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NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Data Validation Report, and the Sample Location Report, SDG 320-35990

Naval Air Warfare Center Weapons Division China Lake
China Lake, California

November 2019

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
401 West A Street, Suite 1200
San Diego, 92021
ATTN: Mr. Robert Hunt

April 25, 2018

SUBJECT: NAWS China Lake, CTO 005, Data Validation

Dear Mr. Hunt,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on April 5, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #41853:

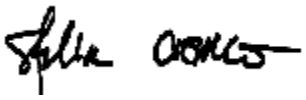
SDG #	Fraction
320-35549-1, 320-35589-1 320-35598-1, 320-35656-1 320-35659-1, 320-35777-1 320-35808-1, 320-35870-1 320-35893-1, 320-35894-1 320-35939-1, 320-35990-1 320-36021-1, 320-36025-1 320-36075-1, 320-36142-1 320-36082-1	Volatiles, Metals, Wet Chemistry, Gasoline Range Organics, Ethanol, Diesel Range Organics & Motor Oil Range Organics, Perfluorinated Alkyl Acids, Explosives, Perchlorate, Methane, Ethane, & Ethene

The data validation was performed under Level III & IV validation guidelines. The analyses were validated using the following documents and variances, as applicable to each method:

- Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California; November 2016
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0; July 2013
- USEPA National Functional Guidelines for Organic Superfund Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007, update V July 2014

Please feel free to contact us if you have any questions.

Sincerely,



Stella Cuenco
Operations Manager/Senior Chemist

26,670 pages-ADV (Wet & Methane Level III) Attachment 1

90/10 EDD

LDC #41853 (AECOM - San Diego,CA / NAWS China Lake, CTO 005)

LDC	SDG#	DATE REC'D	(2) DATE DUE	VOA (8260B)		D.Metals (6020A /7470A)		GRO (8260)		DRO MRO (8015B)		Ethanol (8015B)		Expl. (8330A)		PFAs (537)		Methane Ethane Ethene		CLO_4 (6850)																	
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	320-35549-1	04/05/18	04/19/18	12	0	10	0	-	-	-	-	-	-	-	-	-	-	10	0	-	-																
B	320-35589-1	04/05/18	04/19/18	7	0	7	0	-	-	-	-	-	-	-	-	-	-	7	0	-	-																
C	320-35598-1	04/05/18	04/19/18	3	0	2	0	-	-	-	-	-	-	-	-	-	-	2	0	-	-																
D	320-35656-1	04/05/18	04/19/18	10	0	10	0	-	-	-	-	-	-	-	-	-	-	10	0	-	-																
E	320-35659-1	04/05/18	04/19/18	8	0	-	-	7	0	-	-	-	-	-	-	-	-	-	-	-	-																
F	320-35777-1	04/05/18	04/19/18	10	0	-	-	9	0	-	-	-	-	-	-	-	-	-	-	-	-																
G	320-35808-1	04/05/18	04/19/18	6	0	5	0	5	0	-	-	5	0	-	-	-	-	5	0	-	-																
H	320-35870-1	04/05/18	04/19/18	0	0	4	0	4	0	-	-	9	0	-	-	-	-	11	0	-	-																
H	320-35870-1	04/05/18	04/19/18	12	0	7	0	7	0	-	-	2	0	-	-	-	-	0	0	-	-																
I	320-35893-1	04/05/18	04/19/18	4	0	3	0	3	0	-	-	3	0	-	-	-	-	3	0	-	-																
J	320-35894-1	04/05/18	04/19/18	8	0	-	-	8	0	8	0	-	-	-	-	-	-	-	-	-	-																
K	320-35939-1	04/05/18	04/19/18	8	0	-	-	7	0	7	0	-	-	-	-	-	-	-	-	-	-																
L	320-35990-1	04/05/18	04/19/18	7	0	-	-	6	0	3	0	-	-	-	-	4	0	-	-	-	-																
L	320-35990-1	04/05/18	04/19/18	0	0	-	-	0	0	3	0	-	-	-	-	1	0	-	-	-	-																
M	320-36021-1	04/05/18	04/19/18	5	0	5	0	5	0	5	0	-	-	-	-	-	-	-	-	-	-																
N	320-36025-1	04/05/18	04/19/18	2	0	1	0	-	-	-	-	-	-	1	0	-	-	-	-	1	0																
O	320-36075-1	04/05/18	04/19/18	2	0	1	0	1	0	1	0	-	-	-	-	-	-	-	-	-	-																
P	320-36142-1	04/05/18	04/19/18	6	0	5	0	-	-	-	-	-	-	3	0	-	-	-	-	3	0																
P	320-36142-1	04/05/18	04/19/18	0	0	0	0	-	-	-	-	-	-	2	0	-	-	-	-	2	0																
Q	320-36082-1	04/05/18	04/19/18	7	0	7	0	-	-	-	-	-	-	7	0	-	-	-	-	7	0																
Total	T/SC			117	0	67	0	62	0	27	0	19	0	13	0	5	0	48	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	371

Shaded cells indicates Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

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LDC #41853 (AECOM - San Diego,CA / NAWS China Lake, CTO 005)

LDC	SDG#	DATE REC'D	(2) DATE DUE	Alk. (2320B)		Cl,SO_4 $O\text{-}PO_4\text{-}P$ (9056A)		$NO_3\text{-}N$ $NO_2\text{-}N$ (9056A)		S= (9034)		TDS (2540C)		TSS (2540D)		TOC (9060A)																			
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	320-35549-1	04/05/18	04/19/18	10	0	10	0	10	0	-	-	-	-	-	-	-	-																		
B	320-35589-1	04/05/18	04/19/18	-	-	7	0	7	0	-	-	-	-	-	-	-	-																		
C	320-35598-1	04/05/18	04/19/18	2	0	2	0	2	0	-	-	-	-	-	-	-	-																		
D	320-35656-1	04/05/18	04/19/18	-	-	10	0	10	0	-	-	-	-	-	-	-	-																		
E	320-35659-1	04/05/18	04/19/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
F	320-35777-1	04/05/18	04/19/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
G	320-35808-1	04/05/18	04/19/18	5	0	5	0	5	0	-	-	-	-	-	-	-	-																		
H	320-35870-1	04/05/18	04/19/18	11	0	11	0	11	0	-	-	-	-	-	-	-	-																		
I	320-35893-1	04/05/18	04/19/18	3	0	3	0	3	0	-	-	-	-	-	-	-	-																		
J	320-35894-1	04/05/18	04/19/18	8	0	8	0	8	0	-	-	8	0	-	-	8	0																		
K	320-35939-1	04/05/18	04/19/18	7	0	7	0	7	0	-	-	7	0	-	-	7	0																		
L	320-35990-1	04/05/18	04/19/18	6	0	6	0	6	0	-	-	6	0	-	-	6	0																		
M	320-36021-1	04/05/18	04/19/18	5	0	5	0	5	0	5	0	5	0	5	0	5	0																		
O	320-36075-1	04/05/18	04/19/18	1	0	1	0	1	0	1	0	1	0	1	0	1	0																		
Total	T/SC			58	0	75	0	75	0	6	0	27	0	6	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	274

Shaded cells indicates Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35549-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW01-18A	320-35549-1	Water	01/30/18
RLS15-MW02-18A	320-35549-2	Water	01/30/18
RLS15-MW01-18A	320-35549-3	Water	01/30/18
RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
VSI15-MW02-18A	320-35549-5	Water	01/30/18
TT15-MW02-18A	320-35549-6	Water	01/30/18
TT15-MW05-18A	320-35549-7	Water	01/30/18
TT15-MW06-18A	320-35549-8	Water	01/30/18
TT15-MW03-18A	320-35549-9	Water	01/30/18
TT15-MW04-18A	320-35549-10	Water	01/30/18
TB-013020185-1	320-35549-11	Water	01/30/18
TB-013020185-2	320-35549-12	Water	01/30/18
RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35549-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/09/18	Vinyl acetate	20.9	All samples in SDG 320-35549-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples TB-013020185-1 and TB-013020185-2 were identified as trip blanks. No contaminants were found.

Sample EB-Area R-01312018 (from SDG 320-35598-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	2-Butanone Acetone	0.50 ug/L 5.3 ug/L	TT15-MW01-18A RLS15-MW02-18A RLS15-MW01-18A RLS15-MW01-P-18A VSI15-MW02-18A TT15-MW02-18A TT15-MW05-18A TT15-MW06-18A TT15-MW03-18A TT15-MW04-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
LCS/D 320-207775 (All samples in SDG 320-35549-1)	2-Hexanone 4-Methyl-2-pentanone	21 (≤20) 23 (≤20)	UJ (all non-detects) UJ (all non-detects)	P

X. Field Duplicates

Samples RLS15-MW01-18A and RLS15-MW01-P-18A were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %R, continuing calibration %D, and LCS/LCSD RPD, data were qualified as estimated in twelve samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35549-1

Sample	Compound	Flag	A or P	Reason (Code)
TT15-MW01-18A RLS15-MW02-18A RLS15-MW01-18A RLS15-MW01-P-18A VSI15-MW02-18A TT15-MW02-18A TT15-MW05-18A TT15-MW06-18A TT15-MW03-18A TT15-MW04-18A TB-013020185-1 TB-013020185-2	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
TT15-MW01-18A RLS15-MW02-18A RLS15-MW01-18A RLS15-MW01-P-18A VSI15-MW02-18A TT15-MW02-18A TT15-MW05-18A TT15-MW06-18A TT15-MW03-18A TT15-MW04-18A TB-013020185-1 TB-013020185-2	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)
TT15-MW01-18A RLS15-MW02-18A RLS15-MW01-18A RLS15-MW01-P-18A VSI15-MW02-18A TT15-MW02-18A TT15-MW05-18A TT15-MW06-18A TT15-MW03-18A TT15-MW04-18A TB-013020185-1 TB-013020185-2	2-Hexanone 4-Methyl-2-pentanone	UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (RPD) (L)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

LDC #: 41853A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35549-1 Level III Page: 1 of 2
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: M

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A MW	RSDs 15%, r² ICV ≤ 20%
IV.	Continuing calibration	MW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	MW	TB=11,12. EB=2B Area R-01312018(320-35598-
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	MW	LCS/B
X.	Field duplicates	ND	D=3+4
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT15-MW01-18A	320-35549-1	Water	01/30/18
2	RLS15-MW02-18A	320-35549-2	Water	01/30/18
3	RLS15-MW01-18A	320-35549-3	Water	01/30/18
4	RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
5	VSI15-MW02-18A	320-35549-5	Water	01/30/18
6	TT15-MW02-18A	320-35549-6	Water	01/30/18
7	TT15-MW05-18A	320-35549-7	Water	01/30/18
8	TT15-MW06-18A	320-35549-8	Water	01/30/18
9	TT15-MW03-18A	320-35549-9	Water	01/30/18
10	TT15-MW04-18A	320-35549-10	Water	01/30/18
11	TB-013020185-1	320-35549-11	Water	01/30/18
12	TB-013020185-2	320-35549-12	Water	01/30/18
13	RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18

LDC #: 41853A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35549-1 Level III Page: 2 of 2
Laboratory: Test America, Inc. Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

	Client ID	Lab ID	Matrix	Date
14	RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
15				
16				
17				
18				
19				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41858A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	2	23.6	All (ND)	Y/N/A (C)

ICVvoa.wpd

LDC #: 41853A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	7/9/18	H020901	HH	20.9		All (N/D)	Y/N/A (c)

CONCAL.1SB

LDC #: 41853A1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: FC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 1/31/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35598-1) Associated Samples: 1-10 (F)

Compound	Blank ID	Sample Identification								
	FB-Area R-01312018	10X								
M	0.50	5								
F	5.3	53								

LDC #: 41853A1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-207775		2	( )	( )	21 (≤20)	All (ND)	Y/UJ/A (L)
			Y	( )	( )	23 (√)		√
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35549-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW01-18A	320-35549-1	Water	01/30/18
RLS15-MW02-18A	320-35549-2	Water	01/30/18
RLS15-MW01-18A	320-35549-3	Water	01/30/18
RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
VSI15-MW02-18A	320-35549-5	Water	01/30/18
TT15-MW02-18A	320-35549-6	Water	01/30/18
TT15-MW05-18A	320-35549-7	Water	01/30/18
TT15-MW06-18A	320-35549-8	Water	01/30/18
TT15-MW03-18A	320-35549-9	Water	01/30/18
TT15-MW04-18A	320-35549-10	Water	01/30/18
RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Copper	0.807 ug/L	RLS15-MW01-18A RLS15-MW01-P-18A VSI15-MW02-18A TT15-MW02-18A TT15-MW05-18A TT15-MW06-18A TT15-MW03-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RLS15-MW01-18A	Copper	1.0 ug/L	1.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
RLS15-MW01-P-18A	Copper	1.2 ug/L	1.2U ug/L
TT15-MW02-18A	Copper	2.3 ug/L	2.3U ug/L
TT15-MW03-18A	Copper	1.1 ug/L	1.1U ug/L
TT15-MW04-18A	Copper	1.5 ug/L	1.5U ug/L

VI. Field Blanks

Sample EB-Area R-01312018 (from SDG 320-35598-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	Calcium Copper Sodium	220 ug/L 0.82 ug/L 200 ug/L	All samples in SDG 320-35549-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TT15-MW01-18A	Copper	1.8 ug/L	1.8U ug/L
RLS15-MW02-18A	Copper	3.6 ug/L	3.6U ug/L
RLS15-MW01-18A	Copper	1.0 ug/L	1.0U ug/L
RLS15-MW01-P-18A	Copper	1.2 ug/L	1.2U ug/L
TT15-MW02-18A	Copper	2.3 ug/L	2.3U ug/L
TT15-MW03-18A	Copper	1.1 ug/L	1.1U ug/L
TT15-MW04-18A	Copper	1.5 ug/L	1.5U ug/L

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
RLS15-MW01-18AMS/MSD (RLS15-MW01-18A)	Potassium	85 (87-115)	-	J (all detects)	A

For RLS15-MW01-18AMS/MSD, no data were qualified for Potassium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples RLS15-MW01-18A and RLS15-MW01-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS15-MW01-18A	RLS15-MW01-P-18A	
Iron	210	160	27 (≤25)
Aluminum	140	110	24 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS15-MW01-18A	RLS15-MW01-P-18A	
Arsenic	330	330	0 (≤25)
Barium	75	75	0 (≤25)
Copper	1.0	1.2	18 (≤25)
Calcium	48000	49000	2 (≤25)
Magnesium	16000	16000	0 (≤25)
Manganese	35	36	3 (≤25)
Molybdenum	62	62	0 (≤25)
Potassium	38000	39000	3 (≤25)
Sodium	1100000	1100000	0 (≤25)

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to MS/MSD %R, data were qualified as estimated in one sample.

Due to laboratory blank contamination, data were qualified as not detected in five samples.

Due to equipment blank contamination, data were qualified as not detected in seven samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35549-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS15-MW01-18A	Potassium	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35549-1

Sample	Analyte	Modified Final Concentration	A or P	Code
RLS15-MW01-18A	Copper	1.0U ug/L	A	B
RLS15-MW01-P-18A	Copper	1.2U ug/L	A	B
TT15-MW02-18A	Copper	2.3U ug/L	A	B
TT15-MW03-18A	Copper	1.1U ug/L	A	B
TT15-MW04-18A	Copper	1.5U ug/L	A	B

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35549-1

Sample	Analyte	Modified Final Concentration	A or P	Code
TT15-MW01-18A	Copper	1.8U ug/L	A	F
RLS15-MW02-18A	Copper	3.6U ug/L	A	F
RLS15-MW01-18A	Copper	1.0U ug/L	A	F
RLS15-MW01-P-18A	Copper	1.2U ug/L	A	F
TT15-MW02-18A	Copper	2.3U ug/L	A	F
TT15-MW03-18A	Copper	1.1U ug/L	A	F
TT15-MW04-18A	Copper	1.5U ug/L	A	F

LDC #: 41853A4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

SDG #: 320-35549-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: 43

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	EB = EB-Area A-01312018 From 320-35598-1
VII.	Matrix Spike/Matrix Spike Duplicates	SW	
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(3,4)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT15-MW01-18A	320-35549-1	Water	01/30/18
2	RLS15-MW02-18A	320-35549-2	Water	01/30/18
3	RLS15-MW01-18A	320-35549-3	Water	01/30/18
4	RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
5	VSI15-MW02-18A	320-35549-5	Water	01/30/18
6	TT15-MW02-18A	320-35549-6	Water	01/30/18
7	TT15-MW05-18A	320-35549-7	Water	01/30/18
8	TT15-MW06-18A	320-35549-8	Water	01/30/18
9	TT15-MW03-18A	320-35549-9	Water	01/30/18
10	TT15-MW04-18A	320-35549-10	Water	01/30/18
11	RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
12	RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
13				
14				

Notes:

LDC #: 41853A4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
QC		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
11,12	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853A4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 3 - 9

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Level	3	4	6	9	10				
Cu			0.807	4.035	1.0 B	1.2 B	2.3 B	1.1 B	1.5 B				

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 41853A4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: M

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 1/31/18 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification											
	EB-Area R-01312018	Action Limit	1	2	3	4	6	9	10				
Ca	220	1100											
Cu	0.82	4.1	1.8 F	3.6 F	1.0 F	1.2 F	2.3 F	1.1 F	1.5 F				
Na	200	1000											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JB
2nd Reviewer: [signature]

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	(11,12)	S	K	85 (87-115)			3	J/UJ/A (Det) (Q)

Comments: (11,12); Na > 4x

LDC#: 41853A4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JB
2nd Reviewer: A

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	3	4	
Iron	210	160	27
Aluminum	140	110	24
Arsenic	330	330	0
Barium	75	75	0
Copper	1.0	1.2	18
Calcium	48000	49000	2
Magnesium	16000	16000	0
Manganese	35	36	3
Molybdenum	62	62	0
Potassium	38000	39000	3
Sodium	1100000	1100000	0

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853A4a.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35549-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW01-18A	320-35549-1	Water	01/30/18
RLS15-MW02-18A	320-35549-2	Water	01/30/18
RLS15-MW01-18A	320-35549-3	Water	01/30/18
RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
VSI15-MW02-18A	320-35549-5	Water	01/30/18
TT15-MW02-18A	320-35549-6	Water	01/30/18
TT15-MW05-18A	320-35549-7	Water	01/30/18
TT15-MW06-18A	320-35549-8	Water	01/30/18
TT15-MW03-18A	320-35549-9	Water	01/30/18
TT15-MW04-18A	320-35549-10	Water	01/30/18
RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
RLS15-MW01-18ADUP	320-35549-3DUP	Water	01/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Area R-01312018 (from SDG 320-35598-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	Chloride Sulfate	0.14 mg/L 0.21 mg/L	All samples in SDG 320-35549-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples RLS15-MW01-18A and RLS15-MW01-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	RLS15-MW01-18A	RLS15-MW01-P-18A	
Chloride	1500 mg/L	1400 mg/L	7 (≤25)
Orthophosphate as P	0.51 mg/L	0.47 mg/L	8 (≤25)
Sulfate	380 mg/L	370 mg/L	3 (≤25)
Bicarbonate alkalinity	280000 ug/L	280000 ug/L	0 (≤25)

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

LDC #: 41853A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35549-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: MC

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

bicarbonate

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-Area R-01312018 From 320-35548-1
VI.	Matrix Spike/Matrix Spike Duplicates	A	(11, 12)
VII.	Duplicate sample analysis	A	13
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	(3, 4)
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT15-MW01-18A	320-35549-1	Water	01/30/18
2	RLS15-MW02-18A	320-35549-2	Water	01/30/18
3	RLS15-MW01-18A	320-35549-3	Water	01/30/18
4	RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
5	VSI15-MW02-18A	320-35549-5	Water	01/30/18
6	TT15-MW02-18A	320-35549-6	Water	01/30/18
7	TT15-MW05-18A	320-35549-7	Water	01/30/18
8	TT15-MW06-18A	320-35549-8	Water	01/30/18
9	TT15-MW03-18A	320-35549-9	Water	01/30/18
10	TT15-MW04-18A	320-35549-10	Water	01/30/18
11	RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
12	RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
13	RLS15-MW01-18ADUP	320-35549-3DUP	Water	01/30/18
14				
15				

Notes:

DC #: 41853A

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Parameter
1-10	pH TDS (Cl) F (NO3) (NO2) (SO4) (O-PO4) (Alk) CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
⊖e	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
11,12	pH TDS (Cl) F (NO3) (NO2) (SO4) (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
13	pH TDS Cl F NO3 NO2 SO4 O-PO4 (Alk) CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 41853A6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 1/31/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-Area R-01312018									
Chloride	0.14	0.7								
Sulfate	0.21	1.05								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 41853A6 **VALIDATION FINDINGS WORKSHEET** Page: 1 of 1
Field Duplicates Reviewer: JB
2nd Reviewer:

Inorganics, Method: see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	3	4		
Chloride	1500	1400	7	
Orthophosphate as P	0.51	0.47	8	
Sulfate	380	370	3	
Bicarbonate Alkalinity (ug/L)	280000	280000	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853A6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35549-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW01-18A	320-35549-1	Water	01/30/18
RLS15-MW02-18A	320-35549-2	Water	01/30/18
RLS15-MW01-18A	320-35549-3	Water	01/30/18
RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
VSI15-MW02-18A	320-35549-5	Water	01/30/18
TT15-MW02-18A	320-35549-6	Water	01/30/18
TT15-MW05-18A	320-35549-7	Water	01/30/18
TT15-MW06-18A	320-35549-8	Water	01/30/18
TT15-MW03-18A	320-35549-9	Water	01/30/18
TT15-MW04-18A	320-35549-10	Water	01/30/18
RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
RLS15-MW01-18ADUP	320-35549-3DUP	Water	01/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%. for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Area R-01312018 (from SDG 320-35598-1) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
RLS15-MW01-18AMS/MSD (RLS15-MW01-18A)	Ethane Ethene	35 (≤20) 31 (≤20)	NA	-
RLS15-MW01-18AMS/MSD (RLS15-MW01-18A)	Methane	39 (≤20)	J (all detects)	A

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

Samples RLS15-MW01-18A and RLS15-MW01-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/L)		RPD (Limits)
	RLS15-MW01-18A	RLS15-MW01-P-18A	
Methane	8.4	11	27 (≤25)

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD RPD, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35549-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS15-MW01-18A	Methane	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (E)

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35549-1

No Sample Data Qualified in this SDG

LDC #: 41853A51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35549-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: M

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	~~RSD~~ ≤ 20% ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB-Area R-01/20/18 (320-35598-1)
VI.	Matrix spike/Matrix spike duplicates /DUP	SW/A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	SW	D = 3+4
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT15-MW01-18A	320-35549-1	Water	01/30/18
2	RLS15-MW02-18A	320-35549-2	Water	01/30/18
3	RLS15-MW01-18A	320-35549-3	Water	01/30/18
4	RLS15-MW01-P-18A	320-35549-4	Water	01/30/18
5	VSI15-MW02-18A	320-35549-5	Water	01/30/18
6	TT15-MW02-18A	320-35549-6	Water	01/30/18
7	TT15-MW05-18A	320-35549-7	Water	01/30/18
8	TT15-MW06-18A	320-35549-8	Water	01/30/18
9	TT15-MW03-18A	320-35549-9	Water	01/30/18
10	TT15-MW04-18A	320-35549-10	Water	01/30/18
11	RLS15-MW01-18AMS	320-35549-3MS	Water	01/30/18
12	RLS15-MW01-18AMSD	320-35549-3MSD	Water	01/30/18
13	RLS15-MW01-18ADUP	320-35549-3DUP	Water	01/30/18
14				
15				
16				
17				
18				

LDC #: 41853A5

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1C

METHOD: / **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
(Y) N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y (N) N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	12/11	Ethane	( )	( )	35 (≤20)	3 (ND)	Lots/A
		Ethene	( )	( )	31 ( )	↓	
		Methane	( )	( )	39 ( )	(Lots)	↓
			( )	( )	( )		
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LDC#: 41853A51

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: 1

METHOD: GC (Method RSK-175)

Compound	Concentration (mg/L)		(≤25) RPD
	3	4	
Methane	8.4	11	27

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853A51_AECOM.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35589-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW05-18A	320-35589-1	Water	01/31/18
RLS13-MW01-18A	320-35589-2	Water	01/31/18
RLS13-MW03-18A	320-35589-3	Water	01/31/18
TT68-MW01-18A	320-35589-4	Water	01/31/18
TT68-MW02-18A	320-35589-5	Water	01/31/18
MK69-MW01-18A	320-35589-6	Water	01/31/18
TT68-MW03-18A	320-35589-7	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
TT68-MW03-18A	All compounds	A headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	J (all detects) UJ (all non-detects)	A

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35589-1	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/09/18	Vinyl acetate	20.9	RLS13-MW05-18A RLS13-MW01-18A RLS13-MW03-18A TT68-MW01-18A TT68-MW02-18A	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds with the exception of Vinyl acetate. Since no samples were analyzed after this calibration, no data were qualified.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-01312018 (from SDG 320-35598-1) was identified as a trip blank. No contaminants were found.

Sample EB-Michelson-02012018 (from SDG 320-35656-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Michelson-02012018	02/01/18	2-Butanone Acetone	0.80 ug/L 5.8 ug/L	All samples in SDG 320-35589-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS13-MW03-18A	Acetone	2.5 ug/L	2.5U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
LCS/D 320-207775 (RLS13-MW05-18A RLS13-MW01-18A RLS13-MW03-18A TT68-MW01-18A TT68-MW02-18A)	2-Hexanone 4-Methyl-2-pentanone	21 (≤20) 23 (≤20)	UJ (all non-detects) UJ (all non-detects)	P

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to headspace, ICV %D, continuing calibration %D, and LCS/LCSD RPD, data were qualified as estimated in seven samples.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35589-1

Sample	Compound	Flag	A or P	Reason (Code)
TT68-MW03-18A	All compounds	J (all detects) UJ (all non-detects)	A	Sample condition (headspace) (V)
RLS13-MW05-18A RLS13-MW01-18A RLS13-MW03-18A TT68-MW01-18A TT68-MW02-18A MK69-MW01-18A TT68-MW03-18A	2-Hexanone	J (all detects) UJ (all non-detects)	A	Initial calibration verification (%D) (C)
RLS13-MW05-18A RLS13-MW01-18A RLS13-MW03-18A TT68-MW01-18A TT68-MW02-18A	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)
RLS13-MW05-18A RLS13-MW01-18A RLS13-MW03-18A TT68-MW01-18A TT68-MW02-18A	2-Hexanone 4-Methyl-2-pentanone	UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (RPD) (L)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35589-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS13-MW03-18A	Acetone	2.5U ug/L	A	F

LDC #: 41853B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35589-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: A
2nd Reviewer: M

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	RSD≤15% or r² ICV=20%
IV.	Continuing calibration	SW	CCV=20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB-Nicholson-020120 18 (320-35656-1), TB-01312018 (320-35598-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS13-MW05-18A	320-35589-1	Water	01/31/18
2	RLS13-MW01-18A	320-35589-2	Water	01/31/18
3	RLS13-MW03-18A	320-35589-3	Water	01/31/18
4	TT68-MW01-18A	320-35589-4	Water	01/31/18
5	TT68-MW02-18A	320-35589-5	Water	01/31/18
6	MK69-MW01-18A	320-35589-6	Water	01/31/18
7	TT68-MW03-18A	320-35589-7	Water	01/31/18
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: 9
2nd Reviewer: A

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?
Y N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
7 (dbfm(1))	Headspace		bubbles > 6mm				J (all detects) A *V

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: DC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	All (ND)	Y/N/A (CC)

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	1/9/18	H020901	HH	20.9		1-5. MB (ND)	J (all det.) / A (ND)
	2/10/18	H021004 (2nd ig.)	HH	57.7		6-7. MB	No Qual

CONCAL.1SB

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/1/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35598-1) Associated Samples: All (F)

Compound	Blank ID	Sample Identification								
	EB-Michelson-02012018	10X	3							
M	0.80	8								
F	5.8	58	2.5/U							

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: DC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-207775		2	( )	( )	21 (≤20)	1-5. MB (ND)	J+ (all detects) UJ (all non-detects)
			4	( )	( )	23 (V)		↓
				( )	( )	( )		
				( )	( )	( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35589-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW05-18A	320-35589-1	Water	01/31/18
RLS13-MW01-18A	320-35589-2	Water	01/31/18
RLS13-MW03-18A	320-35589-3	Water	01/31/18
TT68-MW01-18A	320-35589-4	Water	01/31/18
TT68-MW02-18A	320-35589-5	Water	01/31/18
MK69-MW01-18A	320-35589-6	Water	01/31/18
TT68-MW03-18A	320-35589-7	Water	01/31/18
RLS13-MW05-18AMS	320-35589-1MS	Water	01/31/18
RLS13-MW05-18AMSD	320-35589-1MSD	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Sodium	57.4 ug/L	All samples SDG 320-35589-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

Sample EB-Michelson-02012018 (from SDG 320-35656-1) was identified as an equipment blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For RLS13-MW05-18AMS/MSD, no data were qualified for Sodium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

LDC #: 41853B4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

SDG #: 320-35589-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: JB

2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	ND	FB = EB-Michelson - 02012018 From 320-35454-1
VII.	Matrix Spike/Matrix Spike Duplicates	A	(8,9); Na >4X
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS13-MW05-18A	320-35589-1	Water	01/31/18
2	RLS13-MW01-18A	320-35589-2	Water	01/31/18
3	RLS13-MW03-18A	320-35589-3	Water	01/31/18
4	TT68-MW01-18A	320-35589-4	Water	01/31/18
5	TT68-MW02-18A	320-35589-5	Water	01/31/18
6	MK69-MW01-18A	320-35589-6	Water	01/31/18
7	TT68-MW03-18A	320-35589-7	Water	01/31/18
8	RLS13-MW05-18AMS	320-35589-1MS	Water	01/31/18
9	RLS13-MW05-18AMSD	320-35589-1MSD	Water	01/31/18
10				
11				
12				
13				
14				

Notes:

LDC #: 41853B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	W	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo) B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
DC		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
8, 9	W	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo) B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		~~Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,~~

Comments: Mercury by CVAA if performed

LDC #: 41853B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

Soil preparation factor applied: NA
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (mg/l)	Action Level									
Na		57.4		287									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35589-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW05-18A	320-35589-1	Water	01/31/18
RLS13-MW01-18A	320-35589-2	Water	01/31/18
RLS13-MW03-18A	320-35589-3	Water	01/31/18
TT68-MW01-18A	320-35589-4	Water	01/31/18
TT68-MW02-18A	320-35589-5	Water	01/31/18
MK69-MW01-18A	320-35589-6	Water	01/31/18
TT68-MW03-18A	320-35589-7	Water	01/31/18
RLS13-MW05-18AMS	320-35589-1MS	Water	01/31/18
RLS13-MW05-18AMSD	320-35589-1MSD	Water	01/31/18
MK69-MW01-18AMS	320-35589-6MS	Water	01/31/18
MK69-MW01-18AMSD	320-35589-6MSD	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H	Holding times were exceeded.
S	The sequence or number of standards used for the calibration was incorrect.
C	Correlation coefficient is <0.995.
R	%R for calibration is not within control limits
B	Presumed contamination from preparation (method) blank or calibration blank
L	Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits
Q	MS/MSD recovery was poor.
E	MS/MSD or Duplicate RPD or difference was high.
I	ICP ICS results were unsatisfactory.
A	ICP Serial Dilution %D were not within control limits
F	Presumed contamination from FB or ER.
D	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Post Digestion Spike recovery was not within control limits
V	Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Michelson-02012018 (from SDG 320-35656-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Michelson-02012018	02/01/18	Chloride	0.13 mg/L	All samples in SDG 320-35589-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

LDC #: 41853B6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-35589-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JB
2nd Reviewer: M

METHOD: (Analyte) Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-Michelson-02012018 From 320-35654-1
VI.	Matrix Spike/Matrix Spike Duplicates	A	(8,9) (10,11)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	RLS13-MW05-18A	320-35589-1	Water	01/31/18
2	RLS13-MW01-18A	320-35589-2	Water	01/31/18
3	RLS13-MW03-18A	320-35589-3	Water	01/31/18
4	TT68-MW01-18A	320-35589-4	Water	01/31/18
5	TT68-MW02-18A	320-35589-5	Water	01/31/18
6	MK69-MW01-18A	320-35589-6	Water	01/31/18
7	TT68-MW03-18A	320-35589-7	Water	01/31/18
8	RLS13-MW05-18AMS	320-35589-1MS	Water	01/31/18
9	RLS13-MW05-18AMSD	320-35589-1MSD	Water	01/31/18
10	MK69-MW01-18AMS	320-35589-6MS	Water	01/31/18
11	MK69-MW01-18AMSD	320-35589-6MSD	Water	01/31/18
12				
13				
14				
15				

Notes:

DC #: 41853B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: A

All circled methods are applicable to each sample.

