PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

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 A9F0573

SUMMARY

Level II (i.e., EPA Stage 2A) data validation was performed on the data for eight water samples prepared and analyzed using approved procedures for method SW846 8260C (VOCs) and seven water samples prepared and analyzed using approved procedures for methods SW846 8270D (SVOCs), NWTPH-Gx (gasoline range organics [GRO]), NWTPH-Dx (diesel and oil), SW846 6020A (metals by ICPMS), EPA 335.4 (total cyanide), OIA/D6888 (available cyanide), and ASTM D4282 (free cyanide). 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
2708-190617-MULT802-TB	A9F0573-01	VOCs	Water
2708-190617-MULT802-101	A9F0573-02	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-102	A9F0573-03	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-103	A9F0573-04	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-103D	A9F0573-05	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-104	A9F0573-06	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-105	A9F0573-07	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water
2708-190617-MULT802-106	A9F0573-08	VOCs, SVOCs, GRO, DRO, Total Metals, Total CN, Available CN, Free CN	Water

DATA QUALIFIERS (see following sections for detailed explanations)

Sample ID	Method	Analyte	Qualifier	Qualifier Code	Reason for Qualification
2708-190617-MULT802-TB	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery

Sample ID	Method	Analyte	Qualifier	Qualifier Code	Reason for Qualification
2708-190617-MULT802-101	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
	EPA 335.4	Total cyanide	J	2	Insufficient chemical preservation
	D6888-09	Available cyanide	J	2	Insufficient chemical preservation
	D4282-02	Free cyanide	J	2	Insufficient chemical preservation
2708-190617-MULT802-102	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
2708-190617-MULT802-103	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
	8270D	Acenaphthylene	J	14	Poor duplicate precision
2708-190617-MULT802-103D	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
	8270D	Acenaphthylene	J	14	Poor duplicate precision
2708-190617-MULT802-104	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
2708-190617-MULT802-105	8260C	Bromomethane	UJ	10	Low laboratory control sample recovery
2708-190617-MULT802-106	8260C	Bromomethane	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 exceptions.

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

The COC listed one container for the trip blank; however, two containers were received.

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

The pH of the samples at the time of analysis was not included in the Level II data package. There were no preservation problems noted by the laboratory; therefore, it was assumed that the samples were properly preserved and no data were qualified.

Methods EPA 335.4, OIA/D6888, and ASTM D4282

The NaOH preserved poly container for sample 2708-190617-MULT802-101 was received at the laboratory with a pH of ~7. The laboratory attempted to adjust the pH of the sample with NaOH; however, the pH was only raised to ~11. The associated sample results were detects and, therefore, were **qualified J**.

Blanks

Method 8260C

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

Methods 8270D, NWTPH-Gx, NWTPH-Dx, EPA 335.4, OIA/D6888, and ASTM D4282

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

Method 6020A

Manganese was 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 all samples. 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 9061104 were > the upper acceptance limit for carbon tetrachloride and chloromethane. 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 associated with batch 9061104 was < the lower acceptance limit but ≥30% for bromomethane. The associated sample results were non-detects and, therefore, were **qualified UJ**.

Method 8270D

The LCS and/or LCSD recoveries were > the upper acceptance limit for 2,4-dinitrophenol; 4,6-dinitro-2-methylphenol; 2,3,5,6-tetrachlorophenol; 1,4-dinitrobenzene; and 2,4,5-trichlorophenol. The 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 recoveries associated with batch 9061104 were > the upper acceptance limit for carbon tetrachloride and 1,1,1,2-tetrachloroethane. The MS analyses were performed on non-project samples; therefore, no sample results were qualified based on professional judgment.

It should be noted that the MS analysis associated with batch 9061124 was performed on a non-project sample.

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 recovery was outside of the acceptance limits for iron. The parent sample concentration was >4X the spike amount; therefore, no sample results were qualified based on professional judgment.

Method EPA 335.4

It should be noted that the MS analyses were performed on non-project samples.

Laboratory Duplicate

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

Methods 8260C and NWTPH-Gx

It should be noted that the laboratory duplicate analysis associated with batch 9061124 was performed on a non-project sample.

Method EPA 335.4

It should be noted that the laboratory duplicate analyses were performed on non-project samples.

Field Duplicate

Sample 2708-190617-MULT802-103 was collected in duplicate (sample 2708-190617-MULT802-103D). The RPDs between the sample and duplicate results met QC acceptance criteria with the exception of acenaphthylene. Analytes not listed in the table below were non-detects for both sample and duplicate.

