Method 8270D

The surrogates were diluted out of sample 2708-190521-007 (10000X). No sample results were qualified.

Method 8270D SPLP

The surrogates were diluted out of sample 2708-190521-007 (1000X). No sample results were qualified.

Method NWTPH-Dx

The surrogate was diluted out of samples 2708-190521-009 (100X) and 2708-190521-009 DUP (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 recoveries associated with batch 9051139 were > the upper acceptance limit for bromoform; 2,2-dichloropropane; and 1,1,2,2-tetrachloroethane. The associated sample results were non-detects and not affected by the high bias and, therefore, were not qualified based on professional judgment.

The LCS recoveries associated with batches 9051139 and 9060553 were < the lower acceptance limit but ≥30% for methylene chloride. The associated sample results were non-detects and, therefore, were **qualified UJ**.

The LCS recoveries associated with batch 9051198 were > the upper acceptance limit for bromoform; carbon tetrachloride; 2,2-dichloropropane; and 1,1,2,2-tetrachloroethane. The associated sample results were non-detects and not affected by the high bias and, therefore, were not qualified based on professional judgment.

The LCS recoveries associated with batch 9051198 were < the lower acceptance limit but ≥30% for chloroethane; 1,1-dichloroethene; and methylene chloride. The associated sample results were non-detects and, therefore, were **qualified UJ**.

Method 8260C TCLP

The LCS recoveries were > the upper acceptance limit for bromochloromethane, bromodichloromethane, bromoform, bromomethane, carbon tetrachloride, and

dichlorodifluoromethane. The associated sample results were non-detects and not affected by the high bias and, therefore, were not qualified based on professional judgment.

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

Method 8270D

The LCS recoveries were > the upper acceptance limit for naphthalene; 4,6-dinitro-2-methylphenol; and 4-nitroaniline. The associated naphthalene result was a detect and, therefore, was **qualified J**. The remaining associated sample results were non-detects and not affected by the high bias and, therefore, were not qualified based on professional judgment.

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 associated with batch 9060553 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.

Method 8260C TCLP

The MS recovery was > the upper acceptance limit for bromomethane. The MS analysis was performed on a non-project sample; therefore, no sample results were qualified based on professional judgment.

Method 8260C SPLP

The MS recovery was > the upper acceptance limit for trichlorofluoromethane and < the lower acceptance limit but ≥30% for naphthalene. The MS analysis was performed on a project sample from another data package; therefore, no sample results from this data package were qualified based on professional judgment.

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

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

Method 6020A

The MS recoveries were > the upper acceptance limit for iron and zinc. The associated iron result was a detect and, therefore, was **qualified J**. The associated zinc result was a non-detect and not affected by the high bias and, therefore, was not qualified based on professional judgment.

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) associated with batches 9051139 and 9060533 were > the acceptance limit for multiple target analytes. The laboratory duplicate analyses were performed on non-project samples; therefore, no sample results from this data package were qualified based on professional judgment.

It should be noted that the laboratory duplicate analyses associated with batches 9060852 and 9051198 were performed on non-project samples.

Method 8260C SPLP

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

Method 8270D

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

Method 8270D SPLP

The laboratory duplicate (LCS/LCSD) RPDs were > the acceptance limit for phenol; 1,3-dichlorobenzene; 1,4-dichlorobenzene; hexachlorobutadiene; hexachlorocyclopentadiene; and hexachloroethane. The associated phenol result was a detect and, therefore, was **qualified J**. The remaining associated sample results were non-detects and, therefore, were **qualified UJ**.

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.

Method 6020A

The duplicate sample RPD and/or absolute differences were > the acceptance limit for iron and lead. The associated sample results were detects and therefore, were **qualified J**.

Field Duplicate

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

Reporting Limits

All reporting limits (RLs) were properly reported. Sample 2708-190521-007 was diluted 100000X for VOCs, 500X for naphthalene and 50X for all remaining 8260C TCLP target analytes, 100X for 8260 SPLP, 10000X for SVOCs, 1000X for 8270 SPLP, and 10X for total metals. Sample 2708-190521-008 was diluted 100000X for VOCs. Sample 2708-190521-009 was diluted 100000X for naphthalene and 10000X for all remaining VOC target analytes and GRO, and 100X for DRO. Sample 2708-190521-010 was diluted 20000X for VOCs. Reporting limits were adjusted accordingly.

