ANALYTICAL QUALITY ASSOCIATES, INC.

Data Validation Report

USGS
EPA-Pavillion Fracking

TestAmerica Lot # 280-28076-1

Validation Performed By: _____ *Date:* *06-14-12*
Marcia Hilchey

TABLE OF CONTENTS

Cover/TOC 1

Memoranda
Volatiles 3
Semivolatiles 6
DRO 8
GRO 10
RSK-175 12
PAH 14
Glycols 16
Metals 18
General Chemistry 21

Data Qualifier Definitions 23

Annotated Results Forms 24
Calculation verifications 47
Validation Worksheets 56

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/01/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Denver
Analysis: VOCs

Overview

The following table lists the samples included in the validation of Lot # 280-28076-1 that were prepared and analyzed using EPA Method 8260B.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	EPA 8260B	Water
MW02 (unpreserved)	280-28076-2		

Data Qualifiers (see following sections for detailed explanations)

All samples Results for 2-butanone, acrylonitrile, and isopropanol should be **qualified UJ** due to RF < 0.05 and > 0.01.
Results for ethanol and isobutanol should be **qualified R** due to RF < 0.01.
Results for tert-butyl alcohol should be **qualified J+** due to ICV > 20% and RF < 0.05 and >0.01.
Results for acetone should be **qualified J-** due to CCV >40% with negative bias.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The samples were analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration QC acceptance criteria were met with the following exceptions.

The initial calibration average relative response factors (RRF) for 2-butanone, tert-butyl alcohol, acrylonitrile, and isopropanol were <0.05 but ¬ 0.01All associated sample results that were non-detects (ND) should be **qualified UJ** and all associated detected results should be **qualified J.**

The RRFs for ethanol and isobutanol were < 0.01. All associated sample results were ND and should be **qualified R**.

The initial calibration verification and/or continuing calibration (ICV/CCV) percent difference for tert-butyl alcohol was > 20% but < 40% with positive bias. All associated sample results were detects and should be **qualified J+**. The ICV/CCV %D for isopropanol was > 20% and < 40% with negative bias. All associated sample results were ND and were previously qualified due to low RF. Associated results should not be further qualified. The ICV/CCV %D for acetone was > 40% and < 60% with negative bias. All associated sample results were detects and should be **qualified J-**.

Blanks

No target analytes were detected in the method blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS and LCSD were analyzed to provide accuracy and precision data for the samples.

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

The LCS/LCSD analyses met all QC acceptance criteria. It should be noted that 13 of 80 target analytes were not represented in the LCS/LCSD spiking solution. Based on professional judgment, no sample data should be qualified as a result.

Detection Limits/Dilutions

The samples were analyzed at reduced aliquots, resulting in a 20X dilution. Reported MDLs and RLs were adjusted accordingly.

Tentatively Identified Compounds (TICs)

Tentatively identified compounds were requested and reported, but not assessed for data validation.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/01/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Denver
Analysis: SVOCs

Overview

The following table lists the samples included in the validation of Lot # 280-28076-1 that were prepared and analyzed using EPA Method 8270C.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	EPA 8270C	Water
MW02 DL	208-28076-1 DL	EPA 8270C	Water

Data Qualifiers (see following sections for detailed explanations)

No data qualifiers should be applied to SVOC by 8270C sample results in this data package.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration QC acceptance criteria were met with the following exceptions.

The continuing calibration percent differences for bis(2-chloroisopropyl)ether and 4-nitrophenol were > 20% but < 40% with positive bias. All associated sample results were non-detects (ND) and should not be qualified.

Blanks

No target analytes were detected in the method blank with the following exception. Benzyl alcohol was detected in the MB at < PQL. The associated sample results were NDs and should not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS and LCSD were analyzed to provide accuracy and precision data for the samples.

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

The LCS/LCSD analyses met all QC acceptance criteria. It should be noted that 6 of 51 target analytes were not represented in the LCS/LCSD spiking solution. Based on professional judgment, no sample data should be qualified as a result.

Detection Limits/Dilutions

Sample 280-28076-1 DL was analyzed at a 4X dilution. Reported MDLs and RLs were adjusted accordingly.

Tentatively Identified Compounds (TICs)

Tentatively identified compounds were requested and reported, but not assessed for data validation.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/02/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Denver
Analysis: Diesel Range Organics (DRO) by EPA 8015B

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using EPA Method 8015B.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	EPA 8015B	Water

Data Qualifiers (see following sections for detailed explanations)

No qualifications were applied to DRO sample results in this data package.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

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

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the method blank.

Surrogates

Surrogate recoveries met all acceptance criteria.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS and LCSD were analyzed to provide accuracy and precision data for the samples.

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

The LCS/LCSD analyses met all QC acceptance criteria.

Target Compound Identification

The retention times for the target analytes that were detects in the samples were within 30 second windows established with the initial calibration standards.

Detection Limits/Dilutions

Analysis was performed on a slightly reduced aliquot due to lack of sufficient sample volume. Reported MDLs and RLs were adjusted accordingly.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/02/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Denver
Analysis: Gasoline Range Organics (GRO) by EPA 8015B

Overview

The following table lists the samples included in the validation of Lot # 280-28076-1 that were prepared and analyzed using EPA Method 8015B.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	EPA 8015B	Water
MW02 unpreserved	280-28076-2	EPA 8015B	Water

Data Qualifiers (see following sections for detailed explanations)

Sample 280-28076-2 The result for GRO should be **qualified J+** due to high surrogate recovery.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The samples were analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the method blank.

Surrogates

Recovery for surrogate a,a,a-trifluorotoluene in sample 280-28076-2 was > the upper acceptance limit. The associated sample result was a detect and should be **qualified J+**.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS and LCSD were analyzed to provide accuracy and precision data for the samples.

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

The LCS/LCSD analyses met all QC acceptance criteria.

Target Compound Identification

The retention times for the target analytes that were detects in the samples were within 30 second windows established with the initial calibration standards.

Detection Limits/Dilutions

Analysis was performed on a reduced aliquot due to high analyte concentration, resulting in a 20X dilution. Reported MDLs and RLs were adjusted accordingly.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/01/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Pittsburgh
Analysis: Dissolved Gases and propane by RSK-175

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using Method RSK-175.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	RSK-175	Water

Data Qualifiers (see following sections for detailed explanations)

No data qualifiers should be applied to dissolved gases or propane sample results in this data package.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

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

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the method blank.

Surrogates

Surrogate recovery met QC acceptance criteria for propane analysis. Surrogates are not analyzed for dissolved gases analysis.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS and LCSD were analyzed to provide accuracy and precision data for the samples.

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

The LCS/LCSD analyses met all QC acceptance criteria.

Target Compound Identification/Confirmation

The retention times for the target analytes that were detects in the samples were within 30 second windows established with the initial calibration standards.