Sample ID	Parameter
1-7	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
8,9	pH TDS Cl F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
10, 11	pH TDS (Cl) F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments: _____

LDC #: 41853B6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 2/1/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-Michelson-0212018									
Chloride	0.13	0.65								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35589-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW05-18A	320-35589-1	Water	01/31/18
RLS13-MW01-18A	320-35589-2	Water	01/31/18
RLS13-MW03-18A	320-35589-3	Water	01/31/18
TT68-MW01-18A	320-35589-4	Water	01/31/18
TT68-MW02-18A	320-35589-5	Water	01/31/18
MK69-MW01-18A	320-35589-6	Water	01/31/18
TT68-MW03-18A	320-35589-7	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
RLS13-MW05-18A	All compounds	A headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	UJ (all non-detects)	A

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Michelson-02012018 (from SDG 320-35656-1) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to headspace, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35589-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS13-MW05-18A	All compounds	UJ (all non-detects)	A	Sample condition (headspace) (V)

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35589-1

No Sample Data Qualified in this SDG

LDC #: 41853B51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18

SDG #: 320-35589-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW/A	
II.	Initial calibration/ICV	A/A	RSD≤20%. r^2 ICV≤20%
III.	Continuing calibration	A	CCV≤20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB-Nicholson-020/2018 (320-35656-1)
VI.	Matrix spike/Matrix spike duplicates	N	CS
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	N	
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS13-MW05-18A	320-35589-1	Water	01/31/18
2	RLS13-MW01-18A	320-35589-2	Water	01/31/18
3	RLS13-MW03-18A	320-35589-3	Water	01/31/18
4	TT68-MW01-18A	320-35589-4	Water	01/31/18
5	TT68-MW02-18A	320-35589-5	Water	01/31/18
6	MK69-MW01-18A	320-35589-6	Water	01/31/18
7	TT68-MW03-18A	320-35589-7	Water	01/31/18
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 41853B5 /

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: Q
2nd Reviewer: AC

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: __GC__ HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1 (ND)	Headspace, bubbles			>6mm			J (all ND)

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35598-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-18A	320-35598-1	Water	01/31/18
EB-Area R-01312018	320-35598-2	Water	01/31/18
TB-01312018	320-35598-3	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35598-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds with the exception of Vinyl acetate. Since no samples were analyzed after this calibration, no data were qualified.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-01312018 was identified as a trip blank. No contaminants were found.

Sample EB-Area R-01312018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	2-Butanone Acetone	0.50 ug/L 5.3 ug/L	RLS15-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
RLS15-MW03-18A	1,2-Dichloroethane-d4	134 (81-118)	All compounds	J (all detects)	P

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and surrogate %R, data were qualified as estimated in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35598-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS15-MW03-18A EB-Area R-01312018 TB-01312018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
RLS15-MW03-18A	All compounds	J (all detects)	P	Surrogates (%R) (S)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

LDC #: 41853C1

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/11/18

SDG #: 320-35598-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer:

2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / SW	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB = 2. TB = 3
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS15-MW03-18A	320-35598-1	Water	01/31/18
2	EB-Area R-01312018	320-35598-2	Water	01/31/18
3	TB-01312018	320-35598-3	Water	01/31/18
4				
5				
6				
7				
8				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853c1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AR

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?
Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	2	23.6	All (No)	J N/A (C)

ICVvoa.wpd

LDC #: 41853C1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	2/10/18	H02100 4 (Endrin)	HH	ET.T		All	Text

LDC #: 41853C1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 4
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 1/31/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35598-1) Associated Samples: 1 ~~16~~ (F)

Compound	Blank ID	Sample Identification								
	FB-Area R-01312018	10X								
M	0.50	5								
F	5.3	53								

LDC #: 41853c1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: 9
2nd Reviewer: DC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y (N) N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications (S)
		1	DCE	134 (81-118)	vlots (det)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene
(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35598-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-18A	320-35598-1	Water	01/31/18
EB-Area R-01312018	320-35598-2	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Sodium	57.4 ug/L	All samples in SDG 320-35598-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-Area R-01312018	Sodium	200 ug/L	200U ug/L

VI. Field Blanks

Sample EB-Area R-01312018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	Calcium Copper Sodium	220 ug/L 0.82 ug/L 200 ug/L	RLS15-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35598-1

Sample	Analyte	Modified Final Concentration	A or P	Code
EB-Area R-01312018	Sodium	200U ug/L	A	B

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

LDC #: 41853C4a

SDG #: 320-35598-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/12/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: AC

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A ~~A~~	
II.	ICP/MS Tune	~~A~~	
III.	Instrument Calibration	~~A~~	
IV.	ICP Interference Check Sample (ICS) Analysis	~~A~~	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	EB = 2
VII.	Matrix Spike/Matrix Spike Duplicates	N	C-S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	~~A~~	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	~~A~~	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	~~A~~	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS15-MW03-18A	320-35598-1	Water	01/31/18
2	EB-Area R-01312018	320-35598-2	Water	01/31/18
3				
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14				

Notes:

LDC #: 41853C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: R

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853C4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (mg/L)	Action Level	2								
Na		57.4		287	200 B								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 41853C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: DE

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 1/31/18 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: ~~All~~ 1 13

Analyte	Blank ID	Sample Identification										
	2	Action Limit										
Ca	220	1100										
Cu	0.82	4.1										
Na	200	1000										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35598-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-18A	320-35598-1	Water	01/31/18
EB-Area R-01312018	320-35598-2	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Area R-01312018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Area R-01312018	01/31/18	Chloride Sulfate	0.14 mg/L 0.21 mg/L	RLS15-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

LDC #: 41853C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18

SDG #: 320-35598-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: AC

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A) (Bicarbonate)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB=2
VI.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS15-MW03-18A	320-35598-1	Water	01/31/18
2	EB-Area R-01312018	320-35598-2	Water	01/31/18
3				
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14				
15				

Notes:

DC #: 41853C4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Parameter
1, 2	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) (Alk) CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 41853C6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: Mg/L **Associated sample units:** mg/L
Sampling date: 1/31/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1

Analyte	Blank ID	Action Limit	Sample Identification							
	1									
Chloride	0.14	0.7								
Sulfate	0.21	1.05								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35598-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-18A	320-35598-1	Water	01/31/18
EB-Area R-01312018	320-35598-2	Water	01/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Area R-01312018 was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35598-1

No Sample Data Qualified in this SDG

LDC #: 41853C51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18

SDG #: 320-35598-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: 9

2nd Reviewer: M

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A / A	~~RSD~~ ≤ 20%. r^2 ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 2
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	N	
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS15-MW03-18A	320-35598-1	Water	01/31/18
2	EB-Area R-01312018	320-35598-2	Water	01/31/18
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35656-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT33-MW01-18A	320-35656-1	Water	02/01/18
TT07-MW01-18A	320-35656-2	Water	02/01/18
RLS07-MW02-18A	320-35656-3	Water	02/01/18
RLS34-MW01-18A	320-35656-4	Water	02/01/18
RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
RLS07-MW04-18A	320-35656-6	Water	02/01/18
RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
TT07-MW02-18A	320-35656-8	Water	02/01/18
EB-Michelson-02012018	320-35656-9	Water	02/01/18
RLS34-MW05-18A	320-35656-10	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35656-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	RLS34-MW01-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds with the exception of Vinyl acetate. Since no samples were analyzed after this calibration, no data were qualified.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-Michelson-02012018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Michelson-02012018	02/01/18	2-Butanone Acetone	0.80 ug/L 5.8 ug/L	TT33-MW01-18A TT07-MW01-18A RLS07-MW02-18A RLS34-MW01-18A RLS07-MW02-P-18A RLS07-MW04-18A RLS07-MW04-P-18A TT07-MW02-18A RLS34-MW05-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS07-MW04-P-18A	Acetone	2.1 ug/L	2.1U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
RLS34-MW05-18A	1,2-Dichloroethane-d4	126 (81-118)	All compounds	NA	-

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples RLS07-MW02-18A and RLS07-MW02-P-18A and samples RLS07-MW04-18A and RLS07-MW04-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	RLS07-MW02-18A	RLS07-MW02-P-18A	
1,1-Dichloroethane	0.16	0.40U	Not calculable
1,1-Dichloroethene	0.26	0.31	18 (≤25)
1,2-Dichloroethane	1.0	1.1	10 (≤25)
Chloroform	1.6	1.7	6 (≤25)
cis-1,2-Dichloroethene	1.3	1.3	0 (≤25)
Tetrachloroethene	3.0	3.0	0 (≤25)
Trichloroethene	61	61	0 (≤25)
1,2-Dichloroethene, total	1.3	1.3	0 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	RLS07-MW04-18A	RLS07-MW04-P-18A	
Acetone	5.0U	2.1	Not calculable

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in ten samples.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35656-1

Sample	Compound	Flag	A or P	Reason (Code)
TT33-MW01-18A TT07-MW01-18A RLS07-MW02-18A RLS34-MW01-18A RLS07-MW02-P-18A RLS07-MW04-18A RLS07-MW04-P-18A TT07-MW02-18A EB-Michelson-02012018 RLS34-MW05-18A	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
RLS34-MW01-18A	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35656-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS07-MW04-P-18A	Acetone	2.1U ug/L	A	F

LDC #: 41853D1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35656-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	RSD≤15%. r² ICV≤20%
IV.	Continuing calibration	SW	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB=9.
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	N	Insufficient
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=3+5, 6+7
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT33-MW01-18A	320-35656-1	Water	02/01/18
2	TT07-MW01-18A	320-35656-2	Water	02/01/18
3	RLS07-MW02-18A	320-35656-3	Water	02/01/18
4	RLS34-MW01-18A	320-35656-4	Water	02/01/18
5	RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
6	RLS07-MW04-18A	320-35656-6	Water	02/01/18
7	RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
8	TT07-MW02-18A	320-35656-8	Water	02/01/18
9	EB-Michelson-02012018	320-35656-9	Water	02/01/18
10	RLS34-MW05-18A	320-35656-10	Water	02/01/18
11				
12				
13				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 48530 1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 2

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	2	23.6	All (ND)	J (all N/A (c)

LDC #: 41853O1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 9

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications (C)
	2/10/18	H021004 (2nd Begin)	HH	5T.7		1-3.5-10.MB	A Tox
	2/13/18	H021301	HH	2T.0		4.MB (N D)	Y/N/A
			2	26.4			

CONCAL.1SB

LDC #: 41853D1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: C

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/1/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-~~35598-1~~ 35561)

Associated Samples: 1-8, 9 (F)

Compound	Blank ID	Sample Identification								
	FB-Michelson-02012018	10X	7							
M	0.80	8								
F	5.8	58	2.1/U							

LDC #: 41853D1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y (N) N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications (S)
		10	DCE	126 (81-118)	J (all det.) (NO)
				( )	
				( )	
				( )	
				( )	
				( )	
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(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene
(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

LDC#: 41853D1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: 2

METHOD: GCMS VOCs (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		RPD (≤25)
	3	5	
I	0.16	0.40U	NC
H	0.26	0.31	18
L	1.0	1.1	10
K	1.6	1.7	6
QQQ	1.3	1.3	0
AA	3.0	3.0	0
S	61	61	0
J	1.3	1.3	0

Compound	Concentration (ug/L)		RPD (≤25)
	6	7	
F	5.0U	2.1	NC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35656-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT33-MW01-18A	320-35656-1	Water	02/01/18
TT07-MW01-18A	320-35656-2	Water	02/01/18
RLS07-MW02-18A	320-35656-3	Water	02/01/18
RLS34-MW01-18A	320-35656-4	Water	02/01/18
RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
RLS07-MW04-18A	320-35656-6	Water	02/01/18
RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
TT07-MW02-18A	320-35656-8	Water	02/01/18
EB-Michelson-02012018	320-35656-9	Water	02/01/18
RLS34-MW05-18A	320-35656-10	Water	02/01/18
RLS07-MW02-18AMS	320-35656-3MS	Water	02/01/18
RLS07-MW02-18AMSD	320-35656-3MSD	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Sodium	57.4 ug/L	All samples in SDG 320-35656-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

Sample EB-Michelson-02012018 was identified as an equipment blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples RLS07-MW02-18A and RLS07-MW02-P-18A and samples RLS07-MW04-18A and RLS07-MW04-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS07-MW02-18A	RLS07-MW02-P-18A	
Iron	120	98	20 (≤25)
Arsenic	730	690	6 (≤25)
Barium	12	12	0 (≤25)
Copper	5.0	2.5	67 (≤25)
Calcium	490000	490000	0 (≤25)
Magnesium	200000	190000	5 (≤25)
Manganese	58	55	5 (≤25)
Molybdenum	2000	2000	0 (≤25)
Selenium	76	72	5 (≤25)
Potassium	46000	43000	7 (≤25)
Sodium	380000	370000	3 (≤25)
Vanadium	47	43	9 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS07-MW04-18A	RLS07-MW04-P-18A	
Copper	7.5	6.1	21 (≤25)
Arsenic	530	510	4 (≤25)
Barium	16	16	0 (≤25)
Calcium	230000	220000	4 (≤25)
Magnesium	53000	53000	0 (≤25)
Molybdenum	2000	2000	0 (≤25)
Selenium	48	68	34 (≤25)
Potassium	17000	17000	0 (≤25)
Sodium	1100000	1100000	0 (≤25)
Vanadium	120	120	0 (≤25)

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

LDC #: 41853D4a

SDG #: 320-35656-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/12/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	ND	EB = 9
VII.	Matrix Spike/Matrix Spike Duplicates	A	(11, 12)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(3, 5) (6, 7)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT33-MW01-18A	320-35656-1	Water	02/01/18
2	TT07-MW01-18A	320-35656-2	Water	02/01/18
3	RLS07-MW02-18A	320-35656-3	Water	02/01/18
4	RLS34-MW01-18A	320-35656-4	Water	02/01/18
5	RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
6	RLS07-MW04-18A	320-35656-6	Water	02/01/18
7	RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
8	TT07-MW02-18A	320-35656-8	Water	02/01/18
9	EB-Michelson-02012018	320-35656-9	Water	02/01/18
10	RLS34-MW05-18A	320-35656-10	Water	02/01/18
11	RLS07-MW02-18AMS	320-35656-3MS	Water	02/01/18
12	RLS07-MW02-18AMSD	320-35656-3MSD	Water	02/01/18
13				
14				

Notes:

LDC #: 41853D4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	W	(Al), Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
11,12	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, (Hg), Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		~~Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,~~ ___

Comments: Mercury by CVAA if performed

LDC #: 41853D4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (mg/L)	Action Level									
Na		57.4		287									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC#: 41853D4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: D
2nd Reviewer: K

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	3	5	
Iron	120	98	20
Arsenic	730	690	6
Barium	12	12	0
Copper	5.0	2.5	67
Calcium	490000	490000	0
Magnesium	200000	190000	5
Manganese	58	55	5
Molybdenum	2000	2000	0
Selenium	76	72	5
Potassium	46000	43000	7
Sodium	380000	370000	3
Vanadium	47	43	9

Analyte	Concentration (ug/L)		RPD (≤25)
	6	7	
Copper	7.5	6.1	21
Arsenic	530	510	4
Barium	16	16	0
Calcium	230000	220000	4
Magnesium	53000	53000	0

LDC#: 41853D4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: VB

2nd Reviewer: C

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	6	7	
Molybdenum	2000	2000	0
Selenium	48	68	34
Potassium	17000	17000	0
Sodium	1100000	1100000	0
Vanadium	120	120	0

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853D4a.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35656-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT33-MW01-18A	320-35656-1	Water	02/01/18
TT07-MW01-18A	320-35656-2	Water	02/01/18
RLS07-MW02-18A	320-35656-3	Water	02/01/18
RLS07-MW02-18ADL	320-35656-3DL	Water	02/01/18
RLS34-MW01-18A	320-35656-4	Water	02/01/18
RLS34-MW01-18ADL	320-35656-4DL	Water	02/01/18
RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
RLS07-MW02-P-18ADL	320-35656-5DL	Water	02/01/18
RLS07-MW04-18A	320-35656-6	Water	02/01/18
RLS07-MW04-18ADL	320-35656-6DL	Water	02/01/18
RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
RLS07-MW04-P-18ADL	320-35656-7DL	Water	02/01/18
TT07-MW02-18A	320-35656-8	Water	02/01/18
EB-Michelson-02012018	320-35656-9	Water	02/01/18
RLS34-MW05-18A	320-35656-10	Water	02/01/18
RLS34-MW05-18ADL	320-35656-10DL	Water	02/01/18
TT33-MW01-18AMS	320-35656-1MS	Water	02/01/18
TT33-MW01-18AMSD	320-35656-1MSD	Water	02/01/18
TT07-MW01-18AMS	320-35656-2MS	Water	02/01/18
TT07-MW01-18AMSD	320-35656-2MSD	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
RLS07-MW02-18ADL RLS34-MW01-18ADL RLS07-MW02-P-18ADL RLS07-MW04-18ADL RLS07-MW04-P-18ADL RLS34-MW05-18ADL	Orthophosphate as P	15 days	48 hours	R (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Michelson-02012018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Michelson-02012018	02/01/18	Chloride	0.13 mg/L	TT33-MW01-18A TT07-MW01-18A RLS07-MW02-18A RLS34-MW01-18A RLS07-MW02-P-18A RLS07-MW04-18A RLS07-MW04-P-18A TT07-MW02-18A RLS34-MW05-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples RLS07-MW02-18A and RLS07-MW02-P-18A, samples RLS07-MW02-18ADL and RLS07-MW02-P-18ADL, samples RLS07-MW04-18A and RLS07-MW04-P-18A, and samples RLS07-MW04-18ADL and RLS07-MW04-P-18ADL were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)
	RLS07-MW02-18A	RLS07-MW02-P-18A	
Chloride	270	260	4 (≤25)
Nitrate as N	6.1	6.1	0 (≤25)
Sulfate	2600	2600	0 (≤25)

Analyte	Concentration (mg/L)		RPD (Limits)
	RLS07-MW04-18A	RLS07-MW04-P-18A	
Chloride	300	300	0 (≤25)
Nitrate as N	0.16	0.16	0 (≤25)
Sulfate	2700	2700	0 (≤25)

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Flag	A or P
RLS07-MW02-18A RLS34-MW01-18A RLS07-MW02-P-18A RLS07-MW04-18A RLS07-MW04-P-18A RLS34-MW05-18A	Orthophosphate as P	Matrix interference caused by co-elution with Sulfate	UJ (all non-detects)	A

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Analyte	Flag	A or P
RLS07-MW02-18ADL RLS34-MW01-18ADL RLS07-MW02-P-18ADL RLS07-MW04-18ADL RLS07-MW04-P-18ADL RLS34-MW05-18ADL	Orthophosphate as P	R	A

Due to matrix interference, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35656-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS07-MW02-18A RLS34-MW01-18A RLS07-MW02-P-18A RLS07-MW04-18A RLS07-MW04-P-18A RLS34-MW05-18A	Orthophosphate as P	UJ (all non-detects)	A	Sample result verification (matrix interference) (V)
RLS07-MW02-18ADL RLS34-MW01-18ADL RLS07-MW02-P-18ADL RLS07-MW04-18ADL RLS07-MW04-P-18ADL RLS34-MW05-18ADL	Orthophosphate as P	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

LDC #: 41853D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-35656-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JB
2nd Reviewer: A

METHOD: (Analyte) Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB=14
VI.	Matrix Spike/Matrix Spike Duplicates	A	(17,18) (19,20)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	(3,7) (4,8)* (9,11) (10,12)*
X.	Sample result verification	SW	
XI	Overall assessment of data	SW	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
* ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT33-MW01-18A	320-35656-1	Water	02/01/18
2	TT07-MW01-18A	320-35656-2	Water	02/01/18
3	RLS07-MW02-18A	320-35656-3	Water	02/01/18
4	RLS07-MW02-18ADL	320-35656-3DL	Water	02/01/18
5	RLS34-MW01-18A	320-35656-4	Water	02/01/18
6	RLS34-MW01-18ADL	320-35656-4DL	Water	02/01/18
7	RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
8	RLS07-MW02-P-18ADL	320-35656-5DL	Water	02/01/18
9	RLS07-MW04-18A	320-35656-6	Water	02/01/18
10	RLS07-MW04-18ADL	320-35656-6DL	Water	02/01/18
11	RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
12	RLS07-MW04-P-18ADL	320-35656-7DL	Water	02/01/18
13	TT07-MW02-18A	320-35656-8	Water	02/01/18
14	EB-Michelson-02012018	320-35656-9	Water	02/01/18
15	RLS34-MW05-18A	320-35656-10	Water	02/01/18
16	RLS34-MW05-18ADL	320-35656-10DL	Water	02/01/18
17	TT33-MW01-18AMS	320-35656-1MS	Water	02/01/18

LDC #: 41853D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18

SDG #: 320-35656-1 Level III Page: 2 of 2

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: RC

METHOD: (Analyte) Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

	Client ID	Lab ID	Matrix	Date
18	TT33-MW01-18AMSD	320-35656-1MSD	Water	02/01/18
19	TT07-MW01-18AMS	320-35656-2MS	Water	02/01/18
20	TT07-MW01-18AMSD	320-35656-2MSD	Water	02/01/18
21				
22				
23				
24				
25				

Notes:

DC #: 41853DQ

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: M

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3,5,7,9 11,13-15	pH TDS (Cl) F (NO3) (NO2) (SO4) (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
4,6,8,10, 12,16	pH TDS Cl F NO3 NO2 SO4 (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
17,18	pH TDS (Cl) F (NO3) (NO2) (SO4) (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
19,20	pH TDS (Cl) F NO3 NO2 SO4 (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments: _____

LDC #: 41853D6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer:

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	EPA 9056A						
Parameters:	OPO_4^-						
Technical holding time:	48 Hours.						
Sample ID	**Sampling date**	**Analysis date**	**Total Time**	**Qualifier**	**Analysis date**	**Total Time**	**Qualifier**
4, 6, 8, 10 12, 16	2/1/18	2/16/18	15 days	J/~~UJ~~R (ND)	(H)	(reanalysis)	

LDC #: 41853D6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/1/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 3, 5, 7, 9, 11, 13, 15

Analyte	Blank ID	Action Limit	Sample Identification							
	14									
Chloride	0.13	0.65								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 41853D6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: B
2nd Reviewer: C

Inorganics, Method see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	3	7		
Chloride	270	260	4	
Nitrate as N	6.1	6.1	0	
Sulfate	2600	2600	0	

Analyte	Concentration (mg/L)		RPD (≤25)	
	9	11		
Chloride	300	300	0	
Nitrate as N	0.16	0.16	0	
Sulfate	2700	2700	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853D6.wpd

LDC #: 41853D6

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	3, 5, 7, 9, 11, 15	O-PO4			Matrix Interference caused by coelution with SO4	J / UJ / A (ND) (V)

Comments: _____

SRV.SW4.wpd

LDC #: 41853D4

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: VB
2nd Reviewer: [illegible]

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		4, 6, 8, 10, 12, 16	Dilution not necessary as sample remains non-detect; lower RL preferred chose to NR OPO_4 for associated samples	4, 6, 8, 10, 12, 16	NR/A (ND) (D)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35656-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT33-MW01-18A	320-35656-1	Water	02/01/18
TT07-MW01-18A	320-35656-2	Water	02/01/18
RLS07-MW02-18A	320-35656-3	Water	02/01/18
RLS34-MW01-18A	320-35656-4	Water	02/01/18
RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
RLS07-MW04-18A	320-35656-6	Water	02/01/18
RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
TT07-MW02-18A	320-35656-8	Water	02/01/18
EB-Michelson-02012018	320-35656-9	Water	02/01/18
RLS34-MW05-18A	320-35656-10	Water	02/01/18
RLS34-MW05-18ADUP	320-35656-10DUP	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
TT07-MW02-18A	All compounds	A headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	UJ (all non-detects)	A

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample TB-02012018 (from SDG 320-35659-1) was identified as a trip blank. No contaminants were found.