Other QC

Method 8270D

The laboratory noted that peak separation of structural isomers was insufficient for accurate quantification of benzo(b)fluoranthene and benzo(k)fluoranthene for sample 2708-190521-007. 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 8270D SPLP

The laboratory noted that aniline result for sample 2708-190521-007 may contain a high bias because the peak could not be accurately quantified due to matrix intereference. 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 2708-190521-009. The diesel result represents carbon range C12 to C24. 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#: A9E0723 Rev 1	Laboratory: Apex	Validator: Jeanne Peterson	Validation Date: 08/28/2019
Site: Mult 802 Decommissioning	COC#: 1		Validation Level: ☒ II ☐ III
Matrix: Solid	# of Samples: 4	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
None			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
2708-190521-009	A9E0723-03	8260	*	05/21/2019	05/31/2019	06/04/2019	NA	NA
2708-190521-009 RE1	A9E0723-03 RE1	NWTPH-Gx	*	05/21/2019	05/31/2019	06/05/2019	NA	NA
2708-190521-009	A9E0723-03	NWTPH-Gx	*	05/21/2019	05/31/2019	06/04/2019	NA	NA
2708-190521-007	A9E0723-01	SPLP SVOCs	4°C	05/21/2019	06/05/2019	06/11/2019	Yes	No
2708-190521-007 RE1	A9E0723-01 RE1	SPLP SVOCs	4°C	05/21/2019	06/05/2019	06/12/2019	Yes	No

Comments: Samples collected 05/21/2019;

Temp and containers not completed on COC; documented on Cooler Receipt Form.

*Samples were stored at temperatures up to17°C for approximately 48 hours.

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

Lab froze sample for SPLP to extend the holding time. Total time at 4°C was less than the standard holding time. PAHs OK for extended HT; all other target analytes ND in 8270 analysis

Hahn Level III GCMS Worksheet

SDG: A9E0723 Rev 1	Method: 8260C	Matrix: Solid	Lab Sample ID: A9E0723-01, -02, -03, -04
Seq/Batch #s: --/9051139, 9060533, 9060582, 9051198			

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%										
9051139														
Bromoform					✓	NA	129	✓	NA	NA	**	NA		
2,2-Dichloropropane					✓	NA	124	✓	NA	NA	**	NA		
MeCl2					✓	NA	74	✓	NA	NA	**	NA		
1,1,2,2-Tetrachloroethane					✓	NA	122	✓	NA	NA	**	NA		
9060533														
MeCl2					✓	NA	71	68	NA	NA	**	NA		
9060582 (naphthalene only)														
None									NA	NA		NA		
9051198														
Bromoform					✓	NA	133	✓	NA	NA	✓	NA		
CCl4					✓	NA	123	✓	NA	NA	✓	NA		
Chloroethane					✓	NA	72	✓	NA	NA	✓	NA		
1,1-Dichloroethene					✓	NA	79	✓	NA	NA	✓	NA		
2,2-Dichloropropane					✓	NA	125	✓	NA	NA	✓	NA		
MeCl2					✓	NA	79	✓	NA	NA	✓	NA		
1,1,2,2-Tetrachloroethane					✓	NA	122	✓	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. Samples -01, -02, and -03RE1 diluted 100000X; sample -03 diluted 10000X; and sample -04 diluted 20000X
9051139: MB, LCS, -01, -02, unknown Dup, unknown MS; **Multiple outliers; performed on unknown sample; no data qualified.
9060533: MB, LCS, -03, unknown Dup1, unknown Dup2, unknown MS; **Multiple outliers; performed on unknown sample; no data qualified.
9060582: MB, LCS, -03RE1. Unknown Dup, unknown MS
9051198: MB, LCS, -04, unknown Dup, unknown MS

Hahn Level III GCMS Worksheet

SDG: A9E0723 Rev 1	Method: 8260C TCLP	Matrix: Leachate	Lab Sample ID: A9E0723-01
Seq/Batch #s: --/9060587 (l)/9051145 (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%										
Bromochloromethane					✓	NA	127	✓	NA	NA	✓			
Bromodichloromethane					✓	NA	122	✓	NA	NA	✓			
Bromoform					✓	NA	129	✓	NA	NA	✓			
Bromomethane					✓	NA	133	136	NA	NA	✓			
CCl4					✓	NA	126	✓	NA	NA	✓			
Chloromethane					✓	NA	70	✓	NA	NA	✓			
Dichlorodifluoromethane					✓	NA	125	✓	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 for unpreserved samples.
MB, LCS, -01, -01RE1, A9E0723-01 Dup, unknown MS
Sample -01 diluted 500X for naphthalene and 50X for all remaining target analytes

Hahn Level III GCMS Worksheet

SDG: A9E0723 Rev 1	Method: 8260C SPLP	Matrix: Leachate	Lab Sample ID: A9E0723-01
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					✓	NA	✓	133	NA	NA	✓			
Naphthalene (MS RE1)					✓	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 for unpreserved samples.
MB, LCS, -01, A9E0723-01 Dup, A9E0832-02 MS, A9E0832-02 MS RE1
Sample -01 diluted 100X

Hahn Level III GCMS Worksheet

SDG: A9E0723 Rev 1	Method: 8270D	Matrix: Solid	Lab Sample IDs: A9E0723-01
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	163	NA	NA	NA	NA	NA	✓		
4,6-Dinitro-2-methylphenol					✓	NA	143	NA	NA	NA	NA	NA	✓		
4-Nitroaniline					✓	NA	128	NA	NA	NA	NA	NA	✓		
Benzo(k)fluoranthene					✓	NA	✓	NA	NA	NA	NA	NA	39*		

Surrogate Recovery Outliers *(lab limits)*

Sample ID	Nitrobenzene-d5	2-Fluorobiphenyl	Phenol-d6	p-Terphenyl-d14	2-Fluorophenol	2,4,6-Tribromophenol
-01 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, -01, A9E0785-01 Dup
Sample -01 diluted 10000X for all target compounds
* Parent and/or dup sample conc <5*RL and abs diff <RL; OK
Sample -01: The benzo(b)fluoranthene and benzo(k)fluoranthene results are estimated; peak separation for structural isomers is insufficient for accurate quantification.