Confirmation analysis was performed for dissolved gases on a confirmation column. Results were reported for methane and ethylene from both columns. Results from both columns were validated. Ethane results were only reported from one column since ethane is a co-eluter on the other column. RPDs for results from the two columns were acceptable. Confirmation analysis is not performed for propane. No sample data were qualified as a result, based on professional judgment.

Detection Limits/Dilutions

The sample was diluted 18X for dissolved gases analysis and 2X for propane analysis. Reported MDLs and RLs were adjusted accordingly.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/01/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Denver
Analysis: PAH by 8270C-SIM

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using EPA Method 8270C-SIM.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	280-28076-1	EPA 8270C-SIM	Water

Data Qualifiers (see following sections for detailed explanations)

Sample 280-28076-1 Results for dibenz(a,h)anthracene and indeno (1,2,3-cd)pyrene should be **qualified 400U** due to method blank (MB) contamination.
Results for all non-detects (ND) and U-qualified analytes should be **qualified UJ**, and results for all detects should be **qualified J** due to lack of precision information.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the MB with the following exceptions.

Benzo(b)fluroanthene; benzo(a)pyrene; benzo(k)fluoranthene; benzo(g,h,i)perylene; dibenz(a,h)anthracene; fluoranthene; pyrene, and indeno(1,2,3-cd)pyrene were detected in the MB at < PQL. All associated sample results that were < PQL and < 5X the MB concentration should be **qualified U at the PQL**. All associated ND results and results > 5X the MB concentration should not be qualified.

Surrogates

The sample was initially diluted 4X, therefore surrogate recoveries were not evaluated. No sample data should be qualified as a result.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG. No sample data should be qualified as a result. An LCS was analyzed to provide accuracy data for the samples.

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

The LCS analysis met all QC acceptance criteria. It should be noted that the LCS solution did not include 1- or 2-methylnaphthalene. Based on professional judgment, no sample data should be qualified as a result.

An LCSD was not analyzed. All ND sample results and sample results previously qualified U (see Blanks section) should be **qualified UJ**, and all detected sample results should be **qualified J** due to lack of precision information.

Detection Limits/Dilutions

Sample 280-28076-1 was analyzed at a 4X initial dilution. Reported MDLs and RLs were adjusted accordingly.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/02/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: GC Organic Data Review and Validation – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica-Austin
Analysis: glycols by EPA 8015B

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using EPA Method 8015B.

Sample ID No.	Laboratory ID No.	Analytical Method	Sample Matrix
MW02	AVE0007-01	EPA 8015B	Water

Data Qualifiers (see following sections for detailed explanations)

Sample AVE0007-01 The results for diethylene glycol, ethylene glycol, propylene glycol, and triethylene glycol should be **qualified UJ** due to lack of precision information.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and validation.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The sample was analyzed within the prescribed holding time and properly preserved.

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the method blank. It should be noted that the data package did not include a results form for the method blank. Method blank results were found in the raw data.

Surrogates

Surrogate recoveries met all acceptance criteria.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The parent sample used for MS/MSD analysis was from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for validation of this SDG.

No LCSD or replicate analyses were performed; therefore there is no applicable measure of precision reported. All associated sample results were non-detect and should be **qualified UJ**.

Laboratory Control Sample (LCS)

The LCS analysis met recovery acceptance criteria.

Target Compound Identification

The retention time windows were not reported. No sample data should be qualified as a result.

Detection Limits/Dilutions

Detection limits were not reported on results forms. No samples were diluted.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/05/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: Inorganic Data Review and Verification – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica - Denver
Analysis: Metals

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using EPA Methods 6010B (ICP-AES), 6020 (ICP-MS), and 7470A (CVAA mercury).

Sample ID No.	Laboratory ID No.	Analytical Methods	Sample Matrix
MW02	280-28076-1	EPA 6010B, 6020, 7470A	Water

Data Qualifiers (See following sections for detailed explanations. If a sample is not listed, qualifications are not required.)

Sample 280-28076-1

The result for dissolved Sb should be **qualified 2.0U** due to blank contamination.
The result for total Hg should be **qualified UJ** due to an associated negative blank value.
Dissolved Co, total Sb, and total Ag should be **qualified 0.44U, 3.86U, and 8.2U**, respectively, due to blank contamination.
The result for total As should be **qualified J+** due to high CRI recovery.
The result for total Al should be **qualified J** due to high serial dilution %D.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and verification.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration QC acceptance criteria were met. It should be noted that the y-intercept values are not reported for ICPAES or ICPMS analyses. No sample data should be qualified as a result.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria with the following exception. The CRI recovery for total As was >130%. The associated sample result was a detect <5X the practical quantitation limit (PQL) and should be **qualified J+**. The CRI recovery for dissolved Ba was < 70%. The associated sample result was > 5X the PQL and should not be qualified.

It should be noted that the CVAA CRA was not reported in the QC summary, but was reported in the raw data.

Blanks

No target analytes were detected in the blanks except as follows.

Dissolved Sb was detected in an associated CCB at > PQL. The associated sample result was a detect < PQL and should be **qualified 2.0U** at the PQL. Dissolved Na, total As, and total Na were detected in associated blanks at < PQL. The associated sample results were > 5X the highest associated blank concentrations and should not be qualified. Dissolved Co, total Sb, and total Ag were detected in associated blanks at < PQL. The associated sample results were detects < 5X the highest associated blank concentrations and should be **qualified U** at 5X the blank values.

Total Hg was detected in associated CCBs at negative values with absolute value > the MDL but < the PQL. The associated sample result was a non-detect (ND) and should be **qualified UJ**. It should be noted that the negative blank values with absolute value >MDL and < PQL were not reported in the blank summaries, but were reported in the raw data.

ICP-MS Internal Standards

All ICP-MS internal standards intensities met QC acceptance criteria.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

The MS/MSD analyses for ICPMS total and dissolved, ICP dissolved, and CVAA total and dissolved analyses were performed on parent samples from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for these analyses. No sample data should be qualified as a result. LCS/LCSD analyses provided accuracy and precision data for the samples.

The MS/MSD met all QC acceptance criteria for the ICP total analysis.

Laboratory Replicate

Laboratory replicate analyses were not performed. MS/MSD and LCS/LCSD results were evaluated for precision assessment. No sample data were qualified as a result.

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

All LCS/LCSD acceptance criteria were met.

Detection Limits/Dilutions

MDLs and PQLs were properly reported in the data package. The sample was not diluted.

ICP Interference Check Sample (ICS A and AB) Analyses

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe and Mg in the field sample was < those in the ICS solutions. No sample data should be qualified as a result.

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria with the following exception.

The serial dilution percent difference for total Al was >10%. The associated sample result was a detect and should be **qualified J**.