Sample EB-Michelson-02012018 was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

Samples RLS07-MW02-18A and RLS07-MW02-P-18A and samples RLS07-MW04-18A and RLS07-MW04-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/L)		RPD (Limits)
	RLS07-MW04-18A	RLS07-MW04-P-18A	
Methane	0.88	0.49	57 (≤25)

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to headspace, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35656-1

Sample	Compound	Flag	A or P	Reason (Code)
TT07-MW02-18A	All compounds	UJ (all non-detects)	A	Sample condition (headspace) (V)

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35656-1

No Sample Data Qualified in this SDG

LDC #: 41853D51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35656-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: 1

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW/A	
II.	Initial calibration/ICV	A/A	~~RSD~~ ≤ 20%. r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 9. TB=TB-02012018(320-35656-1)
VI.	Matrix spike/Matrix spike duplicates /DUP	N/A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	SW	D = 3+5*. 6+7
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; *ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT33-MW01-18A	320-35656-1	Water	02/01/18
2	TT07-MW01-18A	320-35656-2	Water	02/01/18
3	RLS07-MW02-18A	320-35656-3	Water	02/01/18
4	RLS34-MW01-18A	320-35656-4	Water	02/01/18
5	RLS07-MW02-P-18A	320-35656-5	Water	02/01/18
6	RLS07-MW04-18A	320-35656-6	Water	02/01/18
7	RLS07-MW04-P-18A	320-35656-7	Water	02/01/18
8	TT07-MW02-18A	320-35656-8	Water	02/01/18
9	EB-Michelson-02012018	320-35656-9	Water	02/01/18
10	RLS34-MW05-18A	320-35656-10	Water	02/01/18
11	RLS34-MW05-18ADUP	320-35656-10DUP	Water	02/01/18
12				
13				
14				

Notes:

LDC #41853D51

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: 9
2nd Reviewer: 2

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: GC HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
8	headspace	> 6mm					J/UJ/A (V*)

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC#: 41853D51

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: JC

METHOD: GC (Method RSK-175)

Compound	Concentration (mg/L)		(≤25) RPD
	6	7	
Methane	0.88	0.49	57

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35659-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-8-18A	320-35659-1	Water	02/01/18
NAF-1-18A	320-35659-2	Water	02/01/18
NAF-16-18A	320-35659-3	Water	02/01/18
NAF-23-18A	320-35659-4	Water	02/01/18
NAF-10-18A	320-35659-5	Water	02/01/18
NAF-15-18A	320-35659-6	Water	02/01/18
NAF-2-18A	320-35659-7	Water	02/01/18
TB-02012018	320-35659-8	Water	02/01/18
NAF-1-18AMS	320-35659-2MS	Water	02/01/18
NAF-1-18AMSD	320-35659-2MSD	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35659-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02012018	UJ (all non-detects) UJ (all non-detects)	A

Date	Compound	%D	Associated Samples	Flag	A or P
02/14/18	Vinyl acetate 2-Hexanone	29.4 27.6	NAF-8-18A NAF-1-18A NAF-16-18A NAF-23-18A NAF-10-18A NAF-15-18A NAF-2-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02012018 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35659-1

Sample	Compound	Flag	A or P	Reason (Code)
NAF-8-18A NAF-1-18A NAF-16-18A NAF-23-18A NAF-10-18A NAF-15-18A NAF-2-18A TB-02012018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
NAF-8-18A NAF-1-18A NAF-16-18A NAF-23-18A NAF-10-18A NAF-15-18A NAF-2-18A TB-02012018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35659-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35659-1

No Sample Data Qualified in this SDG

LDC #: 41853E1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35659-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer: TC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	RSD≤15%.r² ICV≤20%
IV.	Continuing calibration	SW	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB=8
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	NAF-8-18A	320-35659-1	Water	02/01/18
2	NAF-1-18A	320-35659-2	Water	02/01/18
3	NAF-16-18A	320-35659-3	Water	02/01/18
4	NAF-23-18A	320-35659-4	Water	02/01/18
5	NAF-10-18A	320-35659-5	Water	02/01/18
6	NAF-15-18A	320-35659-6	Water	02/01/18
7	NAF-2-18A	320-35659-7	Water	02/01/18
8	TB-02012018	320-35659-8	Water	02/01/18
9	NAF-1-18AMS	320-35659-2MS	Water	02/01/18
10	NAF-1-18AMSD	320-35659-2MSD	Water	02/01/18
11				
12				
13				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: ~~48532~~ 48532I

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	2	23.6	All (ND)	J (all / A) (C)

LDC #: 41853E1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: 9
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y (N) N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/13/18	H02130 1	HH	27.0		8, MB (ND)	Y N N/A (C)
			Z	26.4			↓
	2/14/18	H02140 1	HH	29.4		1-7, 9-10, MB (ND)	Y N N/A (C)
			Z	27.6			↓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35659-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-8-18A	320-35659-1	Water	02/01/18
NAF-1-18A	320-35659-2	Water	02/01/18
NAF-16-18A	320-35659-3	Water	02/01/18
NAF-23-18A	320-35659-4	Water	02/01/18
NAF-10-18A	320-35659-5	Water	02/01/18
NAF-15-18A	320-35659-6	Water	02/01/18
NAF-2-18A	320-35659-7	Water	02/01/18
NAF-1-18AMS	320-35659-2MS	Water	02/01/18
NAF-1-18AMSD	320-35659-2MSD	Water	02/01/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-208401/12	2/14/18	Gasoline range organics (C4-C12)	20.6 ug/L	All samples in SDG 320-35659-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
NAF-8-18A	Gasoline range organics (C4-C12)	19 ug/L	19U ug/L
NAF-1-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L
NAF-16-18A	Gasoline range organics (C4-C12)	28 ug/L	28U ug/L
NAF-23-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
NAF-10-18A	Gasoline range organics (C4-C12)	22 ug/L	22U ug/L
NAF-15-18A	Gasoline range organics (C4-C12)	27 ug/L	27U ug/L
NAF-2-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in seven samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35659-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35659-1

Sample	Compound	Modified Final Concentration	A or P	Code
NAF-8-18A	Gasoline range organics (C4-C12)	19U ug/L	A	B
NAF-1-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-16-18A	Gasoline range organics (C4-C12)	28U ug/L	A	B
NAF-23-18A	Gasoline range organics (C4-C12)	21U ug/L	A	B
NAF-10-18A	Gasoline range organics (C4-C12)	22U ug/L	A	B
NAF-15-18A	Gasoline range organics (C4-C12)	27U ug/L	A	B
NAF-2-18A	Gasoline range organics (C4-C12)	21U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35659-1

No Sample Data Qualified in this SDG

LDC #: 41853E7

SDG #: 320-35659-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/11/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CALUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	NAF-8-18A	320-35659-1	Water	02/01/18
2	NAF-1-18A	320-35659-2	Water	02/01/18
3	NAF-16-18A	320-35659-3	Water	02/01/18
4	NAF-23-18A	320-35659-4	Water	02/01/18
5	NAF-10-18A	320-35659-5	Water	02/01/18
6	NAF-15-18A	320-35659-6	Water	02/01/18
7	NAF-2-18A	320-35659-7	Water	02/01/18
8	NAF-1-18AMS	320-35659-2MS	Water	02/01/18
9	NAF-1-18AMSD	320-35659-2MSD	Water	02/01/18
10				
11				
12				
13				

LDC #: ~~41852E7~~

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: CK
2nd Reviewer: AC

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all samples associated with a given method blank?
(Y) N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
(Y) N N/A Was a method blank performed with each extraction batch?
(Y) N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N (N/A) (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N (N/A) Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: ___ **Blank analysis date:** ~~7/14/18~~ **Associated samples:** ~~All~~ (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
MB 320-208401/12		1	2	3	4	5	6	7
GRO (C4-C12)	20.6	19/U	23/U	28/U	21/U	22/U	27/U	21/U

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___
Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35777-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-7-18A	320-35777-1	Water	02/02/18
NAF-7-P-18A	320-35777-2	Water	02/02/18
NAF-3-18A	320-35777-3	Water	02/02/18
NAF-11-18A	320-35777-4	Water	02/02/18
NAF-13-18A	320-35777-5	Water	02/02/18
NAF-14-18A	320-35777-6	Water	02/02/18
NAF-12-18A	320-35777-7	Water	02/02/18
NAF-6-18A	320-35777-8	Water	02/02/18
NAF-17-18A	320-35777-9	Water	02/02/18
TB-02022018	320-35777-10	Water	02/02/18
NAF-6-18AMS	320-35777-8MS	Water	02/02/18
NAF-6-18AMSD	320-35777-8MSD	Water	02/02/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35777-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02022018	UJ (all non-detects) UJ (all non-detects)	A

Date	Compound	%D	Associated Samples	Flag	A or P
02/14/18	Vinyl acetate 2-Hexanone	29.4 27.6	NAF-7-18A NAF-7-P-18A NAF-3-18A NAF-11-18A	UJ (all non-detects) UJ (all non-detects)	A
02/15/18	Vinyl acetate 2-Hexanone	23.9 27.1	NAF-13-18A NAF-14-18A NAF-12-18A NAF-6-18A NAF-17-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02022018 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
NAF-6-18AMS/MSD (NAF-6-18A)	2-Butanone Acetone	23 (≤20) 25 (≤20)	NA	-

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples NAF-7-18A and NAF-7-P-18A were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in ten samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35777-1

Sample	Compound	Flag	A or P	Reason (Code)
NAF-7-18A NAF-7-P-18A NAF-3-18A NAF-11-18A NAF-13-18A NAF-14-18A NAF-12-18A NAF-6-18A NAF-17-18A TB-02022018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
NAF-7-18A NAF-7-P-18A NAF-3-18A NAF-11-18A NAF-13-18A NAF-14-18A NAF-12-18A NAF-6-18A NAF-17-18A TB-02022018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35777-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35777-1

No Sample Data Qualified in this SDG

LDC #: 41853F1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35777-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer: DC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/M	RSD≤15% or r²≥0.99 ICV≤20%
IV.	Continuing calibration	M	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB=10
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	M	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	ND	D=1+2
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1 2	NAF-7-18A	320-35777-1	Water	02/02/18
2 2	NAF-7-P-18A	320-35777-2	Water	02/02/18
3 2	NAF-3-18A	320-35777-3	Water	02/02/18
4 2	NAF-11-18A	320-35777-4	Water	02/02/18
5	NAF-13-18A	320-35777-5	Water	02/02/18
6	NAF-14-18A	320-35777-6	Water	02/02/18
7	NAF-12-18A	320-35777-7	Water	02/02/18
8	NAF-6-18A	320-35777-8	Water	02/02/18
9	NAF-17-18A	320-35777-9	Water	02/02/18
10 1	TB-02022018	320-35777-10	Water	02/02/18
11	NAF-6-18AMS	320-35777-8MS	Water	02/02/18
12	NAF-6-18AMSD	320-35777-8MSD	Water	02/02/18
13				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41353F1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications
	1/9/18	180109A	2	23.6	All (ND)	J/UJ/A (c)

LDC #: 41853F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: SC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	2/13/18	H021301	HH	27.0		10, MB (ND)	√/M/A (C)
			Z	26.4			√
	2/14/18	H021401	HH	29.4		1-4. MB (ND)	√/M/A (C)
			Z	27.6			√
	2/15/18	H02150 1	HH	23.9		5-9. 11-12, MB (ND)	√/M/A (C)
			Z	27.1			√

CONCAL.1SB

LDC #: 41853F1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: A
2nd Reviewer: AR

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		11/12	M	( )	( )	23 (≤20)	8 (ND)	J+ (all detects) / A (all)
			F	( )	( )	25 (↓)		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	(

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35777-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-7-18A	320-35777-1	Water	02/02/18
NAF-7-P-18A	320-35777-2	Water	02/02/18
NAF-3-18A	320-35777-3	Water	02/02/18
NAF-11-18A	320-35777-4	Water	02/02/18
NAF-13-18A	320-35777-5	Water	02/02/18
NAF-14-18A	320-35777-6	Water	02/02/18
NAF-12-18A	320-35777-7	Water	02/02/18
NAF-6-18A	320-35777-8	Water	02/02/18
NAF-17-18A	320-35777-9	Water	02/02/18
NAF-6-18AMS	320-35777-8MS	Water	02/02/18
NAF-6-18AMSD	320-35777-8MSD	Water	02/02/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-208401/12	2/14/18	Gasoline range organics (C4-C12)	20.6 ug/L	NAF-7-18A NAF-7-P-18A NAF-3-18A NAF-11-18A
MB 320-208646/12	02/15/18	Gasoline range organics (C4-C12)	17.7 ug/L	NAF-13-18A NAF-14-18A NAF-12-18A NAF-6-18A NAF-17-18A

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
NAF-7-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
NAF-7-P-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L
NAF-3-18A	Gasoline range organics (C4-C12)	27 ug/L	27U ug/L
NAF-11-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L
NAF-13-18A	Gasoline range organics (C4-C12)	24 ug/L	24U ug/L
NAF-14-18A	Gasoline range organics (C4-C12)	19 ug/L	19U ug/L
NAF-12-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L
NAF-6-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L
NAF-17-18A	Gasoline range organics (C4-C12)	28 ug/L	28U ug/L

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples NAF-7-18A and NAF-7-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	NAF-7-18A	NAF-7-P-18A	
Gasoline range organics (C4-C12)	23	23	0 (≤25)

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in nine samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35777-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35777-1

Sample	Compound	Modified Final Concentration	A or P	Code
NAF-7-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-7-P-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-3-18A	Gasoline range organics (C4-C12)	27U ug/L	A	B
NAF-11-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-13-18A	Gasoline range organics (C4-C12)	24U ug/L	A	B
NAF-14-18A	Gasoline range organics (C4-C12)	19U ug/L	A	B
NAF-12-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-6-18A	Gasoline range organics (C4-C12)	23U ug/L	A	B
NAF-17-18A	Gasoline range organics (C4-C12)	28U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35777-1

No Sample Data Qualified in this SDG

LDC #: 41853F7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35777-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CA LUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤20% ICV≤20%
IV.	Continuing calibration	A	CCV≤20%
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=1+2
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1 1	NAF-7-18A	320-35777-1	Water	02/02/18
2 1	NAF-7-P-18A	320-35777-2	Water	02/02/18
3 1	NAF-3-18A	320-35777-3	Water	02/02/18
4 1	NAF-11-18A	320-35777-4	Water	02/02/18
5 2	NAF-13-18A	320-35777-5	Water	02/02/18
6 2	NAF-14-18A	320-35777-6	Water	02/02/18
7 2	NAF-12-18A	320-35777-7	Water	02/02/18
8 2	NAF-6-18A	320-35777-8	Water	02/02/18
9 2	NAF-17-18A	320-35777-9	Water	02/02/18
10	NAF-6-18AMS	320-35777-8MS	Water	02/02/18
11	NAF-6-18AMSD	320-35777-8MSD	Water	02/02/18
12				
13				

LDC #: 41853FT

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: ___ **Blank analysis date:** 2/14/18 **Associated samples:** 1-4 (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
	MB 320-208401/12		1	2	3	4		
GRO C4-C12	20.6		23/U	23/U	27/U	23/U		

Blank extraction date: ___ **Blank analysis date:** 2/15/18 **Associated samples:** 5-9 (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
	MB 320-208646/12		5	6	7	8	9	
GRO C4-C12	17.7		24/U	19/U	23/U	23/U	28/U	

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#: 41853F7

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

METHOD: GC GRO (PA SW 846 Method 8260B/CALUFT)

Compound	Concentration (ug/L)		RPD (≤25)
	1	2	
GRO (C4-C12)	23	23	0

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853F7_AECOM.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18
TB-02062018	320-35808-6	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	All samples in SDG 320-35808-1	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02062018	UJ (all non-detects) UJ (all non-detects)	A

Date	Compound	%D	Associated Samples	Flag	A or P
02/15/18	Vinyl acetate 2-Hexanone	23.9 27.1	MW-12-18A MW-22-18A MW-08-18A MW-09-18A MW-10-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02062018 was identified as a trip blank. No contaminants were found.

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Acetone	7.4 ug/L	MW-12-18A MW-22-18A MW-08-18A MW-09-18A MW-10-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-10-18A	Acetone	2.5 ug/L	2.5U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35808-1

Sample	Compound	Flag	A or P	Reason (Code)
MW-12-18A MW-22-18A MW-08-18A MW-09-18A MW-10-18A TB-02062018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
MW-12-18A MW-22-18A MW-08-18A MW-09-18A MW-10-18A TB-02062018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35808-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-10-18A	Acetone	2.5U ug/L	A	F

LDC #: 41853G1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18

SDG #: 320-35808-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: 9

2nd Reviewer: R

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	~~%D~~ ≤ 15% . r^2 ≥ 0.990 ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB=6. EB=EB-PW[illegible]-02082018 (320-35893-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
6	TB-02062018	320-35808-6	Water	02/06/18
7				
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853G1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer: JC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	All (ND)	J/UJ/A
		(HP12)				

LDC #~~41853S~~1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications (C)
	2/13/18	H021301	HH	37.0		6. MB (ND)	J/UH/A
			Z	26.4			↓
	2/15/18	H021501	HH	23.9		1-5. MB (ND)	J/UH/A
			Z	27.1			↓

CONCAL.1SB

LDC #: 41853G1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35893-1) Associated Samples: 1-5 (F)

Compound	Blank ID	Sample Identification								
	FB-PWGas-02082018	10X	5							
F	7.4	74	2.5/U							

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Copper	0.40 ug/L	All samples in SDG 320-35808-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

LDC #: 41853G4a

SDG #: 320-35808-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB = EB-PW GAS-02082018 From 320-35893-1
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 41853G4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-5	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853G4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-PWGas-02082018	Action Limit										
Cu	0.40	2										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18
MW-22-18AMS	320-35808-2MS	Water	02/06/18
MW-22-18AMSD	320-35808-2MSD	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Sulfate	0.15 mg/L	All samples in SDG 320-35808-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
MW-22-18AMS/MSD (MW-22-18A)	Sulfate	-	85 (87-112)	J (all detects)	A

Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to MS/MSD %R, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35808-1

Sample	Analyte	Flag	A or P	Reason (Code)
MW-22-18A	Sulfate	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

LDC #: 41853G6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35808-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer:

Bicarbonate

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-PW6AS-02082018 from 320-35893-1
VI.	Matrix Spike/Matrix Spike Duplicates	SW	(6,7)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
6	MW-22-18AMS	320-35808-2MS	Water	02/06/18
7	MW-22-18AMSD	320-35808-2MSD	Water	02/06/18
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

DC #: 418536

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: *

All circled methods are applicable to each sample.

Sample ID	Parameter
1-5	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
6c	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
6,7	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments: _____

LDC #: 41853G6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/8/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-PWGas-02082018									
Sulfate	0.15	0.75								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853G4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	6.7	W	SO4		85 (87-112)		2	J/UJ/A (Det) (Q)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.
C	Calibration %RSD, r, r^2 or %D were noncompliant
R	Calibration RRF was <0.05.
B	Presumed contamination from preparation (methods blank)
L	Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits
Q	MS/MSD recovery was poor
E	MS/MSD or Duplicate RPD was high.
I	Internal standard performance was unsatisfactory
M	Instrument Performance Check (BFB or DFTPP) was noncompliant
T	Presumed contamination from trip blank.
F	Presumed contamination from FB or ER.
D	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor
V	Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-208646/12	02/15/18	Gasoline range organics (C4-C12)	17.7 ug/L	All samples in SDG 320-35808-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-22-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
MW-08-18A	Gasoline range organics (C4-C12)	18 ug/L	18U ug/L
MW-09-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
MW-10-18A	Gasoline range organics (C4-C12)	22 ug/L	22U ug/L

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Gasoline range organics (C4-C12)	19 ug/L	All samples in SDG 320-35808-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-22-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
MW-08-18A	Gasoline range organics (C4-C12)	18 ug/L	18U ug/L
MW-09-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
MW-10-18A	Gasoline range organics (C4-C12)	22 ug/L	22U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory and equipment blank contamination, data were qualified as not detected in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-22-18A	Gasoline range organics (C4-C12)	21U ug/L	A	B
MW-08-18A	Gasoline range organics (C4-C12)	18U ug/L	A	B
MW-09-18A	Gasoline range organics (C4-C12)	21U ug/L	A	B
MW-10-18A	Gasoline range organics (C4-C12)	22U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35808-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-22-18A	Gasoline range organics (C4-C12)	21U ug/L	A	F
MW-08-18A	Gasoline range organics (C4-C12)	18U ug/L	A	F
MW-09-18A	Gasoline range organics (C4-C12)	21U ug/L	A	F
MW-10-18A	Gasoline range organics (C4-C12)	22U ug/L	A	F

LDC #: 41853G7

SDG #: 320-35808-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/11/18

Page: 1 of 1

Reviewer: C

2nd Reviewer: A

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CA LUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB = EB-DWGAS-02082018 (320-35893-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
6				
7				
8				

Notes:

LDC #: ~~41853ET~~

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CA
2nd Reviewer: AK

METHOD: / **GC** ___ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: — **Blank analysis date:** 2/15/18 **Associated samples:** ~~All~~ (CB)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
	MB 320-208646/12	2	3	4	5			
~~TPO~~ C4-C12	17.7	21/4	18/4	21/4	22/4			

Blank extraction date:_____ **Blank analysis date:**_____ **Associated samples:**_____
Conc. units:_____

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853G7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35893-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-PWGas-02082018	5X	2	3	4	5				
GRO (C4-C12)	19	95	21	18	21	22				

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Ethanol

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Ethanol by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Ethanol - Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Field Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

LDC #: 41853G43 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35808-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: Q
2nd Reviewer: K

METHOD: GC Ethanol (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A / A	RSD ≤ 20% ICV ≤ ±20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	NO	EB=EB-DW-QS-02082018 (320-35893-1)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
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12				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35808-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-12-18A	320-35808-1	Water	02/06/18
MW-22-18A	320-35808-2	Water	02/06/18
MW-08-18A	320-35808-3	Water	02/06/18
MW-09-18A	320-35808-4	Water	02/06/18
MW-10-18A	320-35808-5	Water	02/06/18
MW-22-18ADUP	320-35808-2DUP	Water	02/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35808-1

No Sample Data Qualified in this SDG

LDC #: 41853G51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35808-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	RSD ≤ 20%. r^2 ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	NO	EB: EB-PW-GAS-02082018(320-35893-1)
VI.	Matrix spike/Matrix spike duplicates /DUP	N/A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	N	
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-12-18A	320-35808-1	Water	02/06/18
2	MW-22-18A	320-35808-2	Water	02/06/18
3	MW-08-18A	320-35808-3	Water	02/06/18
4	MW-09-18A	320-35808-4	Water	02/06/18
5	MW-10-18A	320-35808-5	Water	02/06/18
6	MW-22-18ADUP	320-35808-2DUP	Water	02/06/18
7				
8				
9				
10				
11				
12				
13				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A	320-35870-1	Water	02/07/18
MW-04-18A	320-35870-2	Water	02/07/18
MW-01-18A	320-35870-3	Water	02/07/18
MW-21-18A	320-35870-4	Water	02/07/18
MW-14-18A	320-35870-5	Water	02/07/18
MW-17-18A	320-35870-6	Water	02/07/18
MW-02-18A	320-35870-7	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
TB-02072018	320-35870-12	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	MW-15-18A MW-04-18A MW-01-18A TB-02072018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/20/18	Acetone Vinyl acetate	25.1 23.9	MW-21-18A MW-14-18A MW-17-18A MW-02-18A MW-03-18A MW-03-P-18A CLPW-MW05-18A CLPW-MW01-18A	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02072018	UJ (all non-detects) UJ (all non-detects)	A
02/15/18	Vinyl acetate 2-Hexanone	23.9 27.1	MW-15-18A MW-04-18A MW-01-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-209289/12	02/20/18	1,2,4-Trimethylbenzene	0.164 ug/L	MW-21-18A MW-14-18A MW-17-18A MW-02-18A MW-03-18A MW-03-P-18A CLPW-MW05-18A CLPW-MW01-18A

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

Sample TB-02072018 was identified as a trip blank. No contaminants were found.

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Acetone	7.4 ug/L	MW-15-18A MW-04-18A MW-01-18A MW-21-18A MW-14-18A MW-17-18A MW-02-18A MW-03-18A MW-03-P-18A CLPW-MW05-18A CLPW-MW01-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-21-18A	Acetone	4.3 ug/L	4.3U ug/L
MW-14-18A	Acetone	3.1 ug/L	3.1U ug/L
MW-02-18A	Acetone	2.6 ug/L	2.6U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
MW-02-18AMS/MSD (MW-02-18A)	Vinyl acetate	233 (54-146)	240 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	MW-03-18A	MW-03-P-18A	
1,2-Dichloroethane	7.3	6.4	13 (≤25)
Methyl-tert-butyl ether	0.37	0.35	6 (≤25)

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in twelve samples.

Due to equipment blank contamination, data were qualified as not detected in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35870-1

Sample	Compound	Flag	A or P	Reason (Code)
MW-15-18A MW-04-18A MW-01-18A TB-02072018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
MW-21-18A MW-14-18A MW-17-18A MW-02-18A MW-03-18A MW-03-P-18A CLPW-MW05-18A CLPW-MW01-18A	Acetone Vinyl acetate	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
TB-02072018 MW-15-18A MW-04-18A MW-01-18A	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35870-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-21-18A	Acetone	4.3U ug/L	A	F
MW-14-18A	Acetone	3.1U ug/L	A	F
MW-02-18A	Acetone	2.6U ug/L	A	F

LDC #: 41853H1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-35870-1 Level IV Page: 1 of 2
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A MW	RSD≤15%, r^2 ICV≤20%
IV.	Continuing calibration	MW	CCV≤20/50%
V.	Laboratory Blanks	MW	
VI.	Field blanks	MW	TB=12. EB=EB-PWEGS-02082018(320-35893-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	MW	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	MW	D = 8+9
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1 2	MW-15-18A	320-35870-1	Water	02/07/18
2 2	MW-04-18A	320-35870-2	Water	02/07/18
3 2	MW-01-18A	320-35870-3	Water	02/07/18
4 3	MW-21-18A	320-35870-4	Water	02/07/18
5 3	MW-14-18A	320-35870-5	Water	02/07/18
6 3	MW-17-18A	320-35870-6	Water	02/07/18
7 3	MW-02-18A	320-35870-7	Water	02/07/18
8 3	MW-03-18A	320-35870-8	Water	02/07/18
9 3	MW-03-P-18A	320-35870-9	Water	02/07/18
10 3	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11 3	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12 1	TB-02072018	320-35870-12	Water	02/07/18
13	MW-02-18AMS	320-35870-7MS	Water	02/07/18

LDC #: 41853H1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-35870-1 Level IV Page: 2 of 2
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: 9

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

	Client ID	Lab ID	Matrix	Date
14	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
15				
16				
17				
18				
19				

Notes:

	MB 320-208790/12						
	MB 320-208649/12						
	MB 320-209289/12						

LDC #: 41853H1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: R

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		✓		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?		✓		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	

LDC #: 41853H1

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer: PC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	1-3, 12, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Q
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/20/18	H022001A	F	25.1		4-11, 13-14, MB (bot 3+ND)	J/UJ/A
			HH	23.9			
	2/12/18	H02130I	HH	27.0		12, MB (ND)	J/UJ/A
			Z	26.4			
	2/15/18	H02150I	HH	23.9		1-3, MB (ND)	J/UJ/A
			Z	27.1			

CONCAL.1SB

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Q
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a method blank associated with every sample in this SDG?
(Y) N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
(Y) N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 3/20/18
Conc. units: ug/L Associated Samples: 4-11

Compound	Blank ID	Sample Identification								
MB 320-209289/12										
Methylene chloride										
Acetone										
DDD	0.164									

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35893-1) Associated Samples: 1-11 Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-PWGas-02082018	10X	4	5	7					
F	7.4	74	4.3	3.1	2.6					

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: Q
2nd Reviewer: R

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		13/14	HH	233 (54-146)	240 (54-146)	( )	7 (ND)	J (all dets) / A (Q)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC#: 41853H1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: a
2nd Reviewer: M

METHOD: GCMS VOCs (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		RPD (≤25)
	8	9	
L	7.3	6.4	13
LL	0.37	0.35	6

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853H1_AECOM.wpd

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: PG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (20 std)	Recalculated RRF (20 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/3/18	L (1st internal standard)	0.4852	0.4852	0.4801	0.4801	2.3	2.3
	(HP10)		EE (2nd internal standard)	2.0911	2.0911	2.1091	2.1091	1.0	1.0
			KKK (3rd internal standard)	3.1780	3.1780	3.1114	3.1114	4.5	4.5
			F (4th internal standard)	0.6685	0.6685	0.6976	0.6976	4.6	4.6
2	ICAL	1/4/18	LL (1st internal standard)	0.6343	0.6343	0.6327	0.6327	4.3	4.3
	(HP12)		AA (2nd internal standard)	0.3716	0.3716	0.3672	0.3672	4.6	4.6
			BB (3rd internal standard)	0.9180	0.9180	0.9022	0.9022	3.3	3.3
			ZZZ (4th internal standard)	0.9339	0.9339	0.9553	0.9553	4.7	4.7
3			S (1st internal standard)						
			EE (2nd internal standard)						
			MMM (3rd internal standard)						
			(4th internal standard)						
4			K (1st internal standard)						
			S (2nd internal standard)						
			AA (3rd internal standard)						
			BB (4th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: PG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	H022001A	2/20/18	L (1st internal standard)	0.4801	0.4507	0.4507	6.1	6.1
	(HP10)		EE (2nd internal standard)	2.1091	2.168	2.168	2.8	2.8
			KKK (3rd internal standard)	3.1114	3.188	3.188	2.5	2.5
			F (4th internal standard)	0.6976	0.5223	0.5223	25.1	25.1
2	H021301	2/13/18	LL (1st internal standard)	0.6327	0.5976	0.5976	5.6	5.6
	(HP12)		AA (2nd internal standard)	0.3672	0.3610	0.3610	1.7	1.7
			BB (3rd internal standard)	0.9022	0.8714	0.8714	3.4	3.4
			ZZZ (4th internal standard)	0.9553	0.9606	0.9606	0.6	0.6
3	H021501	2/15/18	LL (1st internal standard)	0.6327	0.6103	0.6103	3.5	3.5
	(HP12)		AA (2nd internal standard)	0.3672	0.3733	0.3733	1.7	1.6
			BB (3rd internal standard)	0.9022	0.8660	0.8660	4.0	4.0
			ZZZ (4th internal standard)	0.9553	0.9390	0.9390	1.7	1.7
4			S (1st internal standard)					
			EE (2nd internal standard)					
			MMM (3rd internal standard)					
			(4th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: CL
2nd reviewer: SC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	20.0	19.1	95	95	0
1,2-Dichloroethane-d4		18.6	93	93	
Toluene-d8		18.7	93	93	
Bromofluorobenzene		20.7	104	104	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD sample: 13/14

Compound	Spike Added (µg/L)		Sample Concentration (µg/L)	Spiked Sample Concentration (µg/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	20.0	20.0	ND	18.6	19.7	93	93	98	98	6	6
Trichloroethene	↓	↓	↓	18.0	18.3	90	90	91	91	1	2
Benzene	↓	↓	↓	19.2	19.7	96	96	99	99	3	3
Toluene	↓	↓	↓	19.5	19.4	98	98	97	97	0	1
Chlorobenzene	↓	↓	↓	20.4	21.1	102	102	106	106	3	3

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: Q
2nd Reviewer: A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: 320-208190/5

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20.0	20.0	19.7	19.6	98	98	98	98	0	1
Trichloroethene	↓	↓	19.6	19.7	98	98	98	98	0	1
Benzene	↓	↓	20.2	20.1	101	101	101	101	0	0
Toluene	↓	↓	19.9	19.5	100	100	98	98	2	2
Chlorobenzene	↓	↓	20.3	19.8	102	102	99	99	3	3

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853H1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?