Hahn Level III GCMS Worksheet

SDG: A9E0723 Rev 1	Method: 8270D SPLP	Matrix: Leachate	Lab Sample IDs: A9E0723-01
Seq/Batch #s: --/9060621 (l)/9060759 (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/r^2 ≤30%	ICV %D ±25%	CCV %D ±25%											
2-Methylphenol					0.00152	(0.0152)	✓	✓	✓	NA	NA	NA	NA		
3,4-methylphenol					0.00313	(0.0313)	✓	✓	✓	NA	NA	NA	NA		
Naphthalene					0.00306	(0.0306)	✓	✓	✓	NA	NA	NA	NA		
Phenol					0.00431	(0.0431)	✓	✓	34	NA	NA	NA	NA		
1,3-Dichlorobenzene					✓	NA	✓	✓	33	NA	NA	NA	NA		
1,4-Dichlorobenzene					✓	NA	✓	✓	32	NA	NA	NA	NA		
Hexachlorobutadiene					✓	NA	✓	✓	41	NA	NA	NA	NA		
Hexachlorocyclopentadiene					✓	NA	✓	✓	46	NA	NA	NA	NA		
Hexachloroethane									43	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
-01 1000X	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/LCSD, -01
Samples -01and -01RE diluted 1000X
Sample -01: Due to matrix interference, aniline could not be accurately quantified. The reported result may contain a high bias,

Hahn Level III NWTPH-GX Worksheet

SDG: A9E0723 Rev 1	Matrix: Solid	Lab Sample IDs: A9E0723-03
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, -03, unknown Dup1, unknown Dup2
Sample -03 diluted 10000X
**Dup RPD out; performed on unknown sample; no data qualified.

Hahn Level III NWTPH-DX Worksheet

SDG: A9E0723 Rev 1	Matrix: Solid	Lab Sample IDs: A9E0723-03
Seq./Batch #s: --/9060517		

(lab limits) *(lab limits)*

Analyte (outliers)	Calibration			Method Blank	5X Blank	LCS/ LCSD %R	MS %R	MSD %R	MS/D RPD	LCSD %R	LAB RPD
	r^2 ≥0.990 ±20%	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
-03 (100X)	o-Terphenyl	DO						
-03 Dup (100X)	o-Terphenyl	DO						

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

Hahn Level III Metals Worksheet

SDG: A9E0723 Rev 1	Matrix: Solid	Lab Sample IDs: A9E0723-01
Method: 6020A	Seq/Batch #: --/9060676	

ICPMS Mass Cal: ☐ Pass ☐ Fail ☒ NA ICPMS %RSD: ☐ Pass ☐ Fail ☒ NA *(80-120%)* *(75-125%)*

Analyte (outliers)	*(90-110%)* **Calibration**							**ICS A** *<IDL*[1]	**ICS AB %R**[1] ±20%	**MB** ug/L	**10X MB** ug/L	**LCS %R**	**Dup RPD** *≤40%*	**MS %R**	**MSD %R**	**MS/ MSD RPD** *≤40%*	**PS %R**	**Ser. Dil. %D** *≤10%*
	r	**ICV**	**CCV**[1]	**CRI**	**ICB**	**CCB** ug/L	**5X CCB**											
Fe										✓	NA	✓	67^	138	NA	NA	NA	NA
Pb										✓	NA	✓	58	✓	NA	NA	NA	NA
Zn										✓	NA	✓	70#	130	NA	NA	NA	NA

IS Outliers *(Samples 60-125%; CCV/CCB 80-120%)*					
Sample ID	**Li6 %R**	**Sc45 %R**	**Ge74 %R**	**Rh103 %R**	**Tb159 %R**
NA					

IS Outliers *(Samples 60-125%; CCV/CCB 80-120%)*					
CCV/CCB ID	**Li6 %R**	**Sc45 %R**	**Ge74 %R**	**Rh103 %R**	**Tb159 %R**
NA					

Comments: HTs OK.
MB, LCS, -01, A9E0723-01 Dup, A9E0723-01 MS
*Parent sample conc >4X spike amount
^ Parent and/or dup sample conc <5*RL and abs diff >RL; qualify J/UJ
#Parent and/or dup sample conc <5*RL and abs diff <RL; OK
Sample -01 diluted 10X
Reporting levels were elevated due to preparation and/or analytical dilution necessary for analysis.

[1]CRI limits 70-130% (50-150% for Sb, Pb, Tl)