Other QC

No other specific issues that affect data quality were identified.

ANALYTICAL QUALITY ASSOCIATES, INC.

Memorandum

Date: 06/05/2012

To: Gary Cottrell

From: Marcia Hilchey

Subject: Inorganic Data Review and Verification – USGS
Lot #: 280-28076-1
Laboratory: TestAmerica - Denver
Analysis: General Chemistry

Overview

The following table lists the sample included in the validation of Lot # 280-28076-1 that was prepared and analyzed using analytical methods listed in the table below.

Sample ID No.	Laboratory ID No.	Analytical Methods	Sample Matrix
MW02	280-28076-1	EPA 365.1 (total and dissolved P); EPA 350.1(ammonia); EPA 9056 (dissolved anions by IC); EPA353.2 (nitrate/nitrite); SM 2540C(total dissolved solids – TDS); EPA 9060 (total and dissolved inorganic carbon – TIC/ total and dissolved organic carbon – TOC); EPA 425.1 methylene blue active substances - MBAS)	Water

Data Qualifiers (See following sections for detailed explanations. If a sample is not listed, qualifications are not required.)

Sample 280-28076-1 The result for ammonia should be **qualified 2.15U** due to blank contamination.

Summary/General Comments

Data were reported for all required analytes.

This validation was performed according to the U.S. Department of Energy NNSA Service Center Model Data Validation Procedure (MDVP), Rev. 4.2.

See the attached Data Assessment Worksheets for supporting documentation on the data review and verification.

Sample Shipping/Receiving

All chain of custody, analysis request, and sample receipt documentation was complete and correct.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration QC acceptance criteria were met.

Blanks

No target analytes were detected in the blanks except as follows.

Total and dissolved P, ammonia, and total and dissolved TIC were detected in ICB/CCBs and/or method blanks associated with the sample at < PQL. The sample result for ammonia was a detect < 5X the associated blank concentration and should be **qualified 2.15U** at 5X the blank value. Sample results for total and dissolved P, and total and dissolved TIC were detects > 5X the highest associated blank concentration and should not be qualified.

Dissolved P was reported in the method blank at a negative value > MDL and < PQL. The associated sample result was a detect > 5X the MDL and should not be qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses for all reported analyses were performed on parent samples from another SDG, from an unknown client. The MS/MSD results were therefore not evaluated for these analyses. No sample data should be qualified as a result. LCS/LCSD analyses provided accuracy and precision data for the samples.

Laboratory Replicate

Laboratory replicate analyses were not performed. MS/MSD and LCS/LCSD results were evaluated for precision assessment. No sample data were qualified as a result.

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

The LCS/LCSD analyses met all QC acceptance criteria.

Detection Limits/Dilutions

MDLs and PQLs were properly reported in the data package. The sample was not diluted with the following exceptions. The sample was diluted 20X for chloride, and 2X for total P and dissolved P due to high analyte concentration.

Other QC

No other specific issues that affect data quality were identified.

Data Qualifier Definitions

The following data qualifiers and their definitions are applied in the MDVP data review process:

U	The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
J	The associated numerical value is an estimated quantity.
J+	The associated numerical value is an estimated quantity with a suspected positive bias.
J-	The associated numerical value is an estimated quantity with a suspected negative bias.
R	The data are unusable (analyte may or may not be present). Resampling and reanalysis are necessary for verification.
N	Presumptive evidence of the presence of the material.
NJ	Presumptive evidence of the presence of the material at an estimated quantity.
NJ+	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
NJ-	Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
UJ	The material was analyzed for but was not detected. The sample quantitation limit is an estimated quantity.

!"#$ $"()** +)+
%& ' $, ()*)* -

!"#%

622%0(	.		622. 0	)	)	#2#$	%153
3"%0(	+4.		3". 0	*6		!/#$	34$
$						#' 0*1	!
622$	)**	+-				/ ' 0*1	!
3"$	)**	+-					

6		, 27*!8	9:	%$!	, !
6	J-	4+		4	
6	UJ	$			)
60(		$		4)	)
. ;		+		4	
. ;		$		4)	
. 00		$			
. (00		$		4)	
. :		$		4	
. 0		$		)	)
. 7%<=8	UJ	$		)	
(2:(		$		-	)
0(		$		4	
0;		$		4)	
0(0		$		4)	
00		$			)
0:		$		4	
00		$			)
0		$		4)	
)0		$		)	
2 >$00		$		4	
2 >4$0""		$		4	
>$40""		$		-)	
>$0		$		4	
$0		$		4)	
>$0;		$		4	
>4$0;		$			
>)$0;		$		4	
$0(:0		$			)
> $00		$		))	
>$00		$			
> $00		$		)	
>$0""		$		4	
>4$0""		$		))	
>$0""		$		4	
> $0""		$		4	
$2""0		$		+	
<0	R	$		-	
<0;				4	
<00		$		+	)
<00		$		)	
?&0(		$			
?&		$		4)	
#(0		$		)	
#2	R	$		4	
#2""	UJ	$			
#2"":				4	

!"#$ $"()** +)+
%& ' $. ()*)* -

!"#%

622%0(	.		622. 0	)	)	#2#$	%153
3"%0(	+4.		3". 0	*6		!/#$	34$
$						#' 0*1	!
622$	)**	+-				/ ' 0*1	!
3"$	)**	+-					

6	, 27*!8	9:	%$!	, !
%0	$		4	
%00(	$		)	)
)%0"7%#. =8	$			
%00	$		+	
@A"@				)
"00			))	
.	$		4)	
. ;	$		)	
3";	4		4	
@			4	
"#2""	$		)	
2. ;	$		4)	
	$		4)	
B00	$			
. 0	⌡+ 4			
. ;	$		4	
› › ›B00	$		)	
› »B00	$		)	
B00	$		)	
B	-		4)	
2 ›$00	$		4	
2 ›4$0""	$		4	
»4B0;	$		)	
»)B0;	$		)	
› › B00	$		4	
› ›B00	$		+)	
B00	$		4	
B0:0	$		+	)
»4B0""	$			+
»)B0;	)		4	
›4›+B0;			4	
»4B0;	)+		+)	)
10(	$			
@2›B	4		4	)

	C,	9:	6"!2
). :; 78	-		
$:078	--		
›$00()78	-		
B(78	-		+

!"#$ $"()** +)+
%& ' $, ()')' –

!"#%

622%0(	.		622. 0	)	)	#2#$	%153	
3"%0(	+4.		3". 0	*6		!/#$	34$	
$						#' 0*1	!	
622$	)**	+–				/ ' 0*1	!	
3"$	)**	+–						