(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 1, LL:

Conc. = $\frac{(88730)(10.0)(1)}{(26964)(0.627)(\ )(\ )}$

= 52.0 Mg2

#	Sample ID	Compound	Reported Concentration (Mg2)	Calculated Concentration ( )	Qualification
	1	LL	52		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Metals

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A**	320-35870-1**	Water	02/07/18
MW-04-18A**	320-35870-2**	Water	02/07/18
MW-01-18A**	320-35870-3**	Water	02/07/18
MW-21-18A**	320-35870-4**	Water	02/07/18
MW-14-18A**	320-35870-5**	Water	02/07/18
MW-17-18A**	320-35870-6**	Water	02/07/18
MW-02-18A**	320-35870-7**	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Copper	0.40 ug/L	All samples in SDG 320-35870-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
CLPW-MW01-18A	Copper	0.75 ug/L	0.75U ug/L

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For MW-02-18AMS/MSD, no data were qualified for Calcium and Sodium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	MW-03-18A	MW-03-P-18A	
Arsenic	46	45	2 (≤25)
Barium	27	28	4 (≤25)
Iron	190	180	5 (≤25)
Calcium	530000	540000	2 (≤25)
Magnesium	120000	120000	0 (≤25)
Manganese	510	500	2 (≤25)
Molybdenum	1300	1300	0 (≤25)
Potassium	26000	26000	0 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	MW-03-18A	MW-03-P-18A	
Selenium	27	26	4 (≤25)
Sodium	230000	230000	0 (≤25)

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Metals - Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Metals - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Metals - Field Blank Data Qualification Summary - SDG 320-35870-1

Sample	Analyte	Modified Final Concentration	A or P	Code
CLPW-MW01-18A	Copper	0.75U ug/L	A	F

LDC #: 41853H4a

SDG #: 320-35870-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 4/13/18

Page: 1 of 2

Reviewer: √3

2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB = EB-PW Gas-02082018 from 320-35893-1
VII.	Matrix Spike/Matrix Spike Duplicates	A	(12, 13); Ca, Na > 4x
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(8, 9)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Level III validation.
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; ND = No compounds detected; D = Duplicate; SB=Source blank
N = Not provided/applicable; R = Rinsate; TB = Trip blank; OTHER:
SW = See worksheet; FB = Field blank; EB = Equipment blank

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-15-18A**	320-35870-1**	Water	02/07/18
2	MW-04-18A**	320-35870-2**	Water	02/07/18
3	MW-01-18A**	320-35870-3**	Water	02/07/18
4	MW-21-18A**	320-35870-4**	Water	02/07/18
5	MW-14-18A**	320-35870-5**	Water	02/07/18
6	MW-17-18A**	320-35870-6**	Water	02/07/18
7	MW-02-18A**	320-35870-7**	Water	02/07/18
8	MW-03-18A	320-35870-8	Water	02/07/18
9	MW-03-P-18A	320-35870-9	Water	02/07/18
10	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12	MW-02-18AMS	320-35870-7MS	Water	02/07/18
13	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
14				
15				

LDC #: 41853H4a

SDG #: 320-35870-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Reviewer: KB

2nd Reviewer: KD

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

	Client ID	Lab ID	Matrix	Date
16				
17				
18				

Notes:

Method: Metals (EPA SW 846 Method 6010/6020/7000)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were the low standard checks within 70-130%	✓			
Were all initial calibration correlation coefficients within limits as specified by the method?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

DC #: 41853#4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
2e		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
12, 13	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853H4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-PWGas-02082018	Action Limit	11									
Cu	0.40	2	0.75 F									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 41853H4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: VB
2nd Reviewer: AL

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	8	9	
Arsenic	46	45	2
Barium	27	28	4
Iron	190	180	5
Calcium	530000	540000	2
Magnesium	120000	120000	0
Manganese	510	500	2
Molybdenum	1300	1300	0
Potassium	26000	26000	0
Selenium	27	26	4
Sodium	230000	230000	0

LDC #: 41853#4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Low Level calibration)						
CRI	ICP/MS (Low Level calibration) 22:30	Cd	0.48304 ug/L	0.500 ug/L	97%	97%	Y
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration) 23:17	Zn	104.91218 ug/L	100 ug/L	105%	105%	Y
ICV	CVAA (Initial calibration)	Hg	4.9308 ug/L	5.00 ug/L	99%	99%	Y
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration) 04:12	Al	2528.97809 ug/L	2500 ug/L	101%	101%	Y
CCV	CVAA (Continuing calibration) 13:53	Hg	5.0285 ug/L	5.00 ug/L	101%	101%	Y

ICP-MS TUNE	Calculation	Mass	Actual (Mean Counts / Axis)	Required (Counts / Axis)	Recalculated /Found %RSD / X%	Acceptable (Y/N)
	Mass Axis	59	59.00	± 0.1 AMU	NA	Y
	%RSD	205	35014.4	≤ 5% RSD	2.58 RSD	Y

Comments:

LDC #: 41853#4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: AC

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = |I-SDR| / I x 100 Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ni	49.09698 ug/L	50.0 ug/L	98%	98%	Y
LCS	Laboratory control sample	Cu	982.55147 ug/L	1000 ug/L	98%	98%	Y
MS	Matrix spike	Hg	(SSR-SR) 4.9800 ug/L	5.00 ug/L	100%	100%	Y
MSD	Duplicate	Hg	5.0241 ug/L	FOUND: 4.9800 ug/L	1 RPD	1 RPD	Y
PDS	Post digestion spike	Sb	880.34040 ug/L	SR = ND SA = 1000 ug/L	88%	88%	Y
SD	ICP serial dilution	Ca	581285.19583 ug/L	SR = 570000 ug/L	2.0% D	2.1% D	Y

Comments: _____

LDC #: 41853#4a
SDG #: 320-35870-1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JB
2nd reviewer: A

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se #4 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Se From Raw Data = $3.62749 \times 10(DF)$
$= 36.7249\ ug/L$

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	1	As	91	91	Y
	2	Ca	500000	500000	Y
	3	Na	250000	250000	Y
	4	Se	36	36	Y
	5	Mn	230	230	Y
	6	Ba	24	24	Y
	7	Mo	910	910	Y
	8	K	26000	26000	Y
	9	Fe	180	180	Y
	10	Mg	70000	70000	Y
	11	V	22	22	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A	320-35870-1	Water	02/07/18
MW-15-18ARE	320-35870-1RE	Water	02/07/18
MW-04-18A	320-35870-2	Water	02/07/18
MW-01-18A	320-35870-3	Water	02/07/18
MW-21-18A	320-35870-4	Water	02/07/18
MW-14-18A	320-35870-5	Water	02/07/18
MW-17-18A	320-35870-6	Water	02/07/18
MW-02-18A	320-35870-7	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
MW-15-18AMS	320-35870-1MS	Water	02/07/18
MW-15-18AMSD	320-35870-1MSD	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
MW-02-18ADUP	320-35870-7DUP	Water	02/07/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
MW-15-18ARE	Nitrite as N	51.72 hours	48 hours	UJ (all non-detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Sulfate	0.15 mg/L	MW-15-18A MW-04-18A MW-01-18A MW-21-18A MW-14-18A MW-17-18A MW-02-18A MW-03-18A MW-03-P-18A CLPW-MW05-18A CLPW-MW01-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
MW-02-18AMS/MSD (MW-02-18A)	Sulfate	-	122 (87-112)	J (all detects)	A

Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	MW-03-18A	MW-03-P-18A	
Chloride	140 mg/L	140 mg/L	0 (≤25)
Nitrate as N	0.51 mg/L	0.58 mg/L	13 (≤25)
Sulfate	2000 mg/L	2000 mg/L	0 (≤25)
Bicarbonate alkalinity	180000 ug/L	170000 ug/L	6 (≤25)

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria
MW-15-18A	Nitrite as N	MS/MSD spike was not spiked using sample MW-15-18A as matrix.	MS/MSD should be included per batch.

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
MW-15-18ARE	Nitrite as N	R	A

Due to MS/MSD %R, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35870-1

Sample	Analyte	Flag	A or P	Reason (Code)
MW-02-18A	Sulfate	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)
MW-15-18ARE	Nitrite as N	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

LDC #: 41853H6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35870-1 Level III Page: 1 of 2

Laboratory: Test America, Inc. Reviewer: JD

2nd Reviewer: A

vBicarbonate

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-PW6as-0208018 From 320-35893-1
VI.	Matrix Spike/Matrix Spike Duplicates	SW	(12,13) (14,15)
VII.	Duplicate sample analysis	A	16
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	(8,9)
X.	Sample result verification	SW/N	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-15-18A	320-35870-1	Water	02/07/18
2	MW-04-18A	320-35870-2	Water	02/07/18
3	MW-01-18A	320-35870-3	Water	02/07/18
4	MW-21-18A	320-35870-4	Water	02/07/18
5	MW-14-18A	320-35870-5	Water	02/07/18
6	MW-17-18A	320-35870-6	Water	02/07/18
7	MW-02-18A	320-35870-7	Water	02/07/18
8	MW-03-18A	320-35870-8	Water	02/07/18
9	MW-03-P-18A	320-35870-9	Water	02/07/18
10	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12	MW-15-18AMS	320-35870-1MS	Water	02/07/18
13	MW-15-18AMSD	320-35870-1MSD	Water	02/07/18
14	MW-02-18AMS	320-35870-7MS	Water	02/07/18
15	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
16	MW-02-18ADUP	320-35870-7DUP	Water	02/07/18
17	# 1 RE 1			

LDC #: 41853H6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35870-1 Level III Page: 2 of 2

Laboratory: Test America, Inc. Reviewer: VB

2nd Reviewer: AC

Bicarbonate

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A)

	Client ID	Lab ID	Matrix	Date
18				
19				
20				
21				

Notes:

DC #: 41853#6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: R

All circled methods are applicable to each sample.

Sample ID	Parameter
1-11	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) O-(PO_4) (Alk) CN NH_3 TKN TOC Cr6+ ClO_4
17	pH TDS Cl F NO_3 (NO_2) SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
DC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
12,13	pH TDS Cl F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
14,15	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
16	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 (Alk) CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 41853#e

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	EPA 9056A		
Parameters:	Nitrite as N		
Technical holding time:	48 Hours.		

Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
1	2/7/18 8:54	2/9/18 12:37	51.72 hrs.	J1 UJ/A ~~H UJ/A~~ (ND) * reanalysis.	(H)		

LDC #: 41853H6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: AC

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/8/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 11

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-PWGas-02082018									
Sulfate	0.15	0.75								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853#6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JB
2nd Reviewer: SP

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	(14,15)	W	SO4		122 (87-112)		7	J det / A (Det) (Q)

Comments:

LDC#: 41853H6 **VALIDATION FINDINGS WORKSHEET**
Field Duplicates

Reviewer: CB
2nd Reviewer: A

Inorganics, Method: see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	8	9		
Chloride	140	140	0	
Nitrate as N	0.51	0.58	13	
Sulfate	2000	2000	0	
Bicarbonate Alkalinity (ug/L)	180000	170000	6	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853H6.wpd

LDC #: 41853H6

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: VB
2nd Reviewer: AC

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1	NO_2			MS/D spike was not spiked using #1 as matrix. MS/D should be included per batch.	~~J/UJ/A (ND)~~ (V) Text VB

Comments:

LDC #: 41853H6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		17	Reanalysis confirmed ND Sample ~~w~~ passing QC - no matrix interference. OK to report original for NO_2	17	~~N~~ R1A (D)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A**	320-35870-1**	Water	02/07/18
MW-04-18A**	320-35870-2**	Water	02/07/18
MW-01-18A**	320-35870-3**	Water	02/07/18
MW-21-18A**	320-35870-4**	Water	02/07/18
MW-14-18A**	320-35870-5**	Water	02/07/18
MW-17-18A**	320-35870-6**	Water	02/07/18
MW-02-18A**	320-35870-7**	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-208646/12	02/15/18	Gasoline range organics (C4-C12)	17.7 ug/L	MW-15-18A** MW-04-18A** MW-01-18A**

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-01-18A**	Gasoline range organics (C4-C12)	39 ug/L	39U ug/L

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Gasoline range organics (C4-C12)	19 ug/L	All samples in SDG 320-35870-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
MW-01-18A**	Gasoline range organics (C4-C12)	39 ug/L	39U ug/L
MW-21-18A**	Gasoline range organics (C4-C12)	15 ug/L	15U ug/L
MW-14-18A**	Gasoline range organics (C4-C12)	22 ug/L	22U ug/L
MW-02-18A**	Gasoline range organics (C4-C12)	36 ug/L	36U ug/L
MW-03-18A	Gasoline range organics (C4-C12)	27 ug/L	27U ug/L
MW-03-P-18A	Gasoline range organics (C4-C12)	16 ug/L	16U ug/L
CLPW-MW01-18A	Gasoline range organics (C4-C12)	25 ug/L	25U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	MW-03-18A	MW-03-P-18A	
Gasoline range organics (C4-C12)	27	16	51 (≤25)

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to equipment blank contamination, data were qualified as not detected in seven samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-01-18A**	Gasoline range organics (C4-C12)	39U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35870-1

Sample	Compound	Modified Final Concentration	A or P	Code
MW-01-18A**	Gasoline range organics (C4-C12)	39U ug/L	A	F
MW-21-18A**	Gasoline range organics (C4-C12)	15U ug/L	A	F
MW-14-18A**	Gasoline range organics (C4-C12)	22U ug/L	A	F
MW-02-18A**	Gasoline range organics (C4-C12)	36U ug/L	A	F
MW-03-18A	Gasoline range organics (C4-C12)	27U ug/L	A	F
MW-03-P-18A	Gasoline range organics (C4-C12)	16U ug/L	A	F
CLPW-MW01-18A	Gasoline range organics (C4-C12)	25U ug/L	A	F

LDC #: 41853H7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-35870-1 Level III/IV Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: A

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (GRO FT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 20%. r² ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB=EB-PW-GRO-02082018(320-35893-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 8+9
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation.
XIII.	Target compound identification	A	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-15-18A**	320-35870-1**	Water	02/07/18
2	MW-04-18A**	320-35870-2**	Water	02/07/18
3	MW-01-18A**	320-35870-3**	Water	02/07/18
4	MW-21-18A**	320-35870-4**	Water	02/07/18
5	MW-14-18A**	320-35870-5**	Water	02/07/18
6	MW-17-18A**	320-35870-6**	Water	02/07/18
7	MW-02-18A**	320-35870-7**	Water	02/07/18
8	MW-03-18A	320-35870-8	Water	02/07/18
9	MW-03-P-18A	320-35870-9	Water	02/07/18
10	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12	MW-02-18AMS	320-35870-7MS	Water	02/07/18
13	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18

LDC #: 41853H7

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer:

Method: 1 GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?	✓			
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 41852H7

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: MC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: ~~48534~~ 47

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Q
2nd Reviewer: AK

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: ___ **Blank analysis date:** 2/15/18 **Associated samples:** 1-3 (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
MB 320-208646/12		3						
GRO (C4-C12)	17.7		39/U					

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___
Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853H7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35893-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-PWGas-02082018	5X	3	4	5	7	8	9	11	
GRO (C4-C12)	19	95	39	15	22	36	27	16	25	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC#: 41853H7

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC GRO (PA SW 846 Method 8260B/CALUFT)

Compound	Concentration (ug/L)		RPD (≤25)
	8	9	
GRO (C4-C12)	27	16	51

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853H7_AECOM.wpd

LDC #: 41853#7

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (1000std)	Recalculated CF (1000 std)	Reported Ave CF (initial)	Recalculated Ave CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/14/18	GRDC4-C12	35771	35771	38969427	38969.3	7.6	7.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 41853H7

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: AK

Method: GC GRO

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
1/10/2018	HP10	GRO	0	6662845	50.00
			s1	10283898	100.00
			s2	46057945	500.00
			s3	92403415	1000.00
			s4	227072860	2500.00

Regression Output		*Reported*
Constant	*1613202.846853*	*2092007.51000*
Std Err of Y Est		
R Squared	*0.999964*	*0.999700*
Degrees of Freedom		
X Coefficient(s)	*90220.469582*	*88314.25560*
Std Err of Coef.		
Correlation Coefficient	*0.999982*	
Coefficient of Determination (r^2)	*0.999964*	*0.999700*

LDC #: 48534H7

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC √ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	4022001A (HP10)	2/20/18	GRO C4-C12	1000	989	989	1.1	1.1
2	4021501	2/15/18		38969	42150	42150	8.2	8.2
3	SA021511	2/15/18		38969	38497	38497	1.2	1.2
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #40521 /

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: [illegible]

METHOD: ✓ **GC** __ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
BFB		20.0	20.7	104	104	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 41853A7

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 12/13

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	1000	1000	36	906	900	87	87	86	86	1	1
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185347

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer: A

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Concentration; LCS = Laboratory control sample percent recovery; LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 320-208646

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	1000	1000	958	936	96	96	94	94	2	2
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41883H7

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: 9
2nd Reviewer: A

METHOD: ✓ **GC** ___ **HPLC**

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name ERO C4-C12

Concentration = $\frac{(3936249)\ (1)}{(389694267)}$

= 101.0 µg/L

#	Sample ID	Compound	Reported Concentrations (µg/L)	Recalculated Results Concentrations ( )	Qualifications
	1	ERO C4-C12	101		

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Ethanol

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A**	320-35870-1**	Water	02/07/18
MW-04-18A**	320-35870-2**	Water	02/07/18
MW-01-18A	320-35870-3	Water	02/07/18
MW-21-18A	320-35870-4	Water	02/07/18
MW-14-18A	320-35870-5	Water	02/07/18
MW-17-18A	320-35870-6	Water	02/07/18
MW-02-18A	320-35870-7	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Ethanol by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Ethanol - Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Field Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

LDC #: 41853H43 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18

SDG #: 320-35870-1 Level III/IV Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Ethanol (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	~~RSD~~ ≤ 20%. ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	~~EB=EB-DW-GAS-02082018(320-35893-1)~~
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	ND	D=8+9
X.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation.
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	MW-15-18A**	320-35870-1**	Water	02/07/18
2	MW-04-18A**	320-35870-2**	Water	02/07/18
3	MW-01-18A	320-35870-3	Water	02/07/18
4	MW-21-18A	320-35870-4	Water	02/07/18
5	MW-14-18A	320-35870-5	Water	02/07/18
6	MW-17-18A	320-35870-6	Water	02/07/18
7	MW-02-18A	320-35870-7	Water	02/07/18
8	MW-03-18A	320-35870-8	Water	02/07/18
9	MW-03-P-18A	320-35870-9	Water	02/07/18
10	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12	MW-02-18AMS	320-35870-7MS	Water	02/07/18
13	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
14				
15				
16				
17				

LDC #: 41853H43

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: M

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			✓	
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 41853H43

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: MC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?		✓		
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: #18334#3

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported Ave CF (initial)	Recalculated Ave CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/15/18	Ethanol	70194	70194	70660.865	70660.83	1.2	1.2
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853H43

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: AC

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported	Recalculated	Reported	Recalculated
					CF/ Conc. CCV	CF/ Conc. CCV	%D	%D
1	WCCV801	2/18/18	Ethanol	70661	69304	69304	1.9	1.9
2	WCCV812	2/18/18	〃	70661	70522	70522	0.2	0.2
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 110234

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

Page: 1 of 1

Reviewer: 9

2nd reviewer: K

METHOD: √ **GC** ___ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Isobutyl alcohol		20.0	16.2	81	81	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 41853H43

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 2 of 2
Reviewer: 9
2nd Reviewer: AC

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 10/13

Compound	Spike Added ( )		Sample Conc. ( )	Spike Sample Concentration ( )		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Ethanol	20000	20000	ND	18700	19200	94	94	96	96	3	3

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 48534A3

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Reviewer: 9
2nd Reviewer: JK

METHOD: __✓GC __HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 160-35173

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Ethanol	20000	NA	18100	NA	90	90				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #41853H43

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Q
2nd Reviewer: K

METHOD: √ **GC** __ **HPLC**

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1-2 Compound Name ND
LCS:

Concentration = (1275630)(1)(1000) / (70660.865)
= 18052.1 MBL

#	Sample ID	Compound	Reported Concentrations (MBL)	Recalculated Results Concentrations ( )	Qualifications
	LCS	Ethanol	~~159~~ 18100		

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35870-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-15-18A	320-35870-1	Water	02/07/18
MW-04-18A	320-35870-2	Water	02/07/18
MW-01-18A	320-35870-3	Water	02/07/18
MW-21-18A	320-35870-4	Water	02/07/18
MW-14-18A	320-35870-5	Water	02/07/18
MW-17-18A	320-35870-6	Water	02/07/18
MW-02-18A	320-35870-7	Water	02/07/18
MW-03-18A	320-35870-8	Water	02/07/18
MW-03-P-18A	320-35870-9	Water	02/07/18
CLPW-MW05-18A	320-35870-10	Water	02/07/18
CLPW-MW01-18A	320-35870-11	Water	02/07/18
MW-02-18AMS	320-35870-7MS	Water	02/07/18
MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
MW-02-18ADUP	320-35870-7DUP	Water	02/07/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 (from SDG 320-35893-1) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

Samples MW-03-18A and MW-03-P-18A were identified as field duplicates. No results were detected in any of the samples.

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35870-1

No Sample Data Qualified in this SDG

LDC #: 41853H51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/27/18
SDG #: 320-35870-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer: A

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	RSD ≤ 20% . r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB-PNGas-02082018 (320-358931)
VI.	Matrix spike/Matrix spike duplicates/DUP	A/A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	ND	D = 8+9
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-15-18A	320-35870-1	Water	02/07/18
2	MW-04-18A	320-35870-2	Water	02/07/18
3	MW-01-18A	320-35870-3	Water	02/07/18
4	MW-21-18A	320-35870-4	Water	02/07/18
5	MW-14-18A	320-35870-5	Water	02/07/18
6	MW-17-18A	320-35870-6	Water	02/07/18
7	MW-02-18A	320-35870-7	Water	02/07/18
8	MW-03-18A	320-35870-8	Water	02/07/18
9	MW-03-P-18A	320-35870-9	Water	02/07/18
10	CLPW-MW05-18A	320-35870-10	Water	02/07/18
11	CLPW-MW01-18A	320-35870-11	Water	02/07/18
12	MW-02-18AMS	320-35870-7MS	Water	02/07/18
13	MW-02-18AMSD	320-35870-7MSD	Water	02/07/18
14	MW-02-18ADUP	320-35870-7DUP	Water	02/07/18
15				
16				
17				
18				

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18
TB-02082018	320-35893-4	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	TB-02082018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/20/18	Acetone	25.1	CLPW-MW03-18A EB-PWGas-02082018	J (all detects) UJ (all non-detects)	A
	Vinyl acetate	23.9	CLPW-MW04-18A	J (all detects) UJ (all non-detects)	

Date	Compound	%D	Associated Samples	Flag	A or P
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02082018	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-209289/12	02/20/18	1,2,4-Trimethylbenzene	0.164 ug/L	CLPW-MW03-18A EB-PWGas-02082018 CLPW-MW04-18A

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
CLPW-MW04-18A	1,2,4-Trimethylbenzene	0.14 ug/L	0.14U ug/L

VI. Field Blanks

Sample TB-02082018 was identified as a trip blank. No contaminants were found.

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Acetone	7.4 ug/L	CLPW-MW03-18A CLPW-MW04-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in four samples.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35893-1

Sample	Compound	Flag	A or P	Reason (Code)
TB-02082018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
CLPW-MW03-18A EB-PWGas-02082018 CLPW-MW04-18A	Acetone Vinyl acetate	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
TB-02082018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

Sample	Compound	Modified Final Concentration	A or P	Code
CLPW-MW04-18A	1,2,4-Trimethylbenzene	0.14U ug/L	A	B

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

LDC #: 41853I1

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/11/18

SDG #: 320-35893-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: 9

2nd Reviewer: MC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A SW	~~RSD~~ ≤ 15%. r^2 ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB = 2. TB = 1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
4	TB-02082018	320-35893-4	Water	02/08/18
5				
6				
7				
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853I1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	4, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: 9
2nd Reviewer: RC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications (C)
	2/20/18	H022001A	F	25.1		1-3, MB(ND)	J/UH/A
			HH	23.9			
	2/13/18	H021301	HH	27.0		4, MB (ND)	J/UH/A
			Z	26.4			

LDC #: 48531/1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?

Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 2/20/18

Conc. units: ug/L Associated Samples: 1-3 (B)

Compound	Blank ID	Sample Identification								
MB 320-209789/12		3								
Methylene chloride										
Acetone										
DDD	0.164		0.14/U							

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 41853I1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: T
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35893-1) Associated Samples: 1,3 (F)

Compound	Blank ID	Sample Identification								
	EB-PWGas-02082018	10X								
F	7.4	74								

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Copper	0.40 ug/L	CLPW-MW03-18A CLPW-MW04-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

LDC #: 41853I4a

SDG #: 320-35893-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/12/18

Page: 1 of 1

Reviewer: VB

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB = 2
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
4				
5				
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9				
10				
11				
12				
13				

Notes:

DC #: 41853I4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853l4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: A

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 3

Analyte	Blank ID	Sample Identification										
	2	Action Limit										
Cu	0.40	2										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18
CLPW-MW03-18AMS	320-35893-1MS	Water	02/08/18
CLPW-MW03-18AMSD	320-35893-1MSD	Water	02/08/18
CLPW-MW03-18ADUP	320-35893-1DUP	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H	Holding times were exceeded.
S	The sequence or number of standards used for the calibration was incorrect.
C	Correlation coefficient is <0.995.
R	%R for calibration is not within control limits
B	Presumed contamination from preparation (method) blank or calibration blank
L	Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits
Q	MS/MSD recovery was poor.
E	MS/MSD or Duplicate RPD or difference was high.
I	ICP ICS results were unsatisfactory.
A	ICP Serial Dilution %D were not within control limits
F	Presumed contamination from FB or ER.
D	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Post Digestion Spike recovery was not within control limits
V	Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chloride	0.255 mg/L	CLPW-MW03-18A CLPW-MW04-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Sulfate	0.15 mg/L	CLPW-MW03-18A CLPW-MW04-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

LDC #: 41853I6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18

SDG #: 320-35893-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: MS

2nd Reviewer: M

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A) (+ Bicarbonate)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 2
VI.	Matrix Spike/Matrix Spike Duplicates	A	4, 5
VII.	Duplicate sample analysis	A	6
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
4	CLPW-MW03-18AMS	320-35893-1MS	Water	02/08/18
5	CLPW-MW03-18AMSD	320-35893-1MSD	Water	02/08/18
6	CLPW-MW03-18ADUP	320-35893-1DUP	Water	02/08/18
7				
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

DC #: 41853I4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: M

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) O-(PO_4) Alk (CN) NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
6c	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
4,5	pH TDS (Cl) F (NO_3) (NO_2) (SO_4) O-(PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 (Alk) CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments: _____

LDC #: 41853I6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: VB
2nd Reviewer: AR

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples** 1, 3

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)										
Chloride	0.255		1.275									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853I6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/8/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 3

Analyte	Blank ID	Action Limit	Sample Identification							
	2									
Sulfate	0.15	0.75								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-PWGas-02082018	02/08/18	Gasoline range organics (C4-C12)	19 ug/L	CLPW-MW03-18A CLPW-MW04-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
CLPW-MW04-18A	Gasoline range organics (C4-C12)	24 ug/L	24U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35893-1

Sample	Compound	Modified Final Concentration	A or P	Code
CLPW-MW04-18A	Gasoline range organics (C4-C12)	24U ug/L	A	F

LDC #: 41853I7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35893-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: Q
2nd Reviewer: A

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260/CALUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20% . r^2 / ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	A	
VI.	Field blanks	A/W	EB = 2
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
4				
5				
6				
7				
8				

Notes:

LDC #: 41853I7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: A

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/8/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35893-1) Associated Samples: 1,3 Qual U (F)

Compound	Blank ID	Sample Identification								
	FB-PWGas-02082018	5X	3							
GRO (C4-C12)	19	95	24							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Ethanol

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Ethanol by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Ethanol - Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Ethanol - Field Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

LDC #: 41853I43 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/18
SDG #: 320-35893-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Ethanol (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	~~RSD~~ ≤20%. ICV ≤20%
III.	Continuing calibration	A	CCV ≤20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	~~FB~~ =2
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
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Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35893-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
CLPW-MW03-18A	320-35893-1	Water	02/08/18
EB-PWGas-02082018	320-35893-2	Water	02/08/18
CLPW-MW04-18A	320-35893-3	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Methane, Ethane, and Ethene by Method RSK-175

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-PWGas-02082018 was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

IX. Compound Quantitation

Raw data were not reviewed for Level III validation.