	2708-190617-MULT802-103		2708-190617-MULT802-103D			
Analyte	**Result**	**RL**	**Result**	**RL**	**RPD**	**>30%**
Acetone	238	200	204	200	15.38	
Benzene	1210	2	1100	2	9.52	
Ethylbenzene	46.4	5	43.3	5	6.91	
Styrene	40.9	10	32.85	10	21.83	
Toluene	346	10	296	10	15.58	
1,2,4-Trimethylbenzene	27.8	10	21.9	10	23.74	

	2708-190617-MULT802-103		2708-190617-MULT802-103D			
Analyte	**Result**	**RL**	**Result**	**RL**	**RPD**	**>30%**
1,3,5-Trimethylbenzene	11.1	10	ND	10	**	
m,p-Xylenes	118	10	96.4	10	20.15	
o-Xylene	47.3	5	38.4	5	20.77	
Naphthalene	2580	200	2290	200	11.91	
Acenaphthene	470	19	454	10.2	3.46	
Acenaphthylene	57.7	19	36	10.2	46.32	Yes
Anthracene	272	19	246	10.2	10.04	
Benz(a)anthracene	312	19	304	10.2	2.60	
Benzo(a)pyrene	452	28.6	437	15.3	3.37	
Benzo(b)fluoranthene	492	28.6	485	15.3	1.43	
Benzo(k)fluoranthene	192	28.6	165	15.3	15.13	
Benzo(g,h,i)perylene	272	19	257	10.2	5.67	
Chrysene	361	19	343	10.2	5.11	
Dibenz(a,h)anthracene	35.2	19	35.7	10.2	1.41	
Fluoranthene	1000	19	941	10.2	6.08	
Fluorene	268	19	255	10.2	4.97	
Indeno(1,2,3-cd)pyrene	269	19	255	10.2	5.34	
1-Methylnaphthalene	371	38.1	295	20.4	22.82	
2-Methylnaphthalene	726	38.1	574	20.4	23.38	
Naphthalene	2610	38.1	2120	20.4	20.72	
Phenanthrene	1150	19	997	10.2	14.25	
Pyrene	963	19	903	10.2	6.43	
Carbazole	245	28.6	237	15.3	3.32	
Dibenzofuran	257	19	252	10.2	1.96	
2-Methylphenol	65.2	47.6	63.9	25.5	2.01	
3+4-methylphenol	151	47.6	137	25.5	9.72	
Gasoline Range Organics	14.6	1	13	1	11.59	
Diesel	13.6	0.952	13.6	0.98	0.00	
Oil	9.21	1.9	9.85	1.96	6.72	
Aluminum	2430	50	1940	50	22.43	
Arsenic	0.894	1	0.91	1	<RL	
Barium	48.2	1	47.8	1	0.83	

	2708-190617-MULT802-103		2708-190617-MULT802-103D			
Analyte	**Result**	**RL**	**Result**	**RL**	**RPD**	**>30%**
Beryllium	0.263	0.2	0.174	0.2	*	
Cadmium	0.149	0.2	0.139	0.2	<RL	
Chromium	2.15	1	2.1	1	2.35	
Copper	5.35	1	6.13	1	13.59	
Iron	15500	50	14400	50	7.36	
Lead	7.84	0.2	9.74	0.2	21.62	
Manganese	1700	1	1600	1	6.06	
Mercury	0.0508	0.08	0.0579	0.08	<RL	
Nickel	7.19	1	5.86	1	20.38	
Vanadium	28	1	28.9	1	3.16	
Zinc	139	4	104	4	28.81	
Total Cyanide	0.0099	0.005	0.0094	0.005	5.18	
Available Cyanide	0.00121	0.002	0.00133	0.002	<RL	

*One result is < the RL, and one result is > the RL; the absolute value of the difference between the two results is compared to the RL.