&' (! +, &-!.)*

2	6	, B	<2, 27*!8	9:
	. &0		$	
)–	3"	) 4		B
++	#2	)4	–	B
	DE	))		B
	DE	)++		B
)	. >0	+)		B
	DED	+	)	B
–	3	+		B
+–	>0		+)	B
+)4	? & 4	)		
	DE	)	–	B
	0&	+–		
	%00&	))	–+	
	. ; >00	44		B
	. ; >00		)	B

"/ +012212%

!"#$ $"()** +)+
%& ' $. ()*)* -

!"#%

622%0(	.		622. 0	)	)	#2#$	%153
3"%0(	+4.		3". 0	*6		!/#$	3$
$						#' 0*1	!
622$	)**	4-				/ ' 0*1	!
3"$	)**	4-					

6	, 27*!8	9:	%$!	, !
6 J-	)+		4	
6 UJ	$			)
. ;			4	
. ;	$		4)	
. 00	$			
. (00	$		4)	
. :	$		4	
. 0	$		)	)
.	$		4)	
. 7%<=8 UJ	$		)	
. 0 J+	4			
. ;	$		)	
2. ;	$		4)	
. ;	$		4	
(2:(	$		-	)
0(	$		4	
0;	$		4)	
0(0	$		4)	
00	$			)
0:	$		4	
00	$			)
60(	$		4)	)
0	$		4)	
)0	$		)	
>$40""	$		-)	
$0	$		4)	
>$0;	$		4	
>4$0;	$			
>)$0;	$		4	
$0(:0	$			)
> $00	$		))	
>$00	$			
2 >$00	$		4	
2 >$00	$		4	
> $00	$		)	
>$0""	$		4	
>4$0""	$		))	
>$0""	$		4	
2 >4$0""	$		4	
2 >4$0""	$		4	
> $0""	$		4	
<0 R	$		-	
B00	$			
<00	$		)	
<0;			4	
<00	$		+	)

"/ +012212%

!"#$ $"()** +)+
%& ' $. ()*)* -

!"#%

622%0(	.		622. 0	)	)	#2#$	%153	
3"%0(	+4.		3". 0	*6		!/ #$	3$	
$						#' 0*1	!	
622$	)**	4-				/ ' 0*1	!	
3"$	)**	4-						

6	, 27*!8	9:	%$!	, !
?&0(	$			
?&	$		4)	
#(0	$		)	
#2 R	$		4	
#2"" UJ	$			
#2"";;			4	
$2""0	$		+	
"#2""	$		)	
%0	$		4	
%00(	$		)	)
)%0"7%#. =8	$			
%00	$		+	
"00	-		))	
3";			4	
	$		4)	
> > >B00	$		)	
> >>B00	$		)	
B00	$		)	
B			4)	
>>4B0;	$		)	
>>)B0;	$		)	
> > B00	$		4	
> >B00	$		+)	
B00	$		4	
B0:0	$		+	)
>>4B0""	$			+
>>4B0;	)		+)	)
>>)B0;	+		4	
>4>+B0;	-		4	
10(	$			
@A"@				)
@	+		4	
@2>B	4		4	)
>$0	$		4	

	C,	9:	6"!2
>$00()78	-+		
B(78	-)		+
). :;78	-		
$:078	-		

"/ +012212%

!"#$ $"()** +)+
%& ' $, ()')' –

!"#%

622%0(	.		622. 0	)	)	#2#$	%153
3"%0(	+4.		3". 0	*6		!/#$	3$
$						#' 0*1	!
622$	)**	4–				/ ' 0*1	!
3"$	)**	4–					

&' (	!		+, &-!.	)3		
2	6			, B	<2, 27*!8	9:
)–	3"			) 4		B
++	#2			)4		B
–	.			)++		B
)	. >0			+		B
	DE6D			+	–	B
–	3			+–	)	B
–	3				++	B
+)4	?		&	)		
	DE			)	–	B
	0&			+–		
	%00&			))		
	. ;>00			44		B
	. ;>00				)	B
+–	. ;>0	>)(0		4	+	B

!"#$ $"()** +)+
%& ' $, ()*)* -

4' !"#%

622%0(		622. 0	---	#2#$	%5$
3"%0(	4+	3". 0		!/#$	4
$				#' 0*1	---!
622$	+** -			/ ' 0*1	!
3"$	)**			#1	+!

6	, 27*!8	9:	%$!	, !
6	$			
. ; 0	$		4	
. 2700&80	$		-	
. 2700&0	$		)	
. 2700&8"00	4		+	
. ; "00	$			)
$; :	$		-	)
$0"00	$		4	)
$0"00	$			)
$"00	$			)
$"00	$		4+	)
$"0	$			
?&0;	$			
?&0"(	$			+
?&00	$			
#2"0	$			
;	$			
2(0	$		-	
2(""	$		4+	
30"0	$			+
30	4			
3(	$			
>4$;	$			
>4>)>B0"0	$			+
>)>+B0"0	$		)+	
>)>B0"0	$		-	
>)$0"0	$		)	
>)$0"0			+	
>)$"0	$			4
>)$	$			
>$	$		-	
>)$;	$			
0"00	$			)
0"0	$			
4A)%0"0	)		+	
4>4;$0; (	$			+
4	$			
)>$0"0	$		)	+
%0"0	+		-	
	$			
"0	$		4-	
). "0"00	$		)4	
)040"0	$		)	
)0	$			
)0"0"00	$			
)	$			

4' !"#%

622%0(		622. 0	---	#2#$	%5$
3"%0(	4+	3". 0		!/#$	4
$				#' 0'1	---!
622$	+** -			/ ' 0'1	!
3"$	)**			#1	+!

6	, 27'!8	9:	%$!	, !
)"0	$			
6; ;	$		4	)
;	$		)4	)
2702""80	$			

	C,	9:	6"!2
/ "0	-4		+
30(+			+
; (+			)
/ "0	4		4
B"0( )	-		+

!"#$ $"()** +)+
%& ' $, ()')' –

4' !"#%

622%0(		622. 0	---	#2#$	%5$
3"%0(	4+	3". 0		!/#$	4
$				#' 0'1	---!
622$	+** –			/ ' 0'1	!
3"$	)**			#1	+!

&' (! +, &-!.)

2	6		, B	<2, 27'!8	9:
+–44	3>0				B
	DE		–	+	B
4	B		–	–	B
	DE		4	4	B
	DE		+	4	B
	DE		4	+	B
))	<0;		)	)	B
	DE		+		B
44	. ; >	>4(0			B
+–	0&>	0	4		B
	DE		–		B
+– 4	0&>40		4	4	B
))	. ; >	040	4 +	4	B
	. ; >	>4>+0	44–		B
+4	. ; >	>>40	4+	+	B
–	. ; (>0		)–4	4	B
	DE		+	))	B
	DE		–44		B

4' !"#%

622%0(		622. 0	–	#2#$	%5$
3"%0(	4+	3". 0		!/#$	$$
$	)			#' 0'1	---!
622$	+*–*	, B"	$!	/ ' 0'1	!
3"$	)**			#1	+!