X. Target Compound Identification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-35893-1

No Sample Data Qualified in this SDG

LDC #: 41853I51 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/18
SDG #: 320-35893-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: IC

METHOD: GC Methane-Ethane-Ethene (Method RSK-175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	~~A~~ A	~~A~~ %D ≤ 20% . r^2 ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 2
VI.	Matrix spike/Matrix spike duplicates	N	CS
VII.	Laboratory control samples	A	LCS
VIII.	Field duplicates	N	
IX.	Compound quantitation RL/LOQ/LODs	N	
X.	Target compound identification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CLPW-MW03-18A	320-35893-1	Water	02/08/18
2	EB-PWGas-02082018	320-35893-2	Water	02/08/18
3	CLPW-MW04-18A	320-35893-3	Water	02/08/18
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Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35894-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW-11-18A	320-35894-1	Water	02/08/18
ITC45-MW-14-18A	320-35894-2	Water	02/08/18
ITC45-MW-30-18A	320-35894-3	Water	02/08/18
ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
ITC45-MW-33-18A	320-35894-5	Water	02/08/18
ITC02-MW-12-18A	320-35894-6	Water	02/08/18
ITC02-MW-29-18A	320-35894-7	Water	02/08/18
ITC02-MW-20-18A	320-35894-8	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	22.8 28.1 25.4 32.1 23.8 27.6 20.2	ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-29-18A ITC02-MW-20-18A	J (all detects) UJ (all non-detects)	A
03/20/18	Acetone Vinyl acetate	25.1 23.9	ITC45-MW-11-18A ITC45-MW-14-18A	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-209289/12	02/20/18	1,2,4-Trimethylbenzene	0.164 ug/L	ITC45-MW-11-18A ITC45-MW-14-18A

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

Sample TB-02082018 (from SDG 320-35893-1) was identified as a trip blank. No contaminants were found.

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	2-Butanone 2-Hexanone Acetone tert-Butyl alcohol	6.5 ug/L 1.3 ug/L 41 ug/L 8.9 ug/L	All samples in SDG 320-35894-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC02-MW-12-18A	Acetone	2.9 ug/L	2.9U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC02-MW-29-18A	Acetone	3.3 ug/L	3.3U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-209384 (ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-29-18A ITC02-MW-20-18A)	1,1,2,2-Tetrachloroethane	-	125 (71-121)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples ITC45-MW-30-18A and ITC45-MW-30-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	ITC45-MW-30-18A	ITC45-MW-30-P-18A	
Chloroform	0.31	0.34	9 (≤25)
Trichloroethene	2.6	2.6	0 (≤25)

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in eight samples.

Due to equipment blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35894-1

Sample	Compound	Flag	A or P	Reason (Code)
ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-29-18A ITC02-MW-20-18A	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
ITC45-MW-11-18A ITC45-MW-14-18A	Acetone Vinyl acetate	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35894-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35894-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC02-MW-12-18A	Acetone	2.9U ug/L	A	F
ITC02-MW-29-18A	Acetone	3.3U ug/L	A	F

LDC #: 41853J1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35894-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 15% . r² ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	SW	TB-02082018(320-35893-1)
VI.	Field blanks	SW	EB-ARMITAGE-02092018(320-35939-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	SW	D=3+4
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	ITC45-MW-11-18A	320-35894-1	Water	02/08/18
2	ITC45-MW-14-18A	320-35894-2	Water	02/08/18
3	ITC45-MW-30-18A	320-35894-3	Water	02/08/18
4	ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
5	ITC45-MW-33-18A	320-35894-5	Water	02/08/18
6	ITC02-MW-12-18A	320-35894-6	Water	02/08/18
7	ITC02-MW-29-18A	320-35894-7	Water	02/08/18
8	ITC02-MW-20-18A	320-35894-8	Water	02/08/18
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853J1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: K

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/21/18	H022101	F	22.8		3-8, MB	J/UJ/A
			HH	28.1		(dets+ND)	
			Y	25.4			
			Z	32.1			
			X	23.8			
			BB	27.6			
			KK	20.2			
	3/20/18	H022001A	F	25.1		1-2, MB (ND)	J/UJ/A
			HH	23.9			

CONCAL.1SB

LDC #: 41853V1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a method blank associated with every sample in this SDG?
(Y) N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
N (Y) N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 2/20/18
Conc. units: ug/L Associated Samples: 1-2

Compound	Blank ID	Sample Identification								
	MB 320-209789/12									
Methylene chloride										
Acetone										
DDD	0.164									

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 41853J1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35939-1) Associated Samples: All (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5/10X	6	7						
M	6.5	65								
Z	1.3	6.5								
F	41	410	2.9	3.3						
ZZZ	8.9	44.5								

LDC #: 41853-1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: 9
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-209384		BB	( )	125 (71-121)	( )	3-8, MB (ND)	Note 5 (K)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 41853J1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GCMS VOCs (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		RPD (≤25)
	3	4	
K	0.31	0.34	9
S	2.6	2.6	0

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853J1_AECOM.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35894-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW-11-18A	320-35894-1	Water	02/08/18
ITC45-MW-11-18ADL	320-35894-1DL	Water	02/08/18
ITC45-MW-14-18A	320-35894-2	Water	02/08/18
ITC45-MW-30-18A	320-35894-3	Water	02/08/18
ITC45-MW-30-18ADL	320-35894-3DL	Water	02/08/18
ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
ITC45-MW-30-P-18ADL	320-35894-4DL	Water	02/08/18
ITC45-MW-33-18A	320-35894-5	Water	02/08/18
ITC02-MW-12-18A	320-35894-6	Water	02/08/18
ITC02-MW-29-18A	320-35894-7	Water	02/08/18
ITC02-MW-20-18A	320-35894-8	Water	02/08/18
ITC02-MW-20-18ADL	320-35894-8DL	Water	02/08/18
ITC45-MW-11-18AMS	320-35894-1MS	Water	02/08/18
ITC45-MW-11-18AMSD	320-35894-1MSD	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Total Dissolved Solids by Standard Method 2540C
Total Organic Carbon by EPA SW 846 Method 9060A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
ITC45-MW-11-18ADL ITC45-MW-30-18ADL ITC45-MW-30-P-18ADL ITC02-MW-20-18ADL	Nitrite as N	18 days	48 hours	R (all non-detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Total organic carbon	0.172 mg/L	ITC45-MW-11-18A ITC45-MW-14-18A ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-20-18A
ICB/CCB	Sulfate	0.148 mg/L	ITC02-MW-12-18A ITC02-MW-29-18A
PB (prep blank)	Chloride	0.255 ug/L	ITC45-MW-11-18A ITC45-MW-14-18A ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-29-18A ITC02-MW-20-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
ITC02-MW-12-18A	Total organic carbon	670 ug/L	670U ug/L
ITC02-MW-20-18A	Total organic carbon	450 ug/L	450U ug/L

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Sulfate Chloride Total organic carbon	0.18 mg/L 0.12 mg/L 440 ug/L	ITC45-MW-11-18A ITC45-MW-14-18A ITC45-MW-30-18A ITC45-MW-30-P-18A ITC45-MW-33-18A ITC02-MW-12-18A ITC02-MW-29-18A ITC02-MW-20-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
ITC45-MW-14-18A	Total organic carbon	2100 ug/L	2100U ug/L
ITC45-MW-33-18A	Total organic carbon	1200 ug/L	1200U ug/L
ITC02-MW-12-18A	Total organic carbon	670 ug/L	670U ug/L
ITC02-MW-20-18A	Total organic carbon	450 ug/L	450U ug/L

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples ITC45-MW-30-18A and ITC45-MW-30-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	ITC45-MW-30-18A	ITC45-MW-30-P-18A	
Chloride	630 mg/L	630 mg/L	0 (≤25)
Nitrate as N	13 mg/L	13 mg/L	0 (≤25)
Sulfate	340 mg/L	340 mg/L	0 (≤25)
Total organic carbon	3600 ug/L	3500 ug/L	3 (≤25)
Total dissolved solids	1900000 ug/L	1900000 ug/L	0 (≤25)
Bicarbonate alkalinity	280000 ug/L	290000 ug/L	4 (≤25)

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Flag	A or P
ITC45-MW-11-18A ITC45-MW-30-18A ITC45-MW-30-P-18A ITC02-MW-20-18A	Nitrite as N	Chloride interference suspected in Nitrite as N analysis.	UJ (all non-detects)	A

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
ITC45-MW-11-18ADL ITC45-MW-30-18ADL ITC45-MW-30-P-18ADL ITC02-MW-20-18ADL	Nitrite as N	R	A

Due to matrix interference, data were qualified as estimated in four samples.

Due to laboratory blank contamination, data were qualified as not detected in two samples.

Due to equipment blank contamination, data were qualified as not detected in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35894-1

Sample	Analyte	Flag	A or P	Reason (Code)
ITC45-MW-11-18A ITC45-MW-30-18A ITC45-MW-30-P-18A ITC02-MW-20-18A	Nitrite as N	UJ (all non-detects)	A	Sample result verification (matrix interference) (V)
ITC45-MW-11-18ADL ITC45-MW-30-18ADL ITC45-MW-30-P-18ADL ITC02-MW-20-18ADL	Nitrite as N	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35894-1

Sample	Analyte	Modified Final Concentration	A or P	Code
ITC02-MW-12-18A	Total organic carbon	670U ug/L	A	B
ITC02-MW-20-18A	Total organic carbon	450U ug/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35894-1

Sample	Analyte	Modified Final Concentration	A or P	Code
ITC45-MW-14-18A	Total organic carbon	2100U ug/L	A	F
ITC45-MW-33-18A	Total organic carbon	1200U ug/L	A	F
ITC02-MW-12-18A	Total organic carbon	670U ug/L	A	F
ITC02-MW-20-18A	Total organic carbon	450U ug/L	A	F

LDC #: 41853J6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35894-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: JB

Bicarbonate 2nd Reviewer: AC

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), TDS (SM2540C), TOC (EPA SW846 Method 9060A)

~~=Gen~~ JB

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	~~A~~ SW	
II	Initial calibration	~~A~~	
III.	Calibration verification	~~A~~	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB-Armitage - 02092018 From 320-35939-1
VI.	Matrix Spike/Matrix Spike Duplicates	~~A~~	(10, 11)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	~~A~~	LCS
IX.	Field duplicates	SW	(4, 5) (12, 13)*
X.	Sample result verification	SW ~~A~~	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; *ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	ITC45-MW-11-18A	320-35894-1	Water	02/08/18
2	ITC45-MW-11-18ADL	320-35894-1DL	Water	02/08/18
3	ITC45-MW-14-18A	320-35894-2	Water	02/08/18
4	ITC45-MW-30-18A	320-35894-3	Water	02/08/18
5	ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
6	ITC45-MW-33-18A	320-35894-5	Water	02/08/18
7	ITC02-MW-12-18A	320-35894-6	Water	02/08/18
8	ITC02-MW-29-18A	320-35894-7	Water	02/08/18
9	ITC02-MW-20-18A	320-35894-8	Water	02/08/18
10	ITC45-MW-11-18AMS	320-35894-1MS	Water	02/08/18
11	ITC45-MW-11-18AMSD	320-35894-1MSD	Water	02/08/18
12	# 4 DL			
13	# 5 DL			
14	# 9 DL			

Notes:

DC #: 418536

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: N

All circled methods are applicable to each sample.

Sample ID	Parameter
1, 3 - 9	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (O-PO4) (Alk) CN NH3 (TKN) (TOC) Cr6+ ClO4
2, 12 - 14	pH TDS Cl F NO3 (NO2) SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
10, 11	pH TDS Cl F (NO3) (NO2) SO4 (O-PO4) Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments: _____

LDC #: 41853J4

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: ✓

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	EPA 9056A	
Parameters:	Nitrite-N	
Technical holding time:	48 hours	

Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
2, 12-14	2/8/18	2/26/18	18 days	J (ND) (#) *R ~~A~~		Reanalysis	

LDC #: 41853J6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples** 1, 3 - 7, 9

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		7	9								
TOC-Quad		0.172	860	670 B	450 B								

Conc. units: mg/L **Associated Samples** 7, 8

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)											
Sulfate		0.148	0.74										

Conc. units: ug/L **Associated Samples** 1, 3 - 9

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)											
Chloride	0.255		1.275										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853J6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/9/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 3 - 9

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-ARMITAGE-02092018		3	6	7	9				
Sulfate	0.18	0.9								
Chloride	0.12	0.6								
TOC-Quad (ug/L)	440	2200	2100 F	1200 F	670 F	450 F				

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 41853J6 **VALIDATION FINDINGS WORKSHEET**
Field Duplicates

Reviewer: VB
2nd Reviewer: AC

Inorganics, Method: see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	4	5		
Chloride	630	630	0	
Nitrate as N	13	13	0	
Sulfate	340	340	0	
TOC-Quad (ug/L)	3600	3500	3	
TDS (ug/L)	1900000	1900000	0	
Bicarbonate Alkalinity (ug/L)	280000	290000	4	

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LDC #: 41853J6

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1, 4, 5, 9	Nitrite -N			Chloride interference suspected in NO_2 analysis	J (UJ/A (ND)) (V)

Comments:

LDC #: 41853J6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JB
2nd Reviewer: K

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 12-14	NO_2 reanalysis outside of HT Confirmed ND - reporting original @ lower RL.	2, 12-14	~~NR~~ IA (ND) (D)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35894-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW-11-18A	320-35894-1	Water	02/08/18
ITC45-MW-14-18A	320-35894-2	Water	02/08/18
ITC45-MW-30-18A	320-35894-3	Water	02/08/18
ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
ITC45-MW-33-18A	320-35894-5	Water	02/08/18
ITC02-MW-12-18A	320-35894-6	Water	02/08/18
ITC02-MW-29-18A	320-35894-7	Water	02/08/18
ITC02-MW-20-18A	320-35894-8	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Gasoline range organics (C4-C12)	45 ug/L	All samples in SDG 320-35894-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC45-MW-11-18A	Gasoline range organics (C4-C12)	15 ug/L	15U ug/L
ITC45-MW-30-18A	Gasoline range organics (C4-C12)	16 ug/L	16U ug/L
ITC02-MW-12-18A	Gasoline range organics (C4-C12)	22 ug/L	22U ug/L
ITC02-MW-29-18A	Gasoline range organics (C4-C12)	23 ug/L	23U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ITC45-MW-30-18A and ITC45-MW-30-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	ITC45-MW-30-18A	ITC45-MW-30-P-18A	
Gasoline range organics (C4-C12)	16	30U	Not calculable

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to equipment blank contamination, data were qualified as not detected in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35894-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35894-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35894-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC45-MW-11-18A	Gasoline range organics (C4-C12)	15U ug/L	A	F
ITC45-MW-30-18A	Gasoline range organics (C4-C12)	16U ug/L	A	F
ITC02-MW-12-18A	Gasoline range organics (C4-C12)	22U ug/L	A	F
ITC02-MW-29-18A	Gasoline range organics (C4-C12)	23U ug/L	A	F

LDC #: 41853J7

SDG #: 320-35894-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/11/18

Page: 1 of 1

Reviewer: Q

2nd Reviewer: A

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20%. r^2 ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB-EB-ARMITAGE-02092018 (320-35939-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=3+4
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	ITC45-MW-11-18A	320-35894-1	Water	02/08/18
2	ITC45-MW-14-18A	320-35894-2	Water	02/08/18
3	ITC45-MW-30-18A	320-35894-3	Water	02/08/18
4	ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
5	ITC45-MW-33-18A	320-35894-5	Water	02/08/18
6	ITC02-MW-12-18A	320-35894-6	Water	02/08/18
7	ITC02-MW-29-18A	320-35894-7	Water	02/08/18
8	ITC02-MW-20-18A	320-35894-8	Water	02/08/18
9				
10				

Notes:

LDC #: 41853J7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5X	1	3	6	7				
GRO (C4-C12)	45	225	15	16	22	23				

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC#: 41853J7

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: MC

METHOD: GC GRO (PA SW 846 Method 8260B/CALUFT)

Compound	Concentration (ug/L)		RPD (≤25)
	3	4	
GRO (C4-C12)	16	30U	NC

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35894-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW-11-18A	320-35894-1	Water	02/08/18
ITC45-MW-14-18A	320-35894-2	Water	02/08/18
ITC45-MW-30-18A	320-35894-3	Water	02/08/18
ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
ITC45-MW-33-18A	320-35894-5	Water	02/08/18
ITC45-MW-33-18ARE	320-35894-5RE	Water	02/08/18
ITC02-MW-12-18A	320-35894-6	Water	02/08/18
ITC02-MW-29-18A	320-35894-7	Water	02/08/18
ITC02-MW-20-18A	320-35894-8	Water	02/08/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Diesel Range Organics and Motor Oil Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
ITC45-MW-33-18ARE	All compounds	23	7	R (all non-detects)	A

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Diesel range organics (C10-C28)	38 ug/L	All samples in SDG 320-35894-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC45-MW-14-18A	Diesel range organics (C10-C28)	17 ug/L	17U ug/L
ITC45-MW-30-18A	Diesel range organics (C10-C28)	20 ug/L	20U ug/L
ITC45-MW-30-P-18A	Diesel range organics (C10-C28)	26 ug/L	26U ug/L
ITC02-MW-12-18A	Diesel range organics (C10-C28)	140 ug/L	140U ug/L
ITC02-MW-29-18A	Diesel range organics (C10-C28)	20 ug/L	20U ug/L
ITC02-MW-20-18A	Diesel range organics (C10-C28)	110 ug/L	110U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
ITC45-MW-33-18A	Ortho-terphenyl	27 (56-125)	All compounds	UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ITC45-MW-30-18A and ITC45-MW-30-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	ITC45-MW-30-18A	ITC45-MW-30-P-18A	
Diesel range organics (C10-C28)	20	26	26 (≤25)

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
ITC45-MW-33-18ARE	All compounds	R	A

Due to surrogate %R, data were qualified as estimated in one sample.

Due to equipment blank contamination, data were qualified as not detected in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-35894-1

Sample	Compound	Flag	A or P	Reason (Code)
ITC45-MW-33-18A	All compounds	UJ (all non-detects)	A	Surrogates (%R) (S)
ITC45-MW-33-18ARE	All compounds	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35894-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Field Blank Data Qualification Summary - SDG 320-35894-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC45-MW-14-18A	Diesel range organics (C10-C28)	17U ug/L	A	F
ITC45-MW-30-18A	Diesel range organics (C10-C28)	20U ug/L	A	F
ITC45-MW-30-P-18A	Diesel range organics (C10-C28)	26U ug/L	A	F
ITC02-MW-12-18A	Diesel range organics (C10-C28)	140U ug/L	A	F
ITC02-MW-29-18A	Diesel range organics (C10-C28)	20U ug/L	A	F
ITC02-MW-20-18A	Diesel range organics (C10-C28)	110U ug/L	A	F

LDC #: 41853J8 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35894-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Motor Oil Range Organics (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II.	Initial calibration/ICV	A / A	RSD ≤ 20% or r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	SW	EB-ARMITAGE-02092018(320-35939-1)
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	D = 3+4
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	ITC45-MW-11-18A	320-35894-1	Water	02/08/18
2	ITC45-MW-14-18A	320-35894-2	Water	02/08/18
3	ITC45-MW-30-18A	320-35894-3	Water	02/08/18
4	ITC45-MW-30-P-18A	320-35894-4	Water	02/08/18
5	ITC45-MW-33-18A	320-35894-5	Water	02/08/18
6	ITC45-MW-33-18ARE	320-35894-5RE	Water	02/08/18
7	ITC02-MW-12-18A	320-35894-6	Water	02/08/18
8	ITC02-MW-29-18A	320-35894-7	Water	02/08/18
9	ITC02-MW-20-18A	320-35894-8	Water	02/08/18
10				
11				
12				

Notes:

LDC #: 41853I8

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: GC HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
6CN(0)	W		2-8-18	3-3-18		23	J/R/A

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 41853J8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 4
2nd Reviewer: AC

METHOD: GC DRO (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	FB-ARMITAGE-02092018	5X	2	3	4	7	8	9		
DRO (C10-C28)	38	190	17	20	26	140	20	110		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 41853V8

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: 9
2nd Reviewer: AC

METHOD: 1 **GC** __ **HPLC**

Are surrogates required by the method? Yes____ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	5		H	97 (56-125)	Y/N/A (NO)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	1,2-Dinitrobenzene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC#: 41853J8

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AC

METHOD: GC DRO (PA SW 846 Method 8015B)

Compound	Concentration (ug/L)		RPD (≤25)
	3	4	
DRO (C10-C28)	20	26	26

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LDC #: 41853/8

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AC

METHOD: ✓ **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	6	All		R/A (D)

Comments: _____

OVRNew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35939-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS03-MW02-18A	320-35939-1	Water	02/09/18
RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
ITC45-MW-32-18A	320-35939-4	Water	02/09/18
ITC45-MW19-18A	320-35939-5	Water	02/09/18
ITC02-MW21-18A	320-35939-6	Water	02/09/18
ITC01-MW15-18A	320-35939-7	Water	02/09/18
TB-02092018	320-35939-8	Water	02/09/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	TB-02092018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	22.8 28.1 25.4 32.1 23.8 27.6 20.2	RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A	J (all detects) UJ (all non-detects)	A
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02092018	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02092018 was identified as a trip blank. No contaminants were found.

Sample EB-ARMITAGE-02092018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	2-Butanone 2-Hexanone Acetone tert-Butyl alcohol	6.5 ug/L 1.3 ug/L 41 ug/L 8.9 ug/L	RLS03-MW02-18A RLS03-MW02-P-18A ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC01-MW15-18A	Acetone	2.3 ug/L	2.3U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-209384 (RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A)	1,1,2,2-Tetrachloroethane	-	125 (71-121)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples RLS03-MW02-18A and RLS03-MW02-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	RLS03-MW02-18A	RLS03-MW02-P-18A	
1,1-Dichloroethane	0.46	0.42	9 (≤25)

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in eight samples.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35939-1

Sample	Compound	Flag	A or P	Reason (Code)
TB-02092018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
TB-02092018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35939-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC01-MW15-18A	Acetone	2.3U ug/L	A	F

LDC #: 41853K1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/18
SDG #: 320-35939-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer: AC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / SW	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration / Endrin	SW	CCV ≤ 20/20%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB = 3. TB = 8
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	Insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 1, 2
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS03-MW02-18A	320-35939-1	Water	02/09/18
2	RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
3	EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
4	ITC45-MW-32-18A	320-35939-4	Water	02/09/18
5	ITC45-MW19-18A	320-35939-5	Water	02/09/18
6	ITC02-MW21-18A	320-35939-6	Water	02/09/18
7	ITC01-MW15-18A	320-35939-7	Water	02/09/18
8	TB-02092018	320-35939-8	Water	02/09/18
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853K1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer: JC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	B, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	2/2/18	H022001	F	22.8		1-7. MB (ND)	J/UJ/A
			HH	28.1			
			Y	25.4			
			Z	32.1			
			X	23.8			
			BB	27.6			
			KKK	20.2			
	2/13/18	H021301	HH	27.0		8. MB (ND)	J/UJ/A
			Z	26.4			

CONCAL.1SB

LDC #: 41853K1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35939-1) Associated Samples: 1-2, 4-7 (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5/10X	7							
M	6.5	65								
Z	1.3	6.5								
F	41	410	2.3/U							
ZZZ	8.9	44.5								

LDC #: 41853K1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	2CS/D320-209384		BB	( )	125 (71-12)	( )	1-7. MB(ND)	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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LDC#: 41853K1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GCMS VOCs (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		RPD (≤25)
	1	2	
I	0.46	0.42	9

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853K1_AECOM.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35939-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS03-MW02-18A	320-35939-1	Water	02/09/18
RLS03-MW02-18ADL	320-35939-1DL	Water	02/09/18
RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
RLS03-MW02-P-18ADL	320-35939-2DL	Water	02/09/18
EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
EB-ARMITAGE-02092018DL	320-35939-3DL	Water	02/09/18
ITC45-MW-32-18A	320-35939-4	Water	02/09/18
ITC45-MW-32-18ADL	320-35939-4DL	Water	02/09/18
ITC45-MW19-18A	320-35939-5	Water	02/09/18
ITC45-MW19-18ADL	320-35939-5DL	Water	02/09/18
ITC02-MW21-18A	320-35939-6	Water	02/09/18
ITC02-MW21-18ADL	320-35939-6DL	Water	02/09/18
ITC01-MW15-18A	320-35939-7	Water	02/09/18
ITC01-MW15-18ADL	320-35939-7DL	Water	02/09/18
RLS03-MW02-18AMS	320-35939-1MS	Water	02/09/18
RLS03-MW02-18AMSD	320-35939-1MSD	Water	02/09/18
RLS03-MW02-18ADLMS	320-35939-1DLMS	Water	02/09/18
RLS03-MW02-18ADLMSD	320-35939-1DLMSD	Water	02/09/18
ITC45-MW-32-18AMS	320-35939-4MS	Water	02/09/18
ITC45-MW-32-18AMSD	320-35939-4MSD	Water	02/09/18
ITC45-MW19-18ADUP	320-35939-5DUP	Water	02/09/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Total Dissolved Solids by Standard Method 2540C
Total Organic Carbon by EPA SW 846 Method 9060A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
RLS03-MW02-18ADL RLS03-MW02-P-18ADL EB-ARMITAGE-02092018DL ITC45-MW-32-18ADL ITC45-MW19-18ADL ITC02-MW21-18ADL ITC01-MW15-18ADL	Orthophosphate as P	4 days	48 hours	R (all non-detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%D (Limits)	Associated Samples	Flag	A or P
02/10/16	ICV (16:49)	Orthophosphate as P	-10.1 (≤10.0)	RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A	UJ (all non-detects)	P

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Total organic carbon	176 ug/L	RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Total organic carbon	0.171 mg/L	RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-ARMITAGE-02092018	Total organic carbon	440 ug/L	440U ug/L

V. Field Blanks

Sample EB-ARMITAGE-02092018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Sulfate Chloride Total organic carbon	0.18 mg/L 0.12 mg/L 440 ug/L	RLS03-MW02-18A RLS03-MW02-P-18A ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RLS03-MW02-18A	Total organic carbon	890 ug/L	890U ug/L
RLS03-MW02-P-18A	Total organic carbon	930 ug/L	930U ug/L
ITC45-MW-32-18A	Total organic carbon	1600 ug/L	1600U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
ITC45-MW19-18A	Total organic carbon	890 ug/L	890U ug/L
ITC02-MW21-18A	Total organic carbon	1100 ug/L	1100U ug/L

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples RLS03-MW02-18A and RLS03-MW02-P-18A and samples RLS03-MW02-18ADL and RLS03-MW02-P-18ADL were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	RLS03-MW02-18A	RLS03-MW02-P-18A	
Chloride	94 mg/L	77 mg/L	20 (≤25)
Nitrate as N	0.062 mg/L	0.067 mg/L	8 (≤25)
Sulfate	110 mg/L	90 mg/L	20 (≤25)
Total organic carbon	890 ug/L	930 ug/L	4 (≤25)
Total dissolved solids	610000 ug/L	650000 ug/L	6 (≤25)
Bicarbonate alkalinity	240000 ug/L	240000 ug/L	0 (≤25)

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
RLS03-MW02-18ADL RLS03-MW02-P-18ADL EB-ARMITAGE-02092018DL ITC45-MW-32-18ADL ITC45-MW19-18ADL ITC02-MW21-18ADL ITC01-MW15-18ADL	Orthophosphate as P	R	A

Due to ICV %R, data were qualified as estimated in seven samples.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to equipment blank contamination, data were qualified as not detected in five samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35939-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS03-MW02-18A RLS03-MW02-P-18A EB-ARMITAGE-02092018 ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A	Orthophosphate as P	UJ (all non-detects)	P	Initial calibration verification (%R) (R)
RLS03-MW02-18ADL RLS03-MW02-P-18ADL EB-ARMITAGE-02092018DL ITC45-MW-32-18ADL ITC45-MW19-18ADL ITC02-MW21-18ADL ITC01-MW15-18ADL	Orthophosphate as P	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35939-1

Sample	Analyte	Modified Final Concentration	A or P	Code
EB-ARMITAGE-02092018	Total organic carbon	440U ug/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35939-1

Sample	Analyte	Modified Final Concentration	A or P	Code
RLS03-MW02-18A	Total organic carbon	890U ug/L	A	F
RLS03-MW02-P-18A	Total organic carbon	930U ug/L	A	F
ITC45-MW-32-18A	Total organic carbon	1600U ug/L	A	F
ITC45-MW19-18A	Total organic carbon	890U ug/L	A	F
ITC02-MW21-18A	Total organic carbon	1100U ug/L	A	F

LDC #: 41853K6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-35939-1 Level III Page: 1 of 2
Laboratory: Test America, Inc. Reviewer: JB
2nd Reviewer: M

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), TDS (SM2540C), TOC (EPA SW846 Method 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A ISW	
II	Initial calibration	SW	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 5, 6*
VI.	Matrix Spike/Matrix Spike Duplicates	A	(15,16) (17,18) (19,20)
VII.	Duplicate sample analysis	A	21
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	(1,3) (2,4)
X.	Sample result verification	N	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; *ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS03-MW02-18A	320-35939-1	Water	02/09/18
2	RLS03-MW02-18ADL	320-35939-1DL	Water	02/09/18
3	RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
4	RLS03-MW02-P-18ADL	320-35939-2DL	Water	02/09/18
5	EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
6	EB-ARMITAGE-02092018DL	320-35939-3DL	Water	02/09/18
7	ITC45-MW-32-18A	320-35939-4	Water	02/09/18
8	ITC45-MW-32-18ADL	320-35939-4DL	Water	02/09/18
9	ITC45-MW19-18A	320-35939-5	Water	02/09/18
10	ITC45-MW19-18ADL	320-35939-5DL	Water	02/09/18
11	ITC02-MW21-18A	320-35939-6	Water	02/09/18
12	ITC02-MW21-18ADL	320-35939-6DL	Water	02/09/18
13	ITC01-MW15-18A	320-35939-7	Water	02/09/18
14	ITC01-MW15-18ADL	320-35939-7DL	Water	02/09/18
15	RLS03-MW02-18AMS	320-35939-1MS	Water	02/09/18
16	RLS03-MW02-18AMSD	320-35939-1MSD	Water	02/09/18

LDC #: 41853K6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-35939-1 Level III Page: 2of 2
Laboratory: Test America, Inc. Reviewer: SP
2nd Reviewer: MC

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), TDS (SM2540C), TOC (EPA SW846 Method 9060A)

	Client ID	Lab ID	Matrix	Date
17	RLS03-MW02-18ADLMS	320-35939-1DLMS	Water	02/09/18
18	RLS03-MW02-18ADLMSD	320-35939-1DLMSD	Water	02/09/18
19	ITC45-MW-32-18AMS	320-35939-4MS	Water	02/09/18
20	ITC45-MW-32-18AMSD	320-35939-4MSD	Water	02/09/18
21	ITC45-MW19-18ADUP	320-35939-5DUP	Water	02/09/18
22				
23				
24				
25				
26				

Notes:

LDC #: 41853K4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,5,7,9 11,13	pH (TDS) (Cl) F (NO_3) (NO_2) (SO_4) O-(PO_4) (Alk) CN NH_3 TKN (TOC) Cr6+ ClO_4
2,4,6,8, 10,12,14	pH TDS Cl F NO_3 NO_2 SO_4 (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
15,16	pH (TDS) (Cl) F (NO_3) (NO_2) (SO_4) (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
17,18	pH TDS Cl F NO_3 NO_2 SO_4 (O-PO_4) Alk CN NH_3 TKN TOC Cr6+ ClO_4
19,20	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN (TOC) Cr6+ ClO_4
21	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 (Alk) CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 41852 K6 (41853)

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: MC

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	EPA 9056A						
Parameters:	Dpoy						
Technical holding time:	48 Hours						
Sample ID	**Sampling date**	**Analysis date**	**Total Time**	**Qualifier**	**Analysis date**	**Total Time**	**Qualifier**
2,4,6,8 10,12,14	2/9/18	2/13/18	4 days	J (ND) (H)		* reanalysis.	