**One result is > the MDL and one result is a non-detect (ND); RPD not evaluated.

Reporting Limits

All reporting limits (RLs) were properly reported. Sample 2708-190617-MULT802-101 was diluted 200X for benzene, naphthalene, and toluene and 10X for all remaining VOC target analytes; 200X for SVOCs and GRO; and 10X for iron, manganese, selenium, and zinc. Sample 2708-190617-MULT802-102 was diluted 50X for benzene and naphthalene and 10X for all remaining VOC target analytes; 1000X for SVOCs; 50X for GRO; 10X for DRO. Sample 2708-190617-MULT802-103 was diluted 200X for naphthalene and 10X for all remaining VOC target analytes; 200X for SVOCs; 10X for GRO; 10X for DRO. Sample 2708-190617-MULT802-103D was diluted 100X for naphthalene and 10X for all remaining VOC target analytes; 100X for SVOCs; 10X for GRO; 10X for DRO. Sample 2708-190617-MULT802-104 was diluted 10X for VOCs; 200X for SVOCs; 10X for GRO. Sample 2708-190617-MULT802-105 was diluted 100X for naphthalene and 10X for all remaining VOC target analytes; 1000X for naphthalene and 100X for all remaining SVOC target analytes; 10X for GRO; 10X for DRO. Sample 2708-190617-MULT802-106 was diluted 10X for VOCs; 100X for SVOCs; 10X for GRO. 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 for sample 2708-190617-MULT802-101 and benzo(k)fluoranthene for the remaining samples. 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 all samples. The diesel results represent carbon range C12 to C24, and the oil results represent >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#: A9F0573	Laboratory: Apex	Validator: Jeanne Peterson	Validation Date: 08/29/2019
Site: Mult 802 Decommissioning	COC#: 1		Validation Level: ☒ II ☐ III
Matrix: Water	# of Samples: 8	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
2708-190617-MULT802-101	A9F0573-02	EPA 335.4 total CN	pH >12*; 4°C	06/17/2019	06/20/2019	06/20/2019	NA*	NA*
2708-190617-MULT802-101	A9F0573-02	OIA/D6888-09 Available CN	pH >12*; 4°C	06/17/2019	06/20/2019	06/20/2019	NA*	NA*
2708-190617-MULT802-101	A9F0573-02	D4282-02 Free CN	pH >12*; 4°C	06/17/2019	06/18/2019	06/18/2019	NA*	NA*

Comments: Samples collected 06/17/2019
Temp and containers not completed on COC; documented on Cooler Receipt Form.
COC lists 1 container for 2708-190617-MULT802-TB; however, two containers were received, one with no information on it.
*The NaOH preserved poly container for sample 2708-190617-MULT802-101 was received with a pH of ~7; lab added 1mL OF NaOH, final pH ~11.
**Project HT for free CN in water is 48 hours

Hahn Level III GCMS Worksheet

SDG: A9F0573	Method: 8260C	Matrix: Water	Lab Sample ID: A9F0573-01 thru -08
Seq/Batch #s: --/9061104, 9061124			

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%										
9061104														
Bromomethane					✓	NA	60	✓	NA	NA	✓	✓		
CCl4					✓	NA	127	138	NA	NA	✓	✓		
Chloromethane					✓	NA	134	✓	NA	NA	✓	✓		
1,1,1,2-PCA					✓	NA	✓	126	NA	NA	✓	✓		
9061124 (B, N, T only)														
None									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; pH unknown

9061104: MB, LCS, -01, -02, -03, -04, -05, -06, -07, -08, A9F0573-08 Dup, unknown MS

9061124: MB, LCS, -02 RE1, -03 RE1, -04 RE1, -05 RE1, -07 RE1, unknown Dup, unknown MS

Sample -02 diluted 200X for benzene, naphthalene, and toluene and 10X for all remaining target analytes; sample -03 diluted 50X for benzene and naphthalene and 10X for all remaining target analytes; sample -04 diluted 200X for naphthalene and 10X for all remaining target analytes; sample -05 diluted 100X for naphthalene and 10X for all remaining target analytes; sample -06 diluted 10X for all target analytes; sample -07 diluted 100X for naphthalene and 10X for all remaining target analytes; and sample -08 diluted 10X for all target analytes

NOTE: QC results for batch 9061158 included in data package, but no samples from this SDG were reported from this batch.

Hahn Level III GCMS Worksheet

SDG: A9F0573	Method: 8270D	Matrix: Water	Lab Sample IDs: A9F0573-02 thru -08
Seq/Batch #s: --/9061213			

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%											
2,4-Dinitrophenol					✓	NA	146	146	✓	NA	NA	NA	NA		
4,6-Dinitro-2-methylphenol					✓	NA	156	156	✓	NA	NA	NA	NA		
2,3,5,6-Tetrachlorophenol					✓	NA	131	131	✓	NA	NA	NA	NA		
1,4-Dinitrobenzene					✓	NA	133	135	✓	NA	NA	NA	NA		
2,4,5-Trichlorophenol					✓	NA	✓	124	✓	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 200X	[115] DO	[101] DO	[68] DO	[99] DO	[156] DO	[401] DO
-03 1000X	[159] DO	[103] DO	[34] DO	[279] DO	[91] DO	DO
-04 200X	[65] DO	[88] DO	[27] DO	[100] DO	[25] DO	[349] DO
-05 100X	[72] DO	[84] DO	[26] DO	[99] DO	[38] DO	[228] DO
-06 200X	[82] DO	[87] DO	[26] DO	[96] DO	[30] DO	[346] DO
-07 100X	[70] DO	[77] DO	[23] DO	[131] DO	[44] DO	[254] DO
-07 1000X	DO	DO	DO	DO	DO	DO
-08 100X	[100] DO	[100] DO	[29] DO	[115] DO	[10] DO	[145] 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, -02, -03, -04, -05, -06, -07 RE1, -07 RE2, -08
Samples -02, -04, -06 diluted 200X for all target compounds
Sample -03 diluted 1000X for all target compounds
Samples -05, -08 diluted 100X for all target compounds
Sample -07 diluted 1000X for naphthalene and 100X for all remaining target analytes
Sample -02: The benzo(b)fluoranthene result is an estimated; peak separation for structural isomers is insufficient for accurate quantification.
Samples -03, -04, -05, -06, -07, -08: The benzo(k)fluoranthene result is an estimated; peak separation for structural isomers is insufficient for accurate quantification.