6	, 27'!8	9:	%$!	, !
. ; (	–		)	

	C,	9:	6"!2
/ "0		$	+
30(+		$	+
; (+		$	)
/ "0	4	$	4
B"0( )	–	$	+

4' !"#%

622%0(		622. 0	-	#2#$	%5$
3"%0(	4+	3". 0		!/#$	$$
$	)			#' 0'1	---!
622$	+*-*	, B"	$!	/ ' 0'1	!
3"$	)**			#1	+!

&' (! +, &-!.

2	6		, B	<2, 27'!8	9:
	DE		+		B
	DE				B
4	B			4+	B
	DE		-	))	B
	DE		4	4	B
+-+) +	43»4(0		4	4	B
))	<0;		)	-	B
	DE		+		B
44	. ;>	»4(0	-		B
+-	0&»	0	4		B
+- 4	0&»40		4+	)	B
))	. ;>	040	4 +	+	B
	. ;»00		4	4	B
+4	. ;>	»40	44	)	B
	. ;»00		4+	))	B
	DE		)-	4	B
4	. ;(		)-	44	B
--)	. ;(»40		+		B
	DE		+	44	B
	DE		-4)	)	B

!"#$ $"()** +)+
%& ' $, ()*)* -

)*!1!"1%"#%

622%0(	+.		622. 0	-+	#2#$		5	
3"%0(	4+		3". 0	-	#' 0*1		--!	
$					/ ' 0*1		!	
622$	+*4*	4-			#1		!	
3"$	)**				, 2B"		3, #%6, H	

6		, 27*!8	9:	%$!		, !
$2, I 2J	K			44		+
		C,	9:		6"!2	
B"0					+ +	

!"#$ $"()** +)+
%& ' $, ()*)* -

)*#!1!6"#%

622%0(	+.		622. 0	-)	#2#$	15=
3"%0(	+4.			*6	#' 0*1	+!
$					/ ' 0*1	+!
622$	+* *	4			#1	+!
3"$	+* *	4			, 2B"	3, #%6, H

6 , 27*!8 9: %$! , !
2, I 27, I 8 +

C, 9: 6"!2
>>B: -

"/ +012212%

!"#$ $"()** +)+
%& ' $, ()*)* -

)*#!1!6"#%

622%0(	+.		622. 0		+	#2#$		15.
3"%0(	+4.			*6		#' 0*1		+!
$						/ ' 0*1		+!
622$	)**	+				#*1		+!
3"$	)**	+				, 2B"		3, #%6, H

6 , 27*!8 9: %$! , !
2, I 27, I 8 J+ +

C, 9: 6"!2
>>B: @

!"#$ $"()** +)+
%& ' $, ()*)* -

16)4*!!' #!!"#

622%0(	, = +	622. 0	-44	#2#$	15	
	*6		*6	#' 0*1	!	
$				/ ' 0*1	!	
622$	+* * ++			#1		
3"$	*6			, 2B"	3, #%6, H	

6	, 27*!8	9:	%$!	, !
%0	4		4-	-
<0	$			-
<0	)-			-

!"#$ $"()** +)+
%& ' $, ()*)* -

16)4*!!' #!!"#

622%0(	, = +	622. 0	-44	#2#$	15	
	*6		*6	#' 0*1	!	
$				/ ' 0*1	!	
622$	+* * ++			#1		
3"$	*6			, 2B"	<I $6, H	

6	, 27*!8	9:	%$!	, !	
%0	4		4-	-	
<0	$			-	

!"#$ $"()** +)+
%& ' $, ()*)* -

16)4*!!' #!!"#

622%0(, = + 622. 0 4) #2#$, =
*6 *6 #' 0*1 !
$ / ' 0*1 !
622$)*4*)) #1
3"$ *6 , 2B" 3, #%6, H

6 , 27*!8 9: , ! , !
3"

C, 9: 6"!2
› › B:0 -) +

4' !"#$%

622%0(	#%	622. 0	+-)	#2#$	%5/
3"%0(	4+	3". 0		!/ #$	/)$
$	)			#' 0*1	--!
622$	+*+*			/ ' 0*1	!
3"$	)**			#1	!

6		, 27*!8	9:	%$!	, !
. ; J<:0	UJ	$		)	)
. ; J<"	UJ	$			)
. ; J<0	UJ	$		4	)
. ; JD<:0	UJ	$			)
. ; J>0><	J	)	.	)	)
300	UJ	$		4-	)
60	UJ	$		+	)
$; 7>08 0	400UJ		.	-	)
02	UJ	$		4	)
6"00	UJ	$		))	)
6"00	J			)	)
/ 0	UJ	$			)
/	UJ	$			)
3	UJ	$		44	)
#(J >>4(<"	400UJ	+	.	+-	)
%0"00	J	4+		4	)
%0"00	J				)

	C,	9:	6"!2
/ "0		$	)
; (+	+)	$	)4
B"0( )	+	$	)

Form 1
ORGANIC ANALYSIS DATA SHEET
8015B

MW02 (280-28076-1)

Laboratory:	TestAmerica Austin		SDG:	AVE0007	
Client:	TestAmerica Denver		Project:	USGS	
Matrix:	Water	Laboratory ID:	AVE0007-01	File ID:	K-A0015-0
Sampled:	04/22/12 15:45	Prepared:	05/03/12 15:38	Analyzed:	05/03/12 23:29
Solids:		Preparation:	Direct Injection- GC	Initial/Final:	1 mL / 1 mL

Batch: 12E0053 Sequence: V000294 Calibration: A12D006 Instrument: GC11A

CAS NO.	COMPOUND	DILUTION	CONC. (mg/L)		Q
111-46-6	Diethylene glycol	1	25.0	UJ	U
107-21-1	Ethylene Glycol	1	25.0	UJ	U
57-55-6	Propylene glycol	1	25.0	UJ	U
112-27-6	Triethylene Glycol	1	25.0	UJ	U

SYSTEM MONITORING COMPOUND	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
Propargyl alcohol	100.0	104	104	70 - 130	

MLH
6/13/12

!"#$ $"()** +)+
%& ' $, ()')' –

)!"0%

622%0(. 622. 0 4) #2#$ %B5
3"%0(4 6 3". 0 !/#$ (+ 2
$ #' 0*1 +!
622$ +** + / ' 0*1 +!
3"$ +**)

6 , 27*!8 9: %$! , !
.)) 4+ 4+
%2
!0
322) 4
302"02) 4
( ) –
4
B
| >) +

622%0(. 622. 0 -- #2#$ %B5
3"%0(4 6 3". 0 !/#$ + 2
$ #' 0*1 +!
622$ +** / ' 0*1 +!
3"$ +**)

6 , 27*!8 9: %$! , !
6 J
)

)!"0%!!'