LDC #: 41853K6

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: JB
2nd Reviewer: M

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y (N) N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
(Y) N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
(Y) N N/A Was a balance check conducted prior to the TDS analysis.?
Y N (N/A) Was the titrant normality checked?

#	Date	Calibration ID	Analyte	TDS %R	Associated Samples	Qualifications
	2/10/16	ICV (16:49)	OPO4	-10.1 (10.0)	1, 3, 5, 7, 9, 11, 13	J/UJ/P (ND) (R)

Comments:

LDC #: 41853K6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JB
2nd Reviewer: AK

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples** 1, 3, 5, 7, 9, 11, 13

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		~~3~~ 5 JB								
TOC-Quad	176	0.171	880	440 B								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853K6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/9/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 3, 7, 9, 11, 13

Analyte	Blank ID	Action Limit	Sample Identification							
	5		1	3	7	9	11			
Sulfate	0.18	0.9								
Chloride	0.12	0.6								
TOC-Quad (ug/L)	440	2200	890 F	930 F	1600 F	890 F	1100 F			

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 41853K6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: VB
2nd Reviewer:

Inorganics, Method: see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	1	3		
Chloride	94	77	20	
Nitrate as N	0.062	0.067	8	
Sulfate	110	90	20	
TOC-Quad (ug/L)	890	930	4	
TDS (ug/L)	610000	650000	6	
Bicarbonate Alkalinity (ug/L)	240000	240000	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\41853K6.wpd

LDC #: 41853K6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JB
2nd Reviewer: M

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 4, 6, 8, 10, 12, 14	Reanalysis outside of HT	2, 4, 6, 8, 10, 12, 14	~~NR~~ /A (ND) (D)
			Confirmed original analysis		
			w ICV failure @ 0.1%		
			Chose original analytical run.		
			of OPO4 (Orthophosphate)		

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35939-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS03-MW02-18A	320-35939-1	Water	02/09/18
RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
ITC45-MW-32-18A	320-35939-4	Water	02/09/18
ITC45-MW19-18A	320-35939-5	Water	02/09/18
ITC02-MW21-18A	320-35939-6	Water	02/09/18
ITC01-MW15-18A	320-35939-7	Water	02/09/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-ARMITAGE-02092018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Gasoline range organics (C4-C12)	45 ug/L	RLS03-MW02-18A RLS03-MW02-P-18A ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples RLS03-MW02-18A and RLS03-MW02-P-18A were identified as field duplicates. No results were detected in any of the samples.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

LDC #: 41853K7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35939-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CALUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	%RSD<=20% or r^2 ICV<=20%
IV.	Continuing calibration	A	CCV<=20%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	2B&3
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample.
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	ND	D=1+2
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS03-MW02-18A	320-35939-1	Water	02/09/18
2	RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
3	EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
4	ITC45-MW-32-18A	320-35939-4	Water	02/09/18
5	ITC45-MW19-18A	320-35939-5	Water	02/09/18
6	ITC02-MW21-18A	320-35939-6	Water	02/09/18
7	ITC01-MW15-18A	320-35939-7	Water	02/09/18
8				
9				
10				

Notes:

LDC #: 41853K7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: M

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: 1-2, 4-7 Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5X								
GRO (C4-C12)	45	225								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35939-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS03-MW02-18A	320-35939-1	Water	02/09/18
RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
ITC45-MW-32-18A	320-35939-4	Water	02/09/18
ITC45-MW19-18A	320-35939-5	Water	02/09/18
ITC02-MW21-18A	320-35939-6	Water	02/09/18
ITC01-MW15-18A	320-35939-7	Water	02/09/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Diesel Range Organics and Motor Oil Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-ARMITAGE-02092018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Diesel range organics (C10-C28)	38 ug/L	RLS03-MW02-18A RLS03-MW02-P-18A ITC45-MW-32-18A ITC45-MW19-18A ITC02-MW21-18A ITC01-MW15-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS03-MW02-18A	Diesel range organics (C10-C28)	15 ug/L	15U ug/L
RLS03-MW02-P-18A	Diesel range organics (C10-C28)	21 ug/L	21U ug/L
ITC45-MW-32-18A	Diesel range organics (C10-C28)	24 ug/L	24U ug/L
ITC45-MW19-18A	Diesel range organics (C10-C28)	25 ug/L	25U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples RLS03-MW02-18A and RLS03-MW02-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	RLS03-MW02-18A	RLS03-MW02-P-18A	
Diesel range organics (C10-C28)	15	21	33 (≤25)

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to equipment blank contamination, data were qualified as not detected in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35939-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Field Blank Data Qualification Summary - SDG 320-35939-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS03-MW02-18A	Diesel range organics (C10-C28)	15U ug/L	A	F
RLS03-MW02-P-18A	Diesel range organics (C10-C28)	21U ug/L	A	F
ITC45-MW-32-18A	Diesel range organics (C10-C28)	24U ug/L	A	F
ITC45-MW19-18A	Diesel range organics (C10-C28)	25U ug/L	A	F

LDC #: 41853K8 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-35939-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Motor Oil Range Organics (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	RSD ≤ 20%. r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	SW	FB = 3
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	MS
VIII.	Laboratory control samples	A	
IX.	Field duplicates	SW	D = 1,2
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS03-MW02-18A	320-35939-1	Water	02/09/18
2	RLS03-MW02-P-18A	320-35939-2	Water	02/09/18
3	EB-ARMITAGE-02092018	320-35939-3	Water	02/09/18
4	ITC45-MW-32-18A	320-35939-4	Water	02/09/18
5	ITC45-MW19-18A	320-35939-5	Water	02/09/18
6	ITC02-MW21-18A	320-35939-6	Water	02/09/18
7	ITC01-MW15-18A	320-35939-7	Water	02/09/18
8				
9				
10				
11				
12				

Notes:

LDC #: 41853K8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: AC

METHOD: GC DRO (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: 1-2, 4-7 Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5X	1	2	4	5				
DRO (C10-C28)	38	190	15	21	24	25				

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC#: 41853K8

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: AC

METHOD: GC DRO (PA SW 846 Method 8015B)

Compound	Concentration (ug/L)		RPD (≤25)
	1	2	
DRO (C10-C28)	15	21	33

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853K8_AECOM.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35990-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
JMM01-MW03-18A	320-35990-1	Water	02/12/18
ITC44-MW16-18A	320-35990-2	Water	02/12/18
ITC44-MW17-18A	320-35990-3	Water	02/12/18
ETC44-MW04-18A	320-35990-4	Water	02/12/18
TT44-MW02-18A	320-35990-5	Water	02/12/18
26S40E09A01-18A	320-35990-6	Water	02/12/18
TB-02122018	320-35990-7	Water	02/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	TB-02122018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	22.8 28.1 25.4 32.1 23.8 27.6 20.2	JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A	J (all detects) UJ (all non-detects)	A
02/13/18	Vinyl acetate 2-Hexanone	27.0 26.4	TB-02122018	UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02122018 was identified as a trip blank. No contaminants were found.

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	2-Butanone 2-Hexanone Acetone tert-Butyl alcohol	6.5 ug/L 1.3 ug/L 41 ug/L 8.9 ug/L	JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
TT44-MW02-18A	Acetone tert-Butyl alcohol	2.2 ug/L 22 ug/L	2.2U ug/L 22U ug/L

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-209384 (JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A)	1,1,2,2-Tetrachloroethane	-	125 (71-121)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and continuing calibration %D, data were qualified as estimated in seven samples.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Flag	A or P	Reason (Code)
TB-02122018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A	Acetone Vinyl acetate 4-Methyl-2-pentanone 2-Hexanone Bromoform 1,1,2,2-Tetrachloroethane 1,2,4-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
TB-02122018	Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Modified Final Concentration	A or P	Code
TT44-MW02-18A	Acetone tert-Butyl alcohol	2.2U ug/L 22U ug/L	A	F

LDC #: 41853L1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/17/18
SDG #: 320-35990-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: Q
2nd Reviewer: RC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	RSD ≤ 15%; r² ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB=7, EB-ARMITAGE-02092018(320-35939-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample.
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	JMM01-MW03-18A	320-35990-1	Water	02/12/18
2	ITC44-MW16-18A	320-35990-2	Water	02/12/18
3	ITC44-MW17-18A	320-35990-3	Water	02/12/18
4	ETC44-MW04-18A	320-35990-4	Water	02/12/18
5	TT44-MW02-18A	320-35990-5	Water	02/12/18
6	26S40E09A01-18A	320-35990-6	Water	02/12/18
7	TB-02122018	320-35990-7	Water	02/12/18
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853L1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	T, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: T
2nd Reviewer: K

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/31/18	H022100 1	F	20.8		1-6, MB	J/UH/A
			HH	28.1		(6 of 6 + ND)	
			X	25.4			
			Z	32.1			
			X	23.8			
			BB	21.6			
			KK	20.2			
	7/31/18	H021301	HH	21.0		7, MB (ND)	J/UH/A
			Z	26.4			

LDC #: 41853L1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Q
2nd Reviewer: K

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-35939-1) Associated Samples: 1-6 (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5/10X	5							
M	6.5	65								
Z	1.3	6.5								
F	41	410	2.2/U							
ZZZ	8.9	44.5	22/U							

LDC #: 41853Z1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 9

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	4/6	D320-209384	BB	( )	P5 (71-121)	( )	1-6. MB (N1)	J (all det) / P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35990-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
JMM01-MW03-18A	320-35990-1	Water	02/12/18
JMM01-MW03-18ADL	320-35990-1DL	Water	02/12/18
ITC44-MW16-18A	320-35990-2	Water	02/12/18
ITC44-MW17-18A	320-35990-3	Water	02/12/18
ETC44-MW04-18A	320-35990-4	Water	02/12/18
ETC44-MW04-18ADL	320-35990-4DL	Water	02/12/18
TT44-MW02-18A	320-35990-5	Water	02/12/18
26S40E09A01-18A	320-35990-6	Water	02/12/18
26S40E09A01-18ADL	320-35990-6DL	Water	02/12/18
JMM01-MW03-18AMS	320-35990-1MS	Water	02/12/18
JMM01-MW03-18AMSD	320-35990-1MSD	Water	02/12/18
JMM01-MW03-18ADLMS	320-35990-1DLMS	Water	02/12/18
JMM01-MW03-18ADLMSD	320-35990-1DLMSD	Water	02/12/18
ITC44-MW16-18AMS	320-35990-2MS	Water	02/12/18
ITC44-MW16-18AMSD	320-35990-2MSD	Water	02/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Total Dissolved Solids by Standard Method 2540C
Total Organic Carbon by EPA SW 846 Method 9060A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
JMM01-MW03-18ADL 26S40E09A01-18ADL ETC44-MW04-18ADL	Nitrite as N	14 days	48 hours	R (all non-detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Total organic carbon	217 ug/L	JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A
ICB/CCB	Total organic carbon	0.245 mg/L	JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
ITC44-MW16-18A	Total organic carbon	560 ug/L	560U ug/L
ETC44-MW04-18A	Total organic carbon	570 ug/L	570U ug/L
26S40E09A01-18A	Total organic carbon	800 ug/L	800U ug/L

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Sulfate Chloride Total organic carbon	0.18 mg/L 0.12 mg/L 440 ug/L	JMM01-MW03-18A ITC44-MW16-18A ITC44-MW17-18A ETC44-MW04-18A TT44-MW02-18A 26S40E09A01-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
JMM01-MW03-18A	Total organic carbon	2100 ug/L	2100U ug/L
ITC44-MW16-18A	Total organic carbon	560 ug/L	560U ug/L
ETC44-MW04-18A	Total organic carbon	570 ug/L	570U ug/L
26S40E09A01-18A	Total organic carbon	800 ug/L	800U ug/L

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Flag	A or P
JMM01-MW03-18A ETC44-MW04-18A 26S40E09A01-18A	Nitrite as N	Chloride interference due to elevated amount in sample.	UJ (all non-detects)	A

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
JMM01-MW03-18ADL ETC44-MW04-18ADL 26S40E09A01-18ADL	Nitrite as N	R	A

Due to matrix interference, data were qualified as estimated in three samples.

Due to laboratory blank contamination, data were qualified as not detected in three samples.

Due to equipment blank contamination, data were qualified as not detected in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-35990-1

Sample	Analyte	Flag	A or P	Reason (Code)
JMM01-MW03-18A ETC44-MW04-18A 26S40E09A01-18A	Nitrite as N	UJ (all non-detects)	A	Sample result verification (matrix interference) (V)
JMM01-MW03-18ADL ETC44-MW04-18ADL 26S40E09A01-18ADL	Nitrite as N	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-35990-1

Sample	Analyte	Modified Final Concentration	A or P	Code
ITC44-MW16-18A	Total organic carbon	560U ug/L	A	B
ETC44-MW04-18A	Total organic carbon	570U ug/L	A	B
26S40E09A01-18A	Total organic carbon	800U ug/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-35990-1

Sample	Analyte	Modified Final Concentration	A or P	Code
JMM01-MW03-18A	Total organic carbon	2100U ug/L	A	F
ITC44-MW16-18A	Total organic carbon	560U ug/L	A	F
ETC44-MW04-18A	Total organic carbon	570U ug/L	A	F
26S40E09A01-18A	Total organic carbon	800U ug/L	A	F

LDC #: 41853L6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35990-1 Level III Page: 1 of 2

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: M

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), TDS (SM2540C), TOC (EPA SW846 Method 9060A)

Bicarbonate

RWAD JB

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A ISW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = EB-ARMITAGE-02092018 From 320-35939-1
VI.	Matrix Spike/Matrix Spike Duplicates	A	(9, 10) (11, 12) (13, 14)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	SW N	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	JMM01-MW03-18A	320-35990-1	Water	02/12/18
2	JMM01-MW03-18ADL	320-35990-1DL	Water	02/12/18
3	ITC44-MW16-18A	320-35990-2	Water	02/12/18
4	ITC44-MW17-18A	320-35990-3	Water	02/12/18
5	ETC44-MW04-18A	320-35990-4	Water	02/12/18
6	TT44-MW02-18A	320-35990-5	Water	02/12/18
7	26S40E09A01-18A	320-35990-6	Water	02/12/18
8	26S40E09A01-18ADL	320-35990-6DL	Water	02/12/18
9	JMM01-MW03-18AMS	320-35990-1MS	Water	02/12/18
10	JMM01-MW03-18AMSD	320-35990-1MSD	Water	02/12/18
11	JMM01-MW03-18ADLMS	320-35990-1DLMS	Water	02/12/18
12	JMM01-MW03-18ADLMSD	320-35990-1DLMSD	Water	02/12/18
13	ITC44-MW16-18AMS	320-35990-2MS	Water	02/12/18
14	ITC44-MW16-18AMSD	320-35990-2MSD	Water	02/12/18
15	#5 DL			
16				

LDC #: 41853L6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-35990-1 Level III Page: 2 of 2

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: MK

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), TDS (SM2540C), TOC (EPA SW846 Method 9060A)

	Client ID	Lab ID	Matrix	Date
17				
18				
19				

Notes:

DC #: 418536

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: M

All circled methods are applicable to each sample.

Sample ID	Parameter
1, 3-7	pH TDS (Cl) F (NO2) (NO3) (SO4) O-PO4 (Alk) CN NH3 TKN (TOC) Cr6+ ClO4
2, 8, 15	pH TDS Cl F NO3 (NO2) SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
8 c	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9, 10	pH TDS (Cl) F (NO3) (NO2) (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
11, 12	pH TDS Cl F NO3 (NO2) (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
13, 14	pH TDS Cl F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 41853L6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: A

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	EPA 9056A	
Parameters:	Nitrite as N	
Technical holding time:	48 Hours.	

Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
2,8,15	2/12/18	2/28/18	14 days	~~V~~ R (ND) (H)		* Reanalysis	

LDC #: 41853L6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: VB
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples** 1, 3 - 7

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		3	5	7							
TOC-Quad	217	0.245	1225	560 B	570 B	800 B							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853L6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/9/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 3 - 7

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-ARMITAGE-02092018		1	3	5	7				
Sulfate	0.18	0.9								
Chloride	0.12	0.6								
TOC-Quad (ug/L)	440	2200	2100 F	560 F	570 F	800 F				

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853L4

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: VB
2nd Reviewer: [illegible]

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1, 5, 7	Nitrite - N			Cl^- interference due to elevated amount in sample.	J (LW) (ND) (V)

Comments:

LDC #: 41853L60

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 8, 15	Reanalysis of Nitrite outside of HT confirmed original run that samples are ND. Chosing results with lower RL	2, 8, 15	~~NR~~ /A (ND) (D)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35990-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
JMM01-MW03-18A	320-35990-1	Water	02/12/18
ITC44-MW16-18A	320-35990-2	Water	02/12/18
ITC44-MW17-18A	320-35990-3	Water	02/12/18
ETC44-MW04-18A	320-35990-4	Water	02/12/18
TT44-MW02-18A	320-35990-5	Water	02/12/18
26S40E09A01-18A	320-35990-6	Water	02/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Gasoline range organics (C4-C12)	45 ug/L	All samples in SDG 320-35990-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
TT44-MW02-18A	Gasoline range organics (C4-C12)	100 ug/L	100U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Modified Final Concentration	A or P	Code
TT44-MW02-18A	Gasoline range organics (C4-C12)	100U ug/L	A	F

LDC #: 41853L7

SDG #: 320-35990-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/4/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CA LUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20% .r^2 ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB-ARMITAGE-02092018 (320-35939-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	JMM01-MW03-18A	320-35990-1	Water	02/12/18
2	ITC44-MW16-18A	320-35990-2	Water	02/12/18
3	ITC44-MW17-18A	320-35990-3	Water	02/12/18
4	ETC44-MW04-18A	320-35990-4	Water	02/12/18
5	TT44-MW02-18A	320-35990-5	Water	02/12/18
6	26S40E09A01-18A	320-35990-6	Water	02/12/18
7				
8				
9				

Notes:

LDC #: 41853L7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Q
2nd Reviewer: AK

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-ARMITAGE-02092018	5X	5							
GRO (C4-C12)	45	225	100							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35990-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
JMM01-MW03-18A**	320-35990-1**	Water	02/12/18
ITC44-MW16-18A**	320-35990-2**	Water	02/12/18
ITC44-MW17-18A**	320-35990-3**	Water	02/12/18
ETC44-MW04-18A	320-35990-4	Water	02/12/18
TT44-MW02-18A	320-35990-5	Water	02/12/18
26S40E09A01-18A	320-35990-6	Water	02/12/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Diesel Range Organics and Motor Oil Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB 320-208548/1-A	02/15/18	Diesel range organics (C10-C28)	18.3 ug/L	All samples in SDG 320-35990-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC44-MW16-18A**	Diesel range organics (C10-C28)	16 ug/L	16U ug/L
ITC44-MW17-18A**	Diesel range organics (C10-C28)	30 ug/L	30U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
26S40E09A01-18A	Diesel range organics (C10-C28)	16 ug/L	16U ug/L

V. Field Blanks

Sample EB-ARMITAGE-02092018 (from SDG 320-35939-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-ARMITAGE-02092018	02/09/18	Diesel range organics (C10-C28)	38 ug/L	All samples in SDG 320-35990-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
ITC44-MW16-18A**	Diesel range organics (C10-C28)	16 ug/L	16U ug/L
ITC44-MW17-18A**	Diesel range organics (C10-C28)	30 ug/L	30U ug/L
26S40E09A01-18A	Diesel range organics (C10-C28)	16 ug/L	16U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to laboratory and equipment blank contamination, data were qualified as not detected in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC44-MW16-18A**	Diesel range organics (C10-C28)	16U ug/L	A	B
ITC44-MW17-18A**	Diesel range organics (C10-C28)	30U ug/L	A	B
26S40E09A01-18A	Diesel range organics (C10-C28)	16U ug/L	A	B

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Field Blank Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC44-MW16-18A**	Diesel range organics (C10-C28)	16U ug/L	A	F
ITC44-MW17-18A**	Diesel range organics (C10-C28)	30U ug/L	A	F
26S40E09A01-18A	Diesel range organics (C10-C28)	16U ug/L	A	F

LDC #: 41853L8 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/18
SDG #: 320-35990-1 Level III/IV Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer:

METHOD: GC Diesel Range Organics & Motor Oil Range Organics (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A A	~~%D~~ ≤ 20% . r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	SW	
V.	Field blanks	SW	EB-ARMITAGE-02092018 (320-35990-1)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	MS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation.
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	JMM01-MW03-18A**	320-35990-1**	Water	02/12/18
2	ITC44-MW16-18A**	320-35990-2**	Water	02/12/18
3	ITC44-MW17-18A**	320-35990-3**	Water	02/12/18
4	ETC44-MW04-18A	320-35990-4	Water	02/12/18
5	TT44-MW02-18A	320-35990-5	Water	02/12/18
6	26S40E09A01-18A	320-35990-6	Water	02/12/18
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 41853L8

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: A

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?	✓			
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

LDC #: 41853C8

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: AC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 41853-48

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: DC

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: 2/15/18 **Blank analysis date:** 2/28/18 **Associated samples:** All (CB)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
MB 320-20854 8/1-A		2	3	6			
DRO (C10-C28)	18.3		16	30	16			

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___
Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853L8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC DRO (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/9/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-35939-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	FB-ARMITAGE-02092018	5X	2	3	6					
DRO (C10-C28)	38	190	16	30	16					

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 41853L8

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC _____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (1/100std)	Recalculated CF (1/100std)	Reported Ave CF (initial)	Recalculated Ave CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/11/17	DRO C10-C28	351973	351973	356892	356892	5.4	5.4
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853L8

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: M

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	0227-005	2/27/18	DRO C10-C28	356892	384072	384072	7.6	7.6
2	0228-007	2/28/18	✓	356892	388472	388472	8.8	8.8
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41063K-0

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

Page: ___ of ___

Reviewer: ___

2nd reviewer: ___

METHOD: ✓ **GC** ___ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
TPH		13.3	12.1	91	91	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 48852B

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: 1
2nd Reviewer: 1

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 320-208548

Compound	Spike Added (µg/L)		Spiked Sample Concentration (µg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	300	300	278	277	93	93	92	92	0	0
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853L8

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: 9
2nd Reviewer: M

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name DRO C10-C28

Concentration = $\frac{(112677720)(3000)(1)}{(356892.126)(936.4)}$

$= 1011.5$ µg/L

#	Sample ID	Compound	Reported Concentrations (µg/L)	Recalculated Results Concentrations ( )	Qualifications
	1	DRO C10-C28	1000		

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Perfluorinated Alkyl Acids

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-35990-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC44-MW16-18A	320-35990-2	Water	02/12/18
ITC44-MW16-18ARE	320-35990-2RE	Water	02/12/18
ITC44-MW17-18A	320-35990-3	Water	02/12/18
ITC44-MW17-18ADL	320-35990-3DL	Water	02/12/18
ITC44-MW17-18ARE	320-35990-3RE	Water	02/12/18
ITC44-MW17-18AREDL	320-35990-3REDL	Water	02/12/18
ETC44-MW04-18A	320-35990-4	Water	02/12/18
ETC44-MW04-18ARE	320-35990-4RE	Water	02/12/18
TT44-MW02-18A**	320-35990-5**	Water	02/12/18
26S40E09A01-18A	320-35990-6	Water	02/12/18
26S40E09A01-18ARE	320-35990-6RE	Water	02/12/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
ITC44-MW16-18ARE ITC44-MW17-18ARE ITC44-MW17-18AREDL ETC44-MW04-18ARE 26S40E09A01-18ARE	All compounds	18	14	J (all detects) UJ (all non-detects)	A

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

For each calibration point, the percent differences (%D) of its true value were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-210170 (ITC44-MW16-18A ITC44-MW17-18A ITC44-MW17-18ADL ETC44-MW04-18A 26S40E09A01-18A)	Perfluorooctanoic acid	112 (80-107)	-	J (all detects)	P
LCS/D 320-210170 (TT44-MW02-18A**)	Perfluorooctanoic acid	112 (80-107)	-	NA	-

Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ITC44-MW17-18A ITC44-MW17-18ARE	Perfluorooctanoic acid Perfluorooctanesulfonic acid Perfluorobutanesulfonic acid	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A

Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
ITC44-MW16-18ARE ITC44-MW17-18A ITC44-MW17-18ARE ITC44-MW17-18AREDL ETC44-MW04-18ARE 26S40E09A01-18ARE	All compounds	R	A

Due to LCS/LCSD %R, data were qualified as estimated in four samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 320-35990-1

Sample	Compound	Flag	A or P	Reason (Code)
ITC44-MW16-18A ITC44-MW17-18ADL ETC44-MW04-18A 26S40E09A01-18A	Perfluorooctanoic acid	J (all detects)	P	Laboratory control samples (%R) (L)
ITC44-MW16-18ARE ITC44-MW17-18A ITC44-MW17-18ARE ITC44-MW17-18AREDL ETC44-MW04-18ARE 26S40E09A01-18ARE	All compounds	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 320-35990-1