Hahn Level III NWTPH-GX Worksheet

SDG: A9F0573	Matrix: Water	Lab Sample IDs: A9F0573-02 thru -08
Seq./Batch #s: --/9061124, 9061104		

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)*			
None							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 OK for unpreserved samples; pH unknown
9061124: MB, LCS, -01, -02, unknown Dup
9061104: MB, LCS, -03, -04, -05, -06, -07, -08, A9F0573-08 Dup

Sample -02 diluted 200X, sample -03 diluted 50X, and samples -04, -05, -06, -07, and -08 diluted 10X

Hahn Level III NWTPH-DX Worksheet

SDG: A9F0573	Matrix: Water	Lab Sample IDs: A9F0573-02 thru -08
Seq./Batch #s: --/90761096		

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 ±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
None								

Comments: HTs OK. DO = Diluted out
MB, LCS/LCSD, -02 thru -08
Samples -03, -04, -05, and -07 diluted 5X
All samples: F17 No fuel pattern was detected. The diesel result represents carbon range C12 to C24, and the oil result represents >C24 to C40.

Hahn Level III Metals Worksheet

SDG: A9F0573	Matrix: Water	Lab Sample IDs: A9F0573-02 thru -08
Method: 6020A	Seq/Batch #: --/9061092	

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] ±40%	**MB** ug/L	**10X MB** ug/L	**LCS %R**	**Dup RPD** *≤20%*	**MS %R**	**MSD %R**	**MS/ MSD RPD** *≤20%*	**PS %R**	**Ser. Dil. %D** *≤10%*
	r	**ICV**	**CCV**[1]	**CRI**	**ICB**	**CCB** ug/L	**5X CCB**											
Mn										2.11	21.1	✓	✓	✓	NA	NA	NA	NA
Fe										✓	NA	✓	✓	64*	NA	NA	NA	NA

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

Comments: HTs OK.
MB, LCS, -02, -03, -04, -05, -06, -07, -08, A9F0573-05 Dup, A9F0573-05 MS
*Parent sample conc >4X spike amount
#Parent sample <RL and dup >RL; abs diff <RL; OK
Sample -02 diluted 10X for Fe, Mn, Se, and Zn
Sample -02: The reporting levels for Se were elevated due to preparation and/or analytical dilution necessary for analysis.

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

Hahn Level III Cyanide Worksheet

SDGs: A9F0573	Matrix: Water	Lab Sample IDs: A9F0573-02 thru -08
Method/Seq/Batch #s: EPA 335.4 (Total CN)/--/9061175 & 9061265; OIA/D6888-09 (Available CN)/--/9061164; ASTM D4282-02 (Free CN)/--/9061093		

										(80-120%)	*(≤20%)*	*(75-125%)*		*(≤20%)*		
Analyte (outliers)	*(85-115%)* **Calibration**							**MB**	**5X MB**	**LCS/ D %R**	**LCSD RPD**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**Dup RPD**	
	r ≥0.995	**ICV**	**CCV**	**Dist. ICV**	**ICB (ug/L)**	**CCB (ug/L)**	**5X CB (mg/L)**									
None											NA					

Comments: HTs OK.
Tot CN 9061175: MB, LCS1, LCS2, -02, -03, -04, unknown Dup2, unknown Dup3, unknown MS2, unknown MS3
Tot CN 9061265: MB, LCS1, LCS2, -05, -06, -07, -08, A9F0573-05 Dup, A9F0573-05 MS
Avail CN 9061164: MB, LCS, -02, -03, -04, -05, -06, -07, -08, A9F0573-03 MS/MSD
Free CN 9061093: MB, LCS/LCSD, -02, -03, -04, -05, -06, -07, -08, A9F0573-02 Dup, A9F0573-02 MS
*Parent sample conc >4X spike amount
No dilutions