622%0(. 622. 0 +- #2#$ %B5+
3"%0(4+6 3". 0) !/#$ +6++ 2
$ #' 0*1 +!
622$ +**) / ' 0*1 +!
3"$ +* * +

6 , 27*!8 9: %$! , !
$22(6
$22(.))
$22(44 4+
$22(#)
$22(!0 +
$22(%2)–
$22(322 +) 4
$22( ) 4+ +
$22(( ) . –
$22(4
$22(B

!"#$ $"()** +)+
%& ' $, ()*)* -

!"O%

622%0(		622. 0	+	#2#$	%B5
3"%0(	46	3". 0		!/#$	4-%3!$
$				#' 0*1	+!
622$	+** -			/ ' 0*1	+!
3"$	+**				

6		, 27*!8	9:	%$!	, !
6	3.86U			)	
62	J+	-		44	+
.				-	
.		$			
(		$			
0		4+		+	
				+)	
""				+	
!(		)4			
%2		44		4	
%(		4		)	
D				4	
		$			+
	8.2U	+4		44	+
B0		$		+	
		$		+	
1(		+		+	+
L		4			

!"O%5!!'

622%0(		622. 0		#2#$	%B5
3"%0(	4+6	3". 0	+	!/#$	4%3!$
$				#' 0*1	+!
622$	+* *))			/ ' 0*1	+!
3"$	+* * +				

6		, 27*!8	9:	%$!	, !
$22(6	2.0U	4	M.	)	
$22(62		4		44	+
$22(.		+		-	
$22(.		$			
$22((		$			
$22(0		)+		+	
$22(	0.44U	+	.	+)	
$22(""		4		+	
$22(!(		$			
$22(%2		+		4	
$22(%(				)	
$22(D				4	
$22(		$			+
$22(		$		44	+
$22(B0		$		+	
$22(		$		+	
$22(1(				+	+

!"#$ $"()** +)+
%& ' $, ()')' -

!"O%6!!'

622%0(			622. 0			#2#$		%B5
3"%0(	4+6		3". 0		+	!/#$		4%3!$
$						#' 0*1		+!
622$	+* *	+4				/ ' 0*1		+!
3"$	+* *	+						

6 , 27*!8 9: %$! , !
$22(L)-

434"%

622%0(	)6		622. 0		4 +	#2#$		%B544
3"%0(	)6		3". 0	44		!/#$		+4&
$						#' 0*1		4!
622$	+*4*	4				/ ' 0*1		4!
3"$	+*4*	4						

6 , 27*!8 9: %$! , !
% UJ $

434"%6!!'

622%0(	)6		622. 0		4 +	#2#$		%B544
3"%0(	)6		3". 0	444		!/#$		+4&
$						#' 0*1		4!
622$	+*4*	-				/ ' 0*1		4!
3"$	+*4*	4						

6 , 27*!8 9: %$! , !
%>$22($

#7!

!"#$ $"()** +)+
%& ' $, ()*)* –

6 , 2 9 2 %$! , ! $ %0(

6 2.15U . *! 4+
622. 0 –+ 622$+*–* 4 4
2 $ *! – 4+4
622. 0 –– 622$+*–* 4 4
$22(302"02$22(+ *! 4+
622. 0 –+ 4 622$+* * ++
3". 0 – 3"$+** –
B302"02 4 . *! 4+
622. 0 –+ 4 622$+* * ++)
3". 0 – 3"$+** –
%0. 622 *!6)+
%' 4)
622. 04++ 622$)*)* 4)
0(>$22(+ *! + –+
622. 0 –+ 622$+* *)–
. (>$22(– *! –+
622. 0 –+ 622$+* * +4–
:>$22( ) *! 4 + –+
622. 0 –+ 622$+* * +4–
/ (>$22(*! + –+
622. 0 –+ 622$+* * +4–
$22(#) *! –
9($22(
622. 0 –+ + 622$+* * 4+
B#9(*! –
622. 0 –)– 622$+* *)4
$22(I 4 *! –
9($22(
622. 0) 622$+** +
BI 6 4 *! –
622. 0 4 622$+**)–
B$22((2 *! –) %+)
622. 0 622$)** +

VOC Result Recalculations for USGS Lot # 280-28076-1

EPA Method 8260B (Volatiles by GC/MS)

All sample results were calculated by instrument software.

Batch 280-117414 LCS %R for acetone = $\frac{M}{T}$ 100 $\frac{83.2}{80.0}$ 100 104% ; **correct**

where: M = measured value
T = true value

SVOC Result Recalculations for USGS Lot # 280-28076-1

EPA Method 8270C (Semivolatiles by GC/MS)

All sample results were calculated by instrument software.

Batch 117171 LCS %R for phenol = $\frac{M}{T}$ 100 $\frac{77.5}{80.0}$ 100 97% : **correct**

where: M = measured value
T = true value

DRO and GRO Result Recalculations for USGS Lot # 280-28076-1

EPA Method 8015B (DRO)

All sample results were calculated by instrument software.

Batch 117191 LCSD %R for DRO = $\frac{M}{T}$ 100 $\frac{2}{2}$ 100 100% ; **correct**

EPA Method 8015B (GRO)

All sample results were calculated by instrument software.

Batch 117914 LCS %R for GRO = $\frac{M}{T}$ 100 $\frac{114}{101}$ 100 113% : **correct**

where: M = measured value
T = true value

RSK-175 Result Recalculations for USGS Lot # 280-28076-1

EPA Method RSK-175 (dissolved gases and propane)

All sample results were calculated by instrument software.

Batch 177933 LCS %R for methane = $\frac{M}{T}$ 100 $\frac{67.1}{73.2}$ 100 92% ; **correct**

Batch 34676 LCSD %R for propane = $\frac{M}{T}$ 100 $\frac{134}{151}$ 100 89% ; **correct**

where: M = measured value
T = true value

PAH Result Recalculations for USGS Lot # 280-28076-1

EPA Method 8370C-SIM (PAH)

All sample results were calculated by instrument software.

Batch 118594 LCS %R for phenanthrene = $\frac{M}{T}$ 100 $\frac{887}{900}$ 100 99% ; **correct**

where: M = measured value
T = true value

ANALYTICAL QUALITY ASSOCIATES, INC.

Glycols Result Recalculations for USGS Lot # 280-28076-1

EPA Method 8015B (glycols)

All sample results were calculated by instrument software.

Batch 12E0053 LCS %R for ethylene glycol = $\frac{M}{T}$ 100 $\frac{407}{400}$ 100 102% ; **correct**

where: M = measured value
T = true value

ANALYTICAL QUALITY ASSOCIATES, INC.