No Sample Data Qualified in this SDG

LDC #: 41853L96 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/2/19
SDG #: 320-35990-1 Level III/IV Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 1
2nd Reviewer: 1

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20%. True TOD ≤ 30%. ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for Level III validation.
XIII.	Target compound identification	A	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	ITC44-MW16-18A	320-35990-2	Water	02/12/18
2	ITC44-MW16-18ARE	320-35990-2RE	Water	02/12/18
3	ITC44-MW17-18A	320-35990-3	Water	02/12/18
4	ITC44-MW17-18ADL	320-35990-3DL	Water	02/12/18
5	ITC44-MW17-18ARE	320-35990-3RE	Water	02/12/18
6	ITC44-MW17-18AREDL	320-35990-3REDL	Water	02/12/18
7	ETC44-MW04-18A	320-35990-4	Water	02/12/18
8	ETC44-MW04-18ARE	320-35990-4RE	Water	02/12/18
9	TT44-MW02-18A**	320-35990-5**	Water	02/12/18
10	26S40E09A01-18A	320-35990-6	Water	02/12/18
11	26S40E09A01-18ARE	320-35990-6RE	Water	02/12/18
12				
13				
14				

LDC #: 41853L96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: MC

Method: LCMS (EPA Method 537)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?			✓	
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 41853L96

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: R

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)				
B. Perfluoroheptanoic acid (PFHpA)				
C. Perfluorooctanoic acid (PFOA)				
D. Perfluorononanoic acid (PFNA)				
E. Perfluorodecanoic acid (PFDA)				
F. Perfluoroundecanoic acid (PFUnA)				
G. Perfluorododecanoic acid (PFDoA)				
H. Perfluorotridecanoic acid (PFTriA)				
I. Perfluorotetradecanoic acid (PFTeA)				
J. Perfluorobutanesulfonic acid (PFBS)				
K. Perfluorohexanesulfonic acid (PFHxS)				
L. Perfluoroheptanesulfonic acid (PFHpS)				
M. Perfluorooctanesulfonic acid (PFOS)				
N.Perfluorodecanesulfonic acid (PFDS)				
O. Perfluorooctane Sulfonamide (FOSA)				
P. Perfluorobutanoic acid (PFBA)				
Q. Perfluoropentanoic acis (PFPeA)				
R. 6:2FTS				
S. 8:2FTS				

LDC #: 41853L96

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2,5-6,8	W		2-12-18	3-2-18		18	J/UY/J(H)
11	↓		↓	↓		↓	↓
(dup3+MD)							

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

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LDC #: 41853L96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: Q
2nd Reviewer: M

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS 320-210170 C		112 (80-107)	( )	( )	1,3-4,7,9,10,MB	J (all detects) A (L)
	D		( )	( )	( )	(9=ND, others=detects)	
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )

LDC #: 41853L96

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: __ GC __√__ HPLC/MS

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	3,5	e, M, J > calib range		J det/A (*V)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853K96

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: R

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Compound	Finding	Qualifications
		3, 5, 2, 6, 8, 11	All		R/A (D)
		~~2, 5~~			

Comments: _____

LDC #: 48532A6

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RC

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1.0 std)	Recalculated RRF (1.0 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	1042	2/22/18	PFOA (1st internal standard)	1.0825	1.0825	1.0845	1.0845	2.1	2.1
			(2nd internal standard)						
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #~~41853~~96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	~~2018.02.27~~	~~2/27/18~~	~~PFOA~~ (1st internal standard)	~~1.0845~~	1.119	1.119	3.1	3.1
	017		(2nd internal standard)					
			(3rd internalstandard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internalstandard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internalstandard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internalstandard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-21070

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	40.2	44.6	40.2	112	112	101	101	10	10

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Privileged and Confidential

LDC #: 41853L96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 1

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 9, ND:
#1, PFOA

Conc. = $\frac{(85840)(2.50)(10000)(1)(\quad)}{(438240)(1.0845)(282)(\quad)}$

= 1.60 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFOA	1.60		

Privileged and Confidential

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36021-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-18A	320-36021-1	Water	02/13/18
RLS43-MW04-18A	320-36021-2	Water	02/13/18
KCH43-MW10-18A	320-36021-3	Water	02/13/18
KCH43-MW11-18A	320-36021-4	Water	02/13/18
EB-Site 43-02132018	320-36021-5	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
KCH43-MW09-18A	All compounds	14	7	J (all detects) UJ (all non-detects)	P

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	EB-Site 43-02132018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 2-Hexanone	20.8 29.1 23.1	EB-Site 43-02132018	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02132018 (from SDG 320-36025-1) was identified as a trip blank. No contaminants were found.

Sample EB-Site 43-02132018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Toluene	0.35 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
KCH43-MW09-18A	1,2-Dichloroethane-d4 Dibromofluoromethane Toluene-d8	4 (81-118) 14 (80-119) 155 (89-112)	All compounds	J (all detects) R (all non-detects)	A

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
LCS/D 320-209465 (EB-Site 43-02132018)	2-Hexanone 4-Methyl-2-pentanone Acetone	26 (≤20) 22 (≤20) 27 (≤20)	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
KCH43-MW09-18A	tert-Butyl alcohol-d9 2-Butanone-d5	3322 (224683-898730) 1412 (230590-922358)	tert-Butyl alcohol Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	R (all non-detects) R (all non-detects) R (all non-detects) R (all non-detects) R (all non-detects)	A
KCH43-MW09-18A	Fluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	66796 (170188-680752) 64477 (125093-500370) 35140 (62741-250964)	All compounds except tert-Butyl alcohol Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	J (all detects) UJ (all non-detects)	A

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to surrogate %R and internal standard area, data were rejected in one sample.

Due to technical holding time, ICV %D, continuing calibration %D, surrogate %R, LCS/LCSD RPD, and internal standard area, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW09-18A	1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Benzene Ethylbenzene Isopropyl ether m,p-Xylene Naphthalene o-Xylene n-Propylbenzene Xylenes, total	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Technical holding times (H)
EB-Site 43-02132018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
EB-Site 43-02132018	Acetone Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
KCH43-MW09-18A	All compounds except tert-Butyl alcohol Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	J (all detects) R (all non-detects)	A	Surrogates (%R) (S)
EB-Site 43-02132018	2-Hexanone 4-Methyl-2-pentanone Acetone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (RPD) (L)
KCH43-MW09-18A	tert-Butyl alcohol Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	R (all non-detects) R (all non-detects) R (all non-detects) R (all non-detects) R (all non-detects)	A	Internal standards (area) (I)
KCH43-MW09-18A	1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Benzene Ethylbenzene Isopropyl ether m,p-Xylene Naphthalene o-Xylene n-Propylbenzene Xylenes, total	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Internal standards (area) (I)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

LDC #: 41853M1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18

SDG #: 320-36021-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: [illegible]

2nd Reviewer: MC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/SW	RSD≤15%, r^2 ICV≤20%
IV.	Continuing calibration /Endrin	SW	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB=5, TB-02132018(320-36025-1)
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	KCH43-MW09-18A	320-36021-1	Water	02/13/18
2	RLS43-MW04-18A	320-36021-2	Water	02/13/18
3	KCH43-MW10-18A	320-36021-3	Water	02/13/18
4	KCH43-MW11-18A	320-36021-4	Water	02/13/18
5	EB-Site 43-02132018	320-36021-5	Water	02/13/18
6				
7				
8				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41833A1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
Y (N) N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B) (HT=7)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1 (40BHN(D)	W	N	2-13-18		2-27-18	14	~~VM~~ J (H)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 41853M1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N) N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	5, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853W1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/21/18	H022161	F	20.8		5, MB (ND)	J/UJ/A
			HH	29.1			
			Z	23.1			

LDC #: 41853M1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-36021-1) Associated Samples: 1-4 (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5/10X								
CC	0.35	1.75								

LDC #: 41853M1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: Q
2nd Reviewer: 3

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications (S)
		1	DCE	4 (81-118)	J/R/A (detect+ND)
			~~BFB~~ DFM	14 (80-119)	↓
			TOL	155 (89-112)	
				( )	
				( )	
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(TOL) = Toluene-d8 (DCE) = 1,2-Dichloroethane-d4
(BFB) = Bromofluorobenzene (DFM) = Dibromofluoromethane

LDC #: 4853M1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 2

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-209465		Z	( )	( )	26 (≤20)	5, MB (ND)	J (all detects) UJ (all non-detects) (L)
			Y	( )	( )	22 (↓)		
			F	( )	( )	27 (↓)		L
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 41853M1

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: 9

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1	TBAd9	3322 (224683-898730)		J/R/A * (ND)
			BUT	1412 (230590-922358)		** (ND)
			FBZ	66796 (170188-680752)		J/UJ/A (detect ND)
			CBZ	64477 (125093-500370)		
			4DCB	35140 (60741-250964)		
						(All except 222 F, N, Y, Z)
			* qual 222			
			** qual F, N, Y, Z			

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene
~~TBA d9~~
BUT = 2-Butanone-d5

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36021-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-18A	320-36021-1	Water	02/13/18
RLS43-MW04-18A	320-36021-2	Water	02/13/18
KCH43-MW10-18A	320-36021-3	Water	02/13/18
KCH43-MW11-18A	320-36021-4	Water	02/13/18
EB-Site 43-02132018	320-36021-5	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-Site 43-02132018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Copper	0.53 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

LDC #: 41853M4a

SDG #: 320-36021-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/12/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: A

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB = 5
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	KCH43-MW09-18A	320-36021-1	Water	02/13/18
2	RLS43-MW04-18A	320-36021-2	Water	02/13/18
3	KCH43-MW10-18A	320-36021-3	Water	02/13/18
4	KCH43-MW11-18A	320-36021-4	Water	02/13/18
5	EB-Site 43-02132018	320-36021-5	Water	02/13/18
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 41853M4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-S	W	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo) B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853M4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VB
2nd Reviewer: DK

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 4

Analyte	Blank ID	Sample Identification										
	5	Action Limit										
Cu	0.53	2.65										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 23, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36021-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-18A	320-36021-1	Water	02/13/18
KCH43-MW09-18ARE	320-36021-1RE	Water	02/13/18
RLS43-MW04-18A	320-36021-2	Water	02/13/18
RLS43-MW04-18ARE	320-36021-2RE	Water	02/13/18
KCH43-MW10-18A	320-36021-3	Water	02/13/18
KCH43-MW10-18ARE	320-36021-3RE	Water	02/13/18
KCH43-MW11-18A	320-36021-4	Water	02/13/18
KCH43-MW11-18ARE	320-36021-4RE	Water	02/13/18
EB-Site 43-02132018	320-36021-5	Water	02/13/18
EB-Site 43-02132018RE	320-36021-5RE	Water	02/13/18
KCH43-MW09-18AMS	320-36021-1MS	Water	02/13/18
KCH43-MW09-18AMSD	320-36021-1MSD	Water	02/13/18
KCH43-MW09-18ADUP	320-36021-1DUP	Water	02/13/18
KCH43-MW09-18AREDUP	320-36021-1REDUP	Water	02/13/18
RLS43-MW04-18AMS	320-36021-2MS	Water	02/13/18
RLS43-MW04-18AMSD	320-36021-2MSD	Water	02/13/18
RLS43-MW04-18ADUP	320-36021-2DUP	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Sulfide by EPA SW 846 Method 9034
Total Dissolved Solids by Standard Method 2540C
Total Suspended Solids by Standard Method 2540D
Total Organic Carbon by EPA SW 846 Method 9060A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
KCH43-MW09-18ARE RLS43-MW04-18ARE KCH43-MW10-18ARE KCH43-MW11-18ARE EB-Site 43-02132018RE	Total suspended solids	10 days	7 days	J (all detects) UJ (all non-detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Total organic carbon Total organic carbon	233 ug/L 322 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A EB-Site 43-02132018
PB (prep blank)	Total organic carbon Total organic carbon	186 ug/L 217 ug/L	RLS43-MW04-18A KCH43-MW11-18A
ICB/CCB	Total organic carbon	0.223 mg/L	RLS43-MW04-18A KCH43-MW11-18A
ICB/CCB	Total organic carbon	0.323 mg/L	KCH43-MW09-18A
ICB/CCB	Total organic carbon	1.60 mg/L	EB-Site 43-02132018

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-Site 43-02132018	Total organic carbon	400 ug/L	400U ug/L

V. Field Blanks

Samples EB-Site 43-02132018 and EB-Site 43-02132018RE were identified as equipment blanks. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Total dissolved solids Chloride Total organic carbon	9000 ug/L 0.14 mg/L 400 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A	Bicarbonate alkalinity	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Analyte	Flag	A or P
RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A	Bicarbonate alkalinity	R	A
KCH43-MW09-18ARE RLS43-MW04-18ARE KCH43-MW10-18ARE KCH43-MW11-18ARE EB-Site 43-02132018RE	Total suspended solids	R	A

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-36021-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A	Bicarbonate alkalinity	R	A	Overall assessment of data (D)
KCH43-MW09-18ARE RLS43-MW04-18ARE KCH43-MW10-18ARE KCH43-MW11-18ARE EB-Site 43-02132018RE	Total suspended solids	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-36021-1

Sample	Analyte	Modified Final Concentration	A or P	Code
EB-Site 43-02132018	Total organic carbon	400U ug/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

LDC #: 41853M6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-36021-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: VB
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), Sulfide (EPA SW846 Method 9034), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A ISW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 5, 16*
VI.	Matrix Spike/Matrix Spike Duplicates	A	(6,7) (9,10)
VII.	Duplicate sample analysis	A	TSS or by difference 8, 11
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	SW N	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; *ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	KCH43-MW09-18A	320-36021-1	Water	02/13/18
2	RLS43-MW04-18A	320-36021-2	Water	02/13/18
3	KCH43-MW10-18A	320-36021-3	Water	02/13/18
4	KCH43-MW11-18A	320-36021-4	Water	02/13/18
5	EB-Site 43-02132018	320-36021-5	Water	02/13/18
6	KCH43-MW09-18AMS	320-36021-1MS	Water	02/13/18
7	KCH43-MW09-18AMSD	320-36021-1MSD	Water	02/13/18
8	KCH43-MW09-18ADUP	320-36021-1DUP	Water	02/13/18
9	RLS43-MW04-18AMS	320-36021-2MS	Water	02/13/18
10	RLS43-MW04-18AMSD	320-36021-2MSD	Water	02/13/18
11	RLS43-MW04-18ADUP	320-36021-2DUP	Water	02/13/18
12	#1 RE1			
13	#2 RE1			
14	#3 RE1			
15	#4 RE1			
16	#5 RE1			
17	#8 DUP RE1			

Notes:

DC #: 41853M4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Parameter
1-5	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 S^2 TSS
12, 16	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
13, 14, 15, ~~16~~	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
1, 2, 4, 5	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
0c	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
6, 7	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
8	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
9, 10	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
11	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
17	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 41853M6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:		SM SM 2540D					
Parameters:		TSS					
Technical holding time:		7 days					
Sample ID	**Sampling date**	**Analysis date**	**Total Time**	**Qualifier**	**Analysis date**	**Total Time**	**Qualifier**
12-16	2/13/18	2/23/18	10 days	J/UJ/A	(1-4; Det 5=ND)	(H)	* reanalysis

LDC #: 41853M6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: V3
2nd Reviewer: AC

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples** 1, 5

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		5								
TOC-Quad	233		1165	400 B								
TOC-Quad	322		1610	400 B								

Conc. units: ug/L **Associated Samples** 2, 4

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)										
TOC-Quad	186	0.223	930									
TOC-Quad	217		1085									

Conc. units: ug/L **Associated Samples** 1

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)										
TOC-Quad		0.323	1615									

Conc. units: ug/L **Associated Samples** 5

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		5								
TOC-Quad		1.60	8000	400 B								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853M6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/13/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 4

Analyte	Blank ID	Action Limit	Sample Identification							
	5									
TDS (ug/L)	9000	45000								
Chloride	0.14	0.7								
TOC-Quad (ug/L)	400	2000								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853M4

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JB
2nd Reviewer: [signature]

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	2, 3, 4	Bicarbonate Alkalinity			Results exceeded concentration ranges per method SOP Reanalysis with different titrant required.	J det /A (Dqt) (V

Comments: _____

SRV.SW4.wpd

LDC #: 41853M6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JB
2nd Reviewer: AP

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2,3,4	Results for Bicarbonate Alk- outside of method specified concentration range	2,3,4	~~NR~~ A (Det) (J)
		12-16	TSS Reanalysis confirms original results, "negative Blk" (ND) result in original run does not affect results.	12-16	~~NR~~ A (12-15=Det, 16=ND) (J)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36021-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-18A	320-36021-1	Water	02/13/18
RLS43-MW04-18A	320-36021-2	Water	02/13/18
KCH43-MW10-18A	320-36021-3	Water	02/13/18
KCH43-MW11-18A	320-36021-4	Water	02/13/18
EB-Site 43-02132018	320-36021-5	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
KCH43-MW09-18A	Gasoline range organics (C4-C12)	14	7	J (all detects)	P

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-210265/9	02/27/18	Gasoline range organics (C4-C12)	15.8 ug/L	All samples in SDG 320-36021-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH43-MW10-18A	Gasoline range organics (C4-C12)	73 ug/L	73U ug/L
KCH43-MW11-18A	Gasoline range organics (C4-C12)	31 ug/L	31U ug/L
EB-Site 43-02132018	Gasoline range organics (C4-C12)	19 ug/L	19U ug/L

V. Field Blanks

Sample EB-Site 43-02132018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Gasoline range organics (C4-C12)	19 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH43-MW10-18A	Gasoline range organics (C4-C12)	73 ug/L	73U ug/L
KCH43-MW11-18A	Gasoline range organics (C4-C12)	31 ug/L	31U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to technical holding time, data were qualified as estimated in one sample.

Due to laboratory blank contamination, data were qualified as not detected in three samples.

Due to equipment blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW09-18A	Gasoline range organics (C4-C12)	J (all detects)	P	Technical holding times (H)

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Modified Final Concentration	A or P	Code
KCH43-MW10-18A	Gasoline range organics (C4-C12)	73U ug/L	A	B
KCH43-MW11-18A	Gasoline range organics (C4-C12)	31U ug/L	A	B
EB-Site 43-02132018	Gasoline range organics (C4-C12)	19U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Modified Final Concentration	A or P	Code
KCH43-MW10-18A	Gasoline range organics (C4-C12)	73U ug/L	A	F
KCH43-MW11-18A	Gasoline range organics (C4-C12)	31U ug/L	A	F

LDC #: 41853M7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18
SDG #: 320-36021-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: 9
2nd Reviewer: R

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (GRUFT)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20%. r^2 ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB = 5
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	KCH43-MW09-18A	320-36021-1	Water	02/13/18
2	RLS43-MW04-18A	320-36021-2	Water	02/13/18
3	KCH43-MW10-18A	320-36021-3	Water	02/13/18
4	KCH43-MW11-18A	320-36021-4	Water	02/13/18
5	EB-Site 43-02132018	320-36021-5	Water	02/13/18
6				
7				
8				
9				

Notes:

LDC #: 41853MT

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: 9
2nd Reviewer: A

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: GC HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	(HT=7) Total # of Days	Qualifier
1 (dets)	W	N	2-13-18		2-27-18	14	J/UJ/A (H)

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 41853MT

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Q
2nd Reviewer: RR

METHOD: √ **GC** ___ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: — **Blank analysis date:** 2/7/18 **Associated samples:** All (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
MB 320-21026	5/9 (5x)	3	4	5				
GRO C4-C12	15.8	79	73/U	31/U	19/U			

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853M7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-36021-1) Associated Samples: 1-4 Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5X	3	4						
GRO (C4-C12)	19	95	73	31						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36021-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-18A	320-36021-1	Water	02/13/18
RLS43-MW04-18A	320-36021-2	Water	02/13/18
KCH43-MW10-18A	320-36021-3	Water	02/13/18
KCH43-MW11-18A	320-36021-4	Water	02/13/18
EB-Site 43-02132018	320-36021-5	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Diesel Range Organics and Motor Oil Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB 320-208548/1-A	02/15/18	Diesel range organics (C10-C28)	18.3 ug/L	All samples in SDG 320-36021-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
EB-Site 43-02132018	Diesel range organics (C10-C28)	57 ug/L	57U ug/L

V. Field Blanks

Sample EB-Site 43-02132018 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Diesel range organics (C10-C28)	57 ug/L	KCH43-MW09-18A RLS43-MW04-18A KCH43-MW10-18A KCH43-MW11-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH43-MW11-18A	Diesel range organics (C10-C28)	170 ug/L	170U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-36021-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Modified Final Concentration	A or P	Code
EB-Site 43-02132018	Diesel range organics (C10-C28)	57U ug/L	A	B

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Field Blank Data Qualification Summary - SDG 320-36021-1

Sample	Compound	Modified Final Concentration	A or P	Code
KCH43-MW11-18A	Diesel range organics (C10-C28)	170U ug/L	A	F

LDC #: 41853M8 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/11/18

SDG #: 320-36021-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer:

2nd Reviewer: AC

METHOD: GC Diesel Range Organics & Motor Oil Range Organics (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	RSD ≤ 20% . r^2 ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	SW	
V.	Field blanks	SW	EB=5
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	MS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	KCH43-MW09-18A	320-36021-1	Water	02/13/18
2	RLS43-MW04-18A	320-36021-2	Water	02/13/18
3	KCH43-MW10-18A	320-36021-3	Water	02/13/18
4	KCH43-MW11-18A	320-36021-4	Water	02/13/18
5	EB-Site 43-02132018	320-36021-5	Water	02/13/18
6				
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11				
12				

Notes:

LDC #: 41853M8

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: AC

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

~~Level IV~~/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: 3/15/18 **Blank analysis date:** 3/28/18 **Associated samples:** All (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
MB	320-208548/1-A (5x)	5						
DRO C10-C28	18.3	91.5	57/11					

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___
Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853M8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 4
2nd Reviewer: DC

METHOD: GC DRO (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-36021-1) Associated Samples: 1-4 Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5X	4							
DRO (C10-C28)	57	285	ITO							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36025-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46A-18A	320-36025-1	Water	02/13/18
TB-02132018	320-36025-2	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	TB-02132018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 2-Hexanone	20.8 29.1 23.1	TB-02132018	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02132018 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
LCS/D 320-209465 (MW-46A-18A)	2-Hexanone 4-Methyl-2-pentanone Acetone	26 (≤20) 22 (≤20) 27 (≤20)	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D, continuing calibration %D, and LCS/LCSD RPD, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-36025-1

Sample	Compound	Flag	A or P	Reason (Code)
TB-02132018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
TB-02132018	Acetone Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
MW-46A-18A	2-Hexanone 4-Methyl-2-pentanone Acetone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (RPD) (L)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

LDC #: 41853N1

SDG #: 320-36025-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/27/18

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A SW	RSD ≤ 15% r² ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 2
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	Insufficient sample
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46A-18A	320-36025-1	Water	02/13/18
2	TB-02132018	320-36025-2	Water	02/13/18
3				
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Notes:

LDC #: 41853N1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y N N/A Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Associated Samples	Qualifications (C)
	1/9/18	ICV0109A	Z	23.6	2. MB (ND)	J/UJ/A
		(HP12)				

LDC #: 41853N1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: A
2nd Reviewer: A

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were percent differences (%D) ≤20 % and relative response factors (RRF) within the method criteria?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit)	Associated Samples	Qualifications
	2/21/18	H02210 1	F	20.8		2, MB(NO)	Y N N/A (C)
			HH	29.1			
			2	23.1			

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LDC #: 41853N1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: AC

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications (4)
	LCS	320-209465	Z	( )	( )	26 (≤20)	1, MB (ND)	Y/N/P
			X	( )	( )	22 ( )		
			F	( )	( )	27 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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Privileged and Confidential

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36025-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46A-18A	320-36025-1	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

LDC #: 41853N4a

SDG #: 320-36025-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: E

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46A-18A	320-36025-1	Water	02/13/18
2				
3				
4				
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10				
11				
12				

Notes:

LDC #: 41853N4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	W	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo) B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Explosives

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36025-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46A-18A	320-36025-1	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Explosives - Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Explosives - Laboratory Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Explosives - Field Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

LDC #: 41853N40 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-36025-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A / A	RSD ≤ 20% ICV ≤ 15%
III.	Continuing calibration	A	CCV ≤ 15%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	insufficient sample.
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46A-18A	320-36025-1	Water	02/13/18
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Perchlorate

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36025-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46A-18A	320-36025-1	Water	02/13/18
MW-46A-18ADL	320-36025-1DL	Water	02/13/18
MW-46A-18AMS	320-36025-1MS	Water	02/13/18
MW-46A-18AMSD	320-36025-1MSD	Water	02/13/18
MW-46A-18ADLMS	320-36025-1DLMS	Water	02/13/18
MW-46A-18ADLMSD	320-36025-1DLMSD	Water	02/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed at the required frequency.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 50.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were not within the QC limits for MW-46A-18AMS/MSD and MW-46A-18ADLMS/MSD. No data were qualified since the parent sample results were greater than 4X the spiked concentration. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Interference Check Samples

Interference check samples (ICS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
MW-46A-18A	Perchlorate	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
MW-46A-18A	Perchlorate	R	A

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Perchlorate - Data Qualification Summary - SDG 320-36025-1

Sample	Compound	Flag	A or P	Reason (Code)
MW-46A-18A	Perchlorate	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perchlorate - Field Blank Data Qualification Summary - SDG 320-36025-1

No Sample Data Qualified in this SDG

LDC #: 41853N87 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/2/18
SDG #: 320-36025-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	~~RSD~~ ≤ 15%. ICV ≤ 15%
IV.	Continuing calibration	A	CCV ≤ 15%. CCB ≤ 50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	3/4, 5/6 ~~%R out~~ >4xSA
VIII.	Matrix spike/Matrix spike duplicates	N	3/4, 5/6 : %R out >4xSA
IX.	Laboratory control samples	A	LCS
X.	Interference Check Sample	A	
XI.	Field duplicates	N	
XII.	Internal standards	A SW	#2 - ~~%R~~ Area out due to DL
XIII.	Compound quantitation RL/LOQ/LODs	SW N	
XIV.	Target compound identification	N	
XV.	System performance	N	
XVI.	Overall assessment of data	SW	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46A-18A	320-36025-1	Water	02/13/18
2	MW-46A-18ADL	320-36025-1DL	Water	02/13/18
3	MW-46A-18AMS	320-36025-1MS	Water	02/13/18
4	MW-46A-18AMSD	320-36025-1MSD	Water	02/13/18
5	MW-46A-18ADLMS	320-36025-1DLMS	Water	02/13/18
6	MW-46A-18ADLMSD	320-36025-1DLMSD	Water	02/13/18
7				
8				

Notes:

LDC #: 41853A3T

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: Q.
2nd Reviewer: JC

METHOD: ✓ **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N (N/A) Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N (N/A) Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	1	Perchlorate > calib range		J+ (all samples) (*V)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853N8T

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: 9
2nd Reviewer: K

METHOD: ✓ **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	1	All		R/A (all)

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36075-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW03-18A	320-36075-1	Water	02/14/18
TB-02142018	320-36075-2	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.
C	Calibration %RSD, r, r^2 or %D were noncompliant
R	Calibration RRF was <0.05.
B	Presumed contamination from preparation (method blank)
L	Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits
Q	MS/MSD recovery was poor
E	MS/MSD or Duplicate RPD was high.
I	Internal standard performance was unsatisfactory
M	Instrument Performance Check (BFB or DFTPP) was noncompliant
T	Presumed contamination from trip blank.
F	Presumed contamination from FB or ER.
D	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor
V	Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
RLS43-MW03-18A	All compounds	14	7	UJ (all non-detects)	P

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
01/09/18	2-Hexanone	23.6	TB-02142018	UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
02/21/18	Acetone Vinyl acetate 2-Hexanone	20.8 29.1 23.1	TB-02142018	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02142018 was identified as a trip blank. No contaminants were found.