Metals Result Recalculations for USGS Lot # 280-28076-1

EPA Method 6010B (metals by ICP)

All sample results were calculated by instrument software.

Batch 118834 LCS %R for boron = $\frac{M}{T}$ 100 $\frac{926}{1000}$ 100 93% ; **correct**

EPA Method 6020 (metals by ICP-MS)

All sample results were calculated by instrument software.

Batch 117880 LCS %R for dissolved cadmium = $\frac{M}{T}$ 100 $\frac{37.8}{40}$ 100 94% ; **correct**

EPA Method 7470A (mercury by CVAA)

All sample results were calculated by instrument software.

Batch 118315 LCSD %R for dissolved mercury = $\frac{M}{T}$ 100 $\frac{4.91}{5.00}$ 100 98% ; **correct**

where: M = measured value
T = true value

General Chemistry Result Recalculations for USGS Lot # 280-28076-1

EPA Method 350.1 (ammonia)

All sample results were calculated by instrument software.

Batch 119085 LCS %R for ammonia = $\frac{M}{T}$ 100 $\frac{5.14}{5.00}$ 100 103% ; **correct**

EPA Method 353.2 (nitrate/nitrite)

All sample results were calculated by instrument software.

Batch 119089 LCS %R for nitrate/nitrite = $\frac{M}{T}$ 100 $\frac{5.08}{5.00}$ 100 102% ; **correct**

EPA Method 365.1 (total and dissolved P)

All sample results were calculated by instrument software.

Batch 119330 LCS %R for dissolved P = $\frac{M}{T}$ 100 $\frac{40.5}{40.0}$ 100 101% ; **correct**

EPA Method 9056 (anions by IC)

All sample results were calculated by instrument software.

Batch 117895 LCS %R for dissolved chloride = $\frac{M}{T}$ 100 $\frac{24.9}{25.0}$ 100 100% ; **correct**

EPA Method 9060 (total and dissolved organic carbon/total and dissolved inorganic carbon)

All sample results were calculated by instrument software.

Batch 118783 LCS %R for total organic carbon = $\frac{M}{T}$ 100 $\frac{24.4}{25.0}$ 100 97% ; **correct**

Batch 119515 LCS %R for dissolved inorganic carbon = $\frac{M}{T}$ 100 $\frac{25.4}{25.0}$ 100 101% ; **correct**

SM Method 2540C (Total Dissolved Solids)

All sample results were calculated by instrument software.

Batch 117267 LCS %R for total dissolved solids = $\frac{M}{T}$ 100 $\frac{495}{501}$ 100 99% ; **correct**

It should be noted that hand-calculated sample results could not be verified for the TDS analysis due to a lack of raw data in the data package.

EPA Method 425.1 (methylene blue active substances - MBAS)

All sample results were calculated by instrument software.

Batch 235205 LCS %R for total dissolved solids = $\frac{M}{T}$ 100 $\frac{0.476}{0.500}$ 100 95% ; **correct**

It should be noted that hand-calculated sample results could not be verified for the MBAS analysis due to a lack of raw data in the data package.

where: M = measured value
T = true value

Organic Worksheet (GC/MS)

SDG #: 280-28076-1	Method: EPA 8260B (VOA)	Laboratory Sample IDs:
Matrix: Water	Batch #s: 280-117414	280-28076-1 (preserved) and -2 (unpreserved)
Tuning (pass/fail): pass	TICs Required? (yes/no) yes	

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	LCSD %R	LCS/ LCSD RPD		
	Int.	RF	RSD/ R^2	ICV/C CV %D										
Acetone				-41.3		NA		NA	NA	NA				
2-butanone	NA	0.0341				NA		NA	NA	NA				
ethanol	NA	0.0009				NA		NA	NA	NA				
Tert-butyl alcohol	NA	0.0059		25.2/		NA		NA	NA	NA				
acrylonitrile	NA	0.0273				NA		NA	NA	NA				
isobutanol	NA	0.0021				NA		NA	NA	NA				
isopropanol	NA	0.0055		/-32.1		NA		NA	NA	NA				

Surrogate Recovery Outliers

Sample ID						
None						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: MS/MSD other SDG, same matrix, unknown client
Sample TAL = 80 compounds; LCS and MS spikes: 67 compounds
linear ICAL conc. ratio on Y axis; (B)(IS conc 12.5) = conc y-intercept
Both samples diluted 20X (aliquot volume reduced)

Organic Worksheet (GC/MS)

SDG #: 280-28076-1	Method: SW846 8270C (SVOA)	Laboratory Sample IDs: 280-28076-1 and -DL
Matrix: Water	Batch #s: 119099	
Tuning (pass/fail): pass	TICs Required? (yes/no) yes	

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	LCSD %R	LCS/ LCSD RPD		
	Int.	RF	RSD/ R^2	ICV/CCV %D										
Benzyl alcohol	NA				0.528J	2.64		NA	NA	NA				
Bis(2-chloroisopropyl)ether	NA			/22.1		NA		NA	NA	NA				
4-nitrophenol	NA			/26.7		NA		NA	NA	NA				

Surrogate Recovery Outliers

Sample ID						
None						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
none												

Comments: MS/MSD other SDG, same matrix, unknown client linear ICAL conc. ratio on Y axis; (B)(IS conc 12.5) = conc y-intercept
Sample TAL: 51 cmpds; LCS and MS/MSD TAL: 45 cmpds

Organic Worksheet (GC/HPLC)

SDG #: 280-28076-1	Method: EPA 8015B (GRO and DRO)	Laboratory Sample IDs: 280-28076-1 (preserved) and 280-28076-2 (unpreserved, for GRO only)
Matrix: Water	Batch #s:	
Sample Cleanup: NA		

Analyte (outliers)	Calibration				Method Blank	5X Blank	LCS %R	MS %R*	MSD %R*	MS/MSD RPD*	LCS D %R	LCS/LCSD RPD
	Intercept	RSD/R^2	ICV/CCV %D	CCal RT								
GRO						NA		NA	NA	NA		
DRO	NA					NA		NA	NA	NA		

Surrogate Outliers

Sample ID	Surrogate	%R	Sample ID	Surrogate	%R	Sample ID	Surrogate	%R
280-28076-2 (GRO)	a,a,a-trifluorotoluene	117						

Comments: * MS/MSD from other SDG, same matrix, unknown client
GRO – reduced aliquot due to high conc. = 20X dilution DRO – slightly reduced aliquot due to low sample volume; slightly elevated DLs

Organic Worksheet (GC/HPLC)

SDG #: 280-28076-1	Method: RSK-175 (Dissolved Gases and Propane)	Laboratory Sample IDs: 280-28076-1
Matrix: Water	Batch #s: 117933 (dissolved gases) 34676 (propane)	
Sample Cleanup: NA		

Analyte (outliers)	Calibration (1 = front/primary column, 2 = back/confirm. column)								Method Blank	5X Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	LCS D %R	LCS/ LCSD RPD
	Intercept		RSD/R^2		ICV/CCV %D		CCal RT									
	1	2	1	2	1	2	1	2								
methane										NA		NA	NA	NA		
ethane	NA	NA								NA		NA	NA	NA		
propane	NA	NA								NA		NA	NA	NA		

Surrogate Outliers **

Sample ID	Surrogate	%R 1	%R 2	Sample ID	Surrogate	%R 1	%R 2	Sample ID	Surrogate	%R 1	%R 2
None											

Confirmation Outliers ^

Sample ID	Analyte	RPD	Sample ID	Analyte	RPD	Sample ID	Analyte	RPD
None								

Comments: * MS/MSD from other SDG, same matrix, unknown client
^ no confirmation for ethane due to coelution on one column
** surrogate analyzed for propane analysis only

Organic Worksheet (GC/MS)

SDG #: 280-28076-1	Method: SW846 8270C-SIM (PAH)	Laboratory Sample IDs:
Matrix: Water	Batch #s: 118594	280-28076-1
Tuning (pass/fail): pass	TICs Required? (yes/no) no	

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD				
	Int.	RF	RSD/ R^2	ICV/CCV %D										
Benzo(b)fluoranthene	NA				15.3J	76.5		NA	NA	NA				
Benzo(a)pyrene	NA				17.1J	85.5		NA	NA	NA				
Benzo(k)fluoranthene	NA				12.1J	60.5		NA	NA	NA				
Benzo(ghi)perylene	NA				41.2J	206		NA	NA	NA				
Dibenz(ah)anthracene	NA				44.6J	223		NA	NA	NA				
Fluoranthene	NA				25.8J	129		NA	NA	NA				
pyrene	NA				63.0J	315		NA	NA	NA				
Indeno(1,2,3-cd)pyrene	NA				30.0J	150		NA	NA	NA				

Surrogate Recovery Outliers*

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
none												

Comments: MS/MSD other SDG, same matrix. unknown client sample diluted 4X due to high conc. LCS missing 1- and 2-methylnaphthalene

*Surrogates not assessed due to sample dilution no measure of precision

Organic Worksheet (GC/HPLC)

SDG #: 280-28076-1	Method: EPA 8015B (glycols)	Laboratory Sample IDs: AVE0007-01
Matrix: Water	Batch #s: 12 E0053	
Sample Cleanup: NA		

Analyte (outliers)	Calibration				Method Blank	5X Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD		
	Intercept	RSD/R^2	ICV/CCV %D	CCal RT*								
none												

Surrogate Outliers none

Sample ID	Surrogate	%R		Sample ID	Surrogate	%R	Sample ID	Surrogate	%R	

Comments: MS/MSD from other SDG, same matrix, unknown client
No MSD or LCSD or replicate
*RT windows not reported

Inorganic Metals Worksheet

SDG #: 280-28076-1	Method(s): EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) & EPA 7470A (CVAA)	Laboratory Sample IDs: 280-28076-1
Matrix: Water	Batch #s: ICP 118834 total/117859 D; ICPMS 118058total /117880 D; CVAA 118315 total and D	
ICP-MS Mass Cal. (pass/fail): pass	ICP-MS Resolution (pass/fail): pass	

Analyte (outliers)	Calibration						Method Blank	5X Blank or (5X MDL)	LCS %R	MS %R	MS/MS D Rep. RPD	Serial Dil. %D	ICS AB %R	ICS A MDL	CRA/ CRI %R	LCS/ LCSD RPD			
	Int.	R^2	ICV	CCV	ICB	CCB													
Sb D	NA	NA			0.786	2.06	0.782	10.3		NA	NA	NA	NA	NA					
Na D	NA	NA				178	149	890		NA	NA	NA	NA	NA					
Co D	NA	NA					0.0800	0.4		NA	NA	NA	NA	NA					
Ba D	NA	NA						NA		NA	NA	NA	NA	NA	68				
As	NA	NA				0.344		1.72		NA	NA	NA	NA	NA	132				
Hg					-.049	-.047		(0.135)		NA	NA	NA	NA	NA					
Na	NA	NA				190		950					NA	NA					
Sb	NA	NA			0.772			3.86		NA	NA	NA	NA	NA					
Ag	NA	NA				1.64		8.2		NA	NA	NA	NA	NA					
Al	NA	NA						NA		NA	NA	16	NA	NA					

IS Outliers				IS Outliers			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				None			

Comments: D=dissolved QC parent from other SDG, same matrix, unknown client: ICPMS total; ICP D;ICPMS D; CVAA total; CVAA D Hg CRA reported in raw data only
All results < ICS spike Hg negative values not reported in blank summaries – in raw data only

General Chemistry Worksheet

SDG #: 280-28076-01	Matrix: Water	Laboratory Sample IDs: 280-28076-1
Method/Batch #s: EPA 365.1 (total and dissolved P); EPA 350.1 (Ammonia); EPA 9056 (dissolved anions by IC)		
Method/Batch #s: EPA 353.2 (Nitrate/Nitrite); SM 2540C (Total Dissolved Solids - TDS)		
Method/Batch #s: EPA 9060 (Total and Dissolved Inorganic Carbon - TIC/ total and Dissolved Organic Carbon) - TOC		
Method/Batch #s: EPA 425.1 (Methylene Blue Active Substances – MBAS)		

Analyte (outliers)	Calibration						Method Blank	5X Blank or (5X MDL)	LCS %R	MS %R	MSD %R	MS/ MSD RPD	Lab Rep. RPD	Partial/ Total RPD	LCSD %R	LCS/ LCSD RPD
	Int.	R^2	ICV	CCV	ICB	CCB										
Total P					2.30ug /l J	2.55ug /l J	2.33 ug/l J	12.75ug/l		NA	NA	NA	NA	NA		
Ammonia						0.031 mg/l J	0.430 mg/l J	2.15 mg/l		NA	NA	NA	NA	NA		
Dissolved P					2.30ug /l J	2.55ug /l J	-4.67ug/l	12.75ug/l/ **(9.0ug/l)**		NA	NA	NA	NA	NA		
TIC						0.419 mg/l J		2.1mg/l		NA	NA	NA	NA	NA		
Dissolved TIC						0.233 mg/l J		1.17mg/l		NA	NA	NA	NA	NA		

Comments: dilutions: Cl 20X; total and dissolved P 2X
MS/MSD parent from other SDG, same matrix. unknown client: ammonia; nitrate/nitrite; total and dissolved P: anions; total and dissolved TIC; total and dissolved TOC; MBAS
Negative blank values >MDL not reported in summaries; reported in raw data.