Sample EB-Site 43-02132018 (from SDG 320-36021-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Toluene	0.35 ug/L	RLS43-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
LCS/D 320-209465 (TB-02142018)	2-Hexanone 4-Methyl-2-pentanone Acetone	26 (≤20) 22 (≤20) 27 (≤20)	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to technical holding time, ICV %D, continuing calibration %D, and LCS/LCSD RPD, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-36075-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS43-MW03-18A	All compounds	UJ (all non-detects)	P	Technical holding times (H)
TB-02142018	2-Hexanone	UJ (all non-detects)	A	Initial calibration verification (%D) (C)
TB-02142018	Acetone Vinyl acetate 2-Hexanone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
TB-02142018	2-Hexanone 4-Methyl-2-pentanone Acetone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (RPD) (L)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

LDC #: 41853O1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/17/18
SDG #: 320-36075-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 15% . r^2 ICV ≤ 20%
IV.	Continuing calibration / Ending	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB = 2. EB: EB-Site 43-02[illegible]3-2018(320-36[illegible]-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	Matrix/Project sample
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS43-MW03-18A	320-36075-1	Water	02/14/18
2	TB-02142018	320-36075-2	Water	02/14/18
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 41853D1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: K

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
Y (N) N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B) (HT=7)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1 (ND)	W	N	2-14-18		2-28-18	14	J (HT)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 41853O1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: PG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y N N/A) Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y (N N/A) Were all %D within the validation criteria of ≤20 %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	1/9/18	ICV0109A	Z	23.6	2, MB (ND)	J/UJ/A
		(HP12)				

LDC #: 18530J

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications (C)
	2/21/18	HO=2101	F	20.8		2. MB (ND)	J+/A
			HH	29.1			
			Z	23.1			J-

CONCAL.1SB

LDC #: 41853O1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (320-36021-1) Associated Samples: 1 (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5/10X								
CC	0.35	1.75								

LDC #: 41853O1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: Q
2nd Reviewer: M

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCSD320-209465	2	( )	( )	26 (≤20)	2. MB (ND)	J/UJ/P (4)
			Y	( )	( )	22 ( )		
			F	( )	( )	27 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36075-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW03-18A	320-36075-1	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
03/05/18	CRI (23:45)	Copper	121 (80-120)	All samples in SDG 320-36075-1	NA	-

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-Site 43-02132018 (from SDG 320-36021-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Copper	0.53 ug/L	RLS43-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

LDC #: 41853O4a

SDG #: 320-36075-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: A

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	SW	EB = EB-Site 43 02132018 From 320-36021-1
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS43-MW03-18A	320-36075-1	Water	02/14/18
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 41853O4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: AC

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853 04a
SDG # 320-36075-1

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	3/5/18	CRI (23:45)	Cu	121 (80-120)	All	J det / P (~~Det~~ ND) JB (R)

Comments:

LDC #: 41853O4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: AC

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification											
	EB-Site 43-02132018	Action Limit											
Cu	0.53	2.65											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 23, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36075-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW03-18A	320-36075-1	Water	02/14/18
RLS43-MW03-18ARE	320-36075-1RE	Water	02/14/18
RLS43-MW03-18AMS	320-36075-1MS	Water	02/14/18
RLS43-MW03-18AMSD	320-36075-1MSD	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Bicarbonate Alkalinity by Standard Method 2320B
Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Sulfide by EPA SW 846 Method 9034
Total Dissolved Solids by Standard Method 2540C
Total Suspended Solids by Standard Method 2540D
Total Organic Carbon by EPA SW 846 Method 9060A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
RLS43-MW03-18ARE	Total dissolved solids Total suspended solids	12 days 9 days	7 days 7 days	J (all detects) J (all detects)	A

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Total organic carbon	233 ug/L	RLS43-MW03-18A
ICB/CCB	Total organic carbon	0.228 mg/L	RLS43-MW03-18A

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

V. Field Blanks

Sample EB-Site 43-02132018 (from SDG 320-36021-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Total dissolved solids	9000 ug/L	All samples in SDG 320-36075-1
EB-Site 43-02132018	02/13/18	Chloride Total organic carbon	0.14 mg/L 400 ug/L	RLS43-MW03-18A

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
RLS43-MW03-18A	Bicarbonate alkalinity	Sample result exceeded concentration range.	Reported result should be within concentration range.	J (all detects)	A
RLS43-MW03-18A	Total dissolved solids	Sample result exceeded maximum residue range.	Reported result should be within maximum residue range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Analyte	Flag	A or P
RLS43-MW03-18A	Bicarbonate alkalinity Total dissolved solids	R R	A
RLS43-MW03-18ARE	Total suspended solids	R	A

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Wet Chemistry - Data Qualification Summary - SDG 320-36075-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS43-MW03-18A	Bicarbonate alkalinity Total dissolved solids	R R	A	Overall assessment of data (D)
RLS43-MW03-18ARE	Total suspended solids	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

LDC #: 41853O6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-36075-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: JB

2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Chloride, Nitrate-N, Nitrite-N, Orthophosphate-P, Sulfate (EPA SW846 Method 9056A), Sulfide (EPA SW846 Method 9034), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB= EB-Site 43-02132018 From 320-36021-35439-1 JB
VI.	Matrix Spike/Matrix Spike Duplicates	A	(2,3)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	SW	
XI	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS43-MW03-18A	320-36075-1	Water	02/14/18
2	RLS43-MW03-18AMS	320-36075-1MS	Water	02/14/18
3	RLS43-MW03-18AMSD	320-36075-1MSD	Water	02/14/18
4	#1 RE1			
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Notes:

DC #: 4185306

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JB
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH (TDS) (Cl) F (NO3) (NO2) (SO4) O-PO4 (Alk) CN NH3 TKN TOC Cr6+ ClO4 (S2) (TSS)
4	pH (TDS) Cl F NO3 NO2 SO4 O-PO4 (Alk) CN NH3 TKN TOC Cr6+ ClO4 (TSS)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
2,3	pH TDS (Cl) F (NO3) (NO2) (SO4) O-PO4 Alk CN NH3 TKN (TOC) Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments: _____

LDC #: 41853Q4

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JB
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time. CODE H
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	SM 2540C			SM 2540D		
Parameters:	TDS			TSS		
Technical holding time:	7 days			7 days		
Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
4	2/14/18	2/26/18	12 days	J/UJ/P (Det) * reanalysis	2/23/18	9 days	J/UJ/P (Det) * reanalysis

WetHT.wpd

LDC #: 41853JO6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples** All J6 1

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)										
TOC-Quad	233	0.228	1165									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853O6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/13/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-Site 43-02132018									
TDS (ug/L)	9000	45000								

Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 2/13/18 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1

Analyte	Blank ID	Action Limit	Sample Identification							
	EB-Site 43-02132018									
Chloride	0.14	0.7								
TOC-Quad (ug/L)	400	2000								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 41853O6

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JB
2nd Reviewer: AC

METHOD: Inorganics

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1	Bicarbonate Alkalinity			Result outside concentration range	J det / A (DET) (V)
	1	TDS			Result exceeds maximum residue range	J det / A (DET) (V)
	1					

Comments:

LDC #: 41853Q6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1	Result outside (allowable) concentration range per SOP for Bicarbonate Alkalinity	1	~~NR~~ IA (Det) (D)
		1	Result outside maximum residue range for TDS	1	~~NR~~ IA (Det) (D)
		4	Reanalysis confirms original result with |MB| > ½RL where results > 10x hit, Chosing to report original analysis w/in #T. ~~(Bicarbonate Alk. ; TDS)~~ & TSS	4	~~NR~~ IA (Det) (D)

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36075-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW03-18A	320-36075-1	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260 and CA LUFT Method

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (methods blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
RLS43-MW03-18A	Gasoline range organics (C4-C12)	14	7	J (all detects)	P

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

Where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-210483/12	02/28/18	Gasoline range organics (C4-C12)	19.6 ug/L	All samples in SDG 320-36075-1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS43-MW03-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L

V. Field Blanks

Sample EB-Site 43-02132018 (from SDG 320-36075-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Gasoline range organics (C4-C12)	19 ug/L	All samples in SDG 320-36075-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS43-MW03-18A	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to technical holding time, data were qualified as estimated in one sample.

Due to laboratory and equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Gasoline Range Organics - Data Qualification Summary - SDG 320-36075-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS43-MW03-18A	Gasoline range organics (C4-C12)	J (all detects)	P	Technical holding times (H)

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-36075-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS43-MW03-18A	Gasoline range organics (C4-C12)	21U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-36075-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS43-MW03-18A	Gasoline range organics (C4-C12)	21U ug/L	A	F

LDC #: 41853O7 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18

SDG #: 320-36075-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: 0

2nd Reviewer: M

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260) (CAM IX)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20% . r² ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB-Site 43-02132018 (320-36021-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	RLS43-MW03-18A	320-36075-1	Water	02/14/18
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 41853OT

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: 9
2nd Reviewer: AC

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: __ GC __ HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1 (dot3)	W	N	2-14-18		2-28-18	14	VUN/P(H)

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 41853OT

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: √ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

Blank extraction date: — **Blank analysis date:** 2/28/18 **Associated samples:** all (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification						
	MB 320-210483/12		1					
GRO (C4-C12)	19.6		21					

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___
Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 41853O7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC GRO (EPA SW 846 Method 8260B/CALUFT)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-36021-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5X	1							
GRO (C4-C12)	19	95	21							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36075-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW03-18A	320-36075-1	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Diesel Range Organics and Motor Oil Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-Site 43-02132018 (from SDG 320-36021-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-Site 43-02132018	02/13/18	Diesel range organics (C10-C28)	57 ug/L	All samples in SDG 320-36021-1

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RLS43-MW03-18A	Diesel range organics (C10-C28)	79 ug/L	79U ug/L

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-36075-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Field Blank Data Qualification Summary - SDG 320-36075-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS43-MW03-18A	Diesel range organics (C10-C28)	79U ug/L	A	F

LDC #: 41853O8 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18

SDG #: 320-36075-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: 9

2nd Reviewer: M

METHOD: GC Diesel Range Organics & Motor Oil Range Organics (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A/A	~~RSD~~ ≤ 20% r^2 ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	SW	EB-Site43-02132018 (320-36021-1)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	RLS43-MW03-18A	320-36075-1	Water	02/14/18
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 41853O8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: GC DRO (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 2/13/18
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB (SDG: 320-36021-1) Associated Samples: All Qual U (F)

Compound	Blank ID	Sample Identification								
	EB-Site 43-02132018	5X	1							
DRO (C10-C28)	57	285	79							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36142-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT08-MW04-18A	320-36142-1	Water	02/15/18
TT08-MW05-18A	320-36142-2	Water	02/15/18
TT08-MW01-18A	320-36142-3	Water	02/15/18
TT49-MW01-18A	320-36142-4	Water	02/15/18
TT08-MW03-18A	320-36142-5	Water	02/15/18
TB-02152018	320-36142-6	Water	02/15/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
03/01/18	Vinyl acetate	22.1	TT49-MW01-18A TT08-MW03-18A	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02152018 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to continuing calibration %D, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-36142-1

Sample	Compound	Flag	A or P	Reason (Code)
TT49-MW01-18A TT08-MW03-18A	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

LDC #: 41853P1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/18/18

SDG #: 320-36142-1 Level III Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: Q

2nd Reviewer: R

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	r50≤16%. r² ICV≤20%
IV.	Continuing calibration	M	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB=6
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sample.
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	TT08-MW04-18A	320-36142-1	Water	02/15/18
2	TT08-MW05-18A	320-36142-2	Water	02/15/18
3	TT08-MW01-18A	320-36142-3	Water	02/15/18
4 2	TT49-MW01-18A	320-36142-4	Water	02/15/18
5 2	TT08-MW03-18A	320-36142-5	Water	02/15/18
6	TB-02152018	320-36142-6	Water	02/15/18
7				
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853D1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/18	H030101	HH	22.1		4-5, MB (ND)	J (all A (c))

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36142-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT08-MW04-18A	320-36142-1	Water	02/15/18
TT08-MW05-18A	320-36142-2	Water	02/15/18
TT08-MW01-18A	320-36142-3	Water	02/15/18
TT49-MW01-18A	320-36142-4	Water	02/15/18
TT08-MW03-18A	320-36142-5	Water	02/15/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
03/05/18	CRI (23:58)	Copper	121 (80-120)	All samples in SDG 320-36142-1	NA	-

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

LDC #: 41853P4a

SDG #: 320-36142-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	N	C-S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TT08-MW04-18A	320-36142-1	Water	02/15/18
2	TT08-MW05-18A	320-36142-2	Water	02/15/18
3	TT08-MW01-18A	320-36142-3	Water	02/15/18
4	TT49-MW01-18A	320-36142-4	Water	02/15/18
5	TT08-MW03-18A	320-36142-5	Water	02/15/18
6				
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 41853P4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: AC

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-5	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 41853P4a
SDG # 320-36142-1

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	3/5/18	CRI (23:58)	Cu	121 (80-120)	All	J det / P (ND) (R)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Explosives

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36142-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT08-MW04-18A**	320-36142-1**	Water	02/15/18
TT08-MW05-18A**	320-36142-2**	Water	02/15/18
TT08-MW01-18A	320-36142-3	Water	02/15/18
TT49-MW01-18A	320-36142-4	Water	02/15/18
TT08-MW03-18A	320-36142-5	Water	02/15/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
TT49-MW01-18A	2,6-Dinitrotoluene 2-Nitrotoluene 3-Nitrotoluene	53.7 80.0 92.5	J (all detects) J (all detects) J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to RPD between two columns, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Explosives - Data Qualification Summary - SDG 320-36142-1

Sample	Compound	Flag	A or P	Reason (Code)
TT49-MW01-18A	2,6-Dinitrotoluene 2-Nitrotoluene 3-Nitrotoluene	J (all detects) J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (V)

NAWS China Lake, CTO 005
Explosives - Laboratory Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Explosives - Field Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

LDC #: 41853P40 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/2/18
SDG #: 320-36142-1 Level III/IV Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A A	RSD ≤ 20%. ICV ≤ 15%
III.	Continuing calibration	A	CCV ≤ 15%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for Level III validation.
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TT08-MW04-18A**	320-36142-1**	Water	02/15/18
2	TT08-MW05-18A**	320-36142-2**	Water	02/15/18
3	TT08-MW01-18A	320-36142-3	Water	02/15/18
4	TT49-MW01-18A	320-36142-4	Water	02/15/18
5	TT08-MW03-18A	320-36142-5	Water	02/15/18
6				
7				
8				
9				
10				
11				
12				

Notes:

LDC #41853240

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: RC

Method: ____ GC ✓ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			✓	
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ ~~20% or percent recoveries (%R) 80-120%?~~ 15%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~20% or percent recoveries (%R) 80-120%?~~ 15%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VI. Surrogate Spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix Spike/Matrix Spike Duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: ___GC ___HPLC

8310	8330	8151/8321	8141		8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	CC. Trichlorinate	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	DD. Trifluralin	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	EE. Def	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	FF. Prowl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	GG. Ethion	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	HH. Famphur	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	II. Phosmet	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	JJ. Tetrachlorvinphos	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	KK. Demeton (total)	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon		
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton		
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	**8315A**	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	A. Formaldehyde	
N. Naphthalene	N. 4-Nitrotoluene	N. 2,4-Dichlorophenoxybutyric acid	N. Malathion	B. Acetaldehyde	
O. Phenanthrene	O. Nitroglycerin	O.	O. Chlorpyrifos	C. Benzaldehyde	
P. Pyrene	P. Picric acid	P.	P. Fenthion	D. Butyraldehyde	
Q.	Q. 2,4-Dinitrophenol	Q.	Q. Parathion-ethyl	C. Benzaldehyde	
R.	R. 3,5-Dinitroaniline		R. Trichlornate	D. Butyraldehyde	
S.	S. 2-Nitrophenol		S. Merphos		
	T. 4-Nitrophenol		T. Stirofos		
	U. Picramic acid		U. Tokuthion	**Organic acids**	
	V. PETN		V. Fensulfothion	A. Acetic acid	
	W. Hexahydro-1,3,5-trinitroso-1,3,5-triazine		W. Bolstar	B. Butyric acid	
	X. MNX		X. EPN	C. Lactic acid	
	Y. Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine		Y. Azinphos-methyl	D. Propionic acid	
	Z. DNX		Z. Coumaphos	E. Pyruvic acid	
	AA. TNX		AA. Parathion		
			BB. Trichloronate		

LDC #41853240

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

METHOD: __ GC V HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?
Y N N/A Did the relative percent differences of detected compounds between two columns/detectors ≤40%?
If no, please see findings bellow.

#	Compound Name	Sample ID	%RPD Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	K	4	53.7	J- (all detects)
	L		80.0	
	M		92.5	

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853#0

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: CK
2nd Reviewer: AC

METHOD: GC _____ HPLC ✓

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported Ave CF (initial)	Recalculated Ave CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/1/17	A (C18)	145.07	145.07	142.068-86	142.068	3.9	3.9
			I ✓	95.690	95.69	94.68 2574	94.683	4.8	4.8
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853P40

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: R

METHOD: GC _____ HPLC ✓

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	W00003	2/20/18	A (C18)	142.1	138.8	138.8	2.3	2.3
			I ✓	94.68	90.79	90.79	4.1	4.1
2	W00014	2/23/18	✓	142.1	135.9	135.9	4.4	4.4
				94.68	89.52	89.52	5.5	5.5
3	~~W00014~~	~~2/23/18~~						
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #40532A6

Surrogate Results Verification

Reviewer: 9
2nd reviewer: R

METHOD: __ GC √ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3A-ONT	C18	125	109.3	87	87	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 41853240

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

METHOD: ___ GC ✓ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 320-209153

Compound	Spike Added (µg/L)		Spiked Sample Concentration (µg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	1.00	1.00	0.937	0.966	94	94	97	97	3	3
2,4,6-Trinitrotoluene (8330)	✓	✓	0.931	0.956	93	93	96	96	3	3

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853D40

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Q
2nd Reviewer: RC

METHOD: __ GC √ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1-2 #4, I Compound Name ND

Concentration = $\frac{(3835)(20)(1)}{(94.68725714)(983.2)}$

= 0.824 µL

#	Sample ID	Compound	Reported Concentrations (µL)	Recalculated Results Concentrations ( )	Qualifications
	4	I	0.82		

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Perchlorate

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36142-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT08-MW04-18A**	320-36142-1**	Water	02/15/18
TT08-MW05-18A**	320-36142-2**	Water	02/15/18
TT08-MW01-18A	320-36142-3	Water	02/15/18
TT49-MW01-18A	320-36142-4	Water	02/15/18
TT49-MW01-18ADL	320-36142-4DL	Water	02/15/18
TT08-MW03-18A	320-36142-5	Water	02/15/18

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed at the required frequency.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 50.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Interference Check Samples

Interference check samples (ICS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
TT49-MW01-18A	18-O Perchlorate	6739833 (10010857-30032571)	Perchlorate	J (all detects)	P

XII. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
TT49-MW01-18A	Perchlorate	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
TT49-MW01-18A	Perchlorate	R	A

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Perchlorate - Data Qualification Summary - SDG 320-36142-1

Sample	Compound	Flag	A or P	Reason (Code)
TT49-MW01-18A	Perchlorate	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perchlorate - Field Blank Data Qualification Summary - SDG 320-36142-1

No Sample Data Qualified in this SDG

LDC #: 41853P87 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-36142-1 Level III/IV Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤15%
IV.	Continuing calibration	A	CCV≤15%. CCV≤50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	LCS
IX.	Laboratory control samples	A	LCS
X.	Interference Check Sample	A	ICS
XI.	Field duplicates	N	
XII.	Internal standards	SW	
XIII.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for Level III validation.
XIV.	Target compound identification	A	Not reviewed for Level III validation.
XV.	System performance	A	Not reviewed for Level III validation.
XVI.	Overall assessment of data	SW	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	TT08-MW04-18A**	320-36142-1**	Water	02/15/18
2	TT08-MW05-18A**	320-36142-2**	Water	02/15/18
3	TT08-MW01-18A	320-36142-3	Water	02/15/18
4	TT49-MW01-18A	320-36142-4	Water	02/15/18
5	TT49-MW01-18ADL	320-36142-4DL	Water	02/15/18
6	TT08-MW03-18A	320-36142-5	Water	02/15/18
7				
8				

Notes:

LDC #: 41853D87

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: R

Method: Perchlorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ ~~20~~ 15%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?			✓	
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?	✓			
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

LDC #: 41852B87

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1
2nd Reviewer: 1

Validation Area	Yes	No	NA	Findings/Comments
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			ICS
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
Were retention times of m/z 89 ($Cl^{18}O_3^-$) within 0.2 minutes of m/z 83 (ClO_3^-)?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within 0.98 to 1.02?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 41853287

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

Y (N) N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications (I)
		A	18O4	6T39833(100108T-300325T1)		Y/MH/P (dets)

18O4 = 18-O Perchlorate

LDC #: 41853P6T

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: / GC √ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	4	Perchlorate > calib range		J (all det) (*V)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853T8T

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

METHOD: __ GC ✓ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	4	All		R/A (7)

Comments: _____

OVRNew.wpd

LDC #: 41853T

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: M

METHOD: LC/MS

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (1.0 std)	Recalculated CF (1.0 std)	Reported Ave CF (initial)	Recalculated Ave CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/26/18	Fenobucarb	1.044	1.044	0.9890	0.989	3.7	3.7
2	ICAL	3/2/18	√	1.025	1.025	0.9718	0.9718	6.2	6.2
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 41853T

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: R

METHOD: LC/MS

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	022618a	2/27/18	perchlorate	0.9890	1.055	1.055	6.7	6.7
	-030							
2	030T018a	2/27/18	↓	0.9718	1.027	1.027	5.7	5.7
	-002							
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 41853B87

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 1
2nd Reviewer: 1

METHOD: LC/MS

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-209893

Compound	Spike Added (µg/L)		Spike Concentration (µg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~Acenaphthene~~										
Perchlorate	0.500	NA	0.462	NA	92	92				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Privileged and Confidential

LDC #: 41853b8T

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: JC

METHOD: LC/MS

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, 1104:

Conc. = $\frac{490855)(10.0)(1)(1)}{(1595577)(0.9718)(1)(1)}$

= 3.20 µg/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	1	Perchlorate	3.2		

Privileged and Confidential

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 17, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36082-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46B-18A	320-36082-1	Water	02/14/18
MW-46B-P-18A	320-36082-2	Water	02/14/18
TT46-MW01-18A	320-36082-3	Water	02/14/18
ALB08-MW06-18A	320-36082-4	Water	02/14/18
USN08-MW03-18A	320-36082-5	Water	02/14/18
USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
ALB08-MW05-18A	320-36082-6	Water	02/14/18
ALB08-MW05-P-18A	320-36082-7	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
USN08-MW03-18ADL	All compounds	15	14	J (all detects)	A

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
03/01/18	Vinyl acetate	22.1	USN08-MW03-18ADL	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-02142018 (from SDG 320-36075-1) was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples MW-46B-18A and MW-46B-P-18A and samples ALB08-MW05-18A and ALB08-MW05-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	MW-46B-18A	MW-46B-P-18A	
1,2-Dichloroethane	0.73	0.72	1 (≤25)
Chloroform	0.41	0.38	8 (≤25)
Tetrachloroethene	0.40	0.47	16 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	MW-46B-18A	MW-46B-P-18A	
Trichloroethene	59	59	0 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	ALB08-MW05-18A	ALB08-MW05-P-18A	
Chloroform	1.4	1.3	7 (≤25)
Trichloroethene	0.38	0.42	10 (≤25)

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
USN08-MW03-18A	Tetrachloroethene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
USN08-MW03-18A	Tetrachloroethene	R	A
USN08-MW03-18ADL	All compounds except Tetrachloroethene	R	A

Due to technical holding time, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Volatiles - Data Qualification Summary - SDG 320-36082-1

Sample	Compound	Flag	A or P	Reason (Code)
USN08-MW03-18ADL	Tetrachloroethene	J (all detects)	A	Technical holding times (H)
USN08-MW03-18A	Tetrachloroethene	R	A	Overall assessment of data (D)
USN08-MW03-18ADL	All compounds except Tetrachloroethene	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

LDC #: 41853Q1 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/13/18
SDG #: 320-36082-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer: JC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / TW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 15% . r² ICV ≤ 20%
IV.	Continuing calibration	TW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	NO	TB-02142018 (320-36075-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	MS insufficient sample
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	TW	D = 1+2, 7+8
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	TW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46B-18A	320-36082-1	Water	02/14/18
2	MW-46B-P-18A	320-36082-2	Water	02/14/18
3	TT46-MW01-18A	320-36082-3	Water	02/14/18
4	ALB08-MW06-18A	320-36082-4	Water	02/14/18
5	USN08-MW03-18A	320-36082-5	Water	02/14/18
6	USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
7	ALB08-MW05-18A	320-36082-6	Water	02/14/18
8	ALB08-MW05-P-18A	320-36082-7	Water	02/14/18
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1. 2-Propanol
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 41853B1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: 9
2nd Reviewer: 1

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
Y N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
GB (db+N(1))	W	Y	2-14-18		3-1-18	15	J/UJ/A (H)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 18538Q1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/1/18	1030101	HH	22.1		6, MB(ND)	J/UJ/A(C)

CONCAL.1SB

LDC#: 41853Q4

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: AC

METHOD: GCMS VOCs (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		RPD (≤25)
	1	2	
L	0.73	0.72	1
K	0.41	0.38	8
AA	0.40	0.47	16
S	59	59	0

Compound	Concentration (ug/L)		RPD (≤25)
	7	8	
K	1.4	1.3	7
S	0.38	0.42	10

LDC #: 41853R1

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and RLs

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Compound	Finding	Qualifications
		5	AA > calib range		Lots/A (*V)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853Q1

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 8

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Compound	Finding	Qualifications
		5	AA		P/A (D)
		6	All except DA		↓

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 19, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36082-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46B-18A	320-36082-1	Water	02/14/18
MW-46B-P-18A	320-36082-2	Water	02/14/18
TT46-MW01-18A	320-36082-3	Water	02/14/18
ALB08-MW06-18A	320-36082-4	Water	02/14/18
USN08-MW03-18A	320-36082-5	Water	02/14/18
ALB08-MW05-18A	320-36082-6	Water	02/14/18
ALB08-MW05-P-18A	320-36082-7	Water	02/14/18
MW-46B-P-18AMS	320-36082-2MS	Water	02/14/18
MW-46B-P-18AMSD	320-36082-2MSD	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S The sequence or number of standards used for the calibration was incorrect.

C Correlation coefficient is <0.995.

R %R for calibration is not within control limits

B Presumed contamination from preparation (method) blank or calibration blank

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor.

E MS/MSD or Duplicate RPD or difference was high.

I ICP ICS results were unsatisfactory.

A ICP Serial Dilution %D were not within control limits

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Post Digestion Spike recovery was not within control limits

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
03/05/18	CRI (23:45)	Copper	121 (80-120)	MW-46B-18A	J (all detects)	P
03/05/18	CRI (23:45)	Copper	121 (80-120)	MW-46B-P-18A TT46-MW01-18A ALB08-MW06-18A USN08-MW03-18A ALB08-MW05-18A ALB08-MW05-P-18A	NA	-

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-46B-18A and MW-46B-P-18A and samples ALB08-MW05-18A and ALB08-MW05-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	MW-46B-18A	MW-46B-P-18A	
Arsenic	190	190	0 (≤25)
Barium	30	29	3 (≤25)
Copper	62	20U	Not calculable
Calcium	260000	260000	0 (≤25)
Magnesium	13000	13000	0 (≤25)
Molybdenum	67	57	16 (≤25)
Potassium	19000	18000	5 (≤25)
Sodium	1900000	1900000	0 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	ALB08-MW05-18A	ALB08-MW05-P-18A	
Arsenic	110	130	17 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	ALB08-MW05-18A	ALB08-MW05-P-18A	
Barium	24	23	4 (≤25)
Calcium	170000	170000	0 (≤25)
Magnesium	5400	5300	2 (≤25)
Molybdenum	56	56	0 (≤25)
Potassium	24000	24000	0 (≤25)
Sodium	1900000	1800000	5 (≤25)

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to instrument calibration CRI %R, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Dissolved Metals - Data Qualification Summary - SDG 320-36082-1

Sample	Analyte	Flag	A or P	Reason (Code)
MW-46B-18A	Copper	J (all detects)	P	Instrument calibration (CRI %R) (R)

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

LDC #: 41853Q4a

SDG #: 320-36082-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/13/18

Page: 1 of 1

Reviewer: VB

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	(8,9)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(2,3) JB (1,2) (6,7)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46B-18A	320-36082-1	Water	02/14/18
2	MW-46B-P-18A	320-36082-2	Water	02/14/18
3	TT46-MW01-18A	320-36082-3	Water	02/14/18
4	ALB08-MW06-18A	320-36082-4	Water	02/14/18
5	USN08-MW03-18A	320-36082-5	Water	02/14/18
6	ALB08-MW05-18A	320-36082-6	Water	02/14/18
7	ALB08-MW05-P-18A	320-36082-7	Water	02/14/18
8	MW-46B-P-18AMS	320-36082-2MS	Water	02/14/18
9	MW-46B-P-18AMSD	320-36082-2MSD	Water	02/14/18
10				
11				
12				

Notes:

LDC #: 41853Q4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
8, 9	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		~~Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti~~

Comments: Mercury ~~by~~ CVAA if performed

LDC #: 41853Q4a
SDG # 320-36082-1

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: JB
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y (N) N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N (N/A) Was a midrange cyanide standard distilled?

Y N (N/A) Are all correlation coefficients ≥0.995?

Y N (N/A) Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	3/5/18	CRI (23:45	Cu	121 (80-120)	All	J det/P (1 = Det, 2-7 = ND) (R)

Comments:

LDC#: 41853Q4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JB
2nd Reviewer: M

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	1	2	
Arsenic	190	190	0
Barium	30	29	3
Copper	62	20U	NC
Calcium	260000	260000	0
Magnesium	13000	13000	0
Molybdenum	67	57	16
Potassium	19000	18000	5
Sodium	1900000	1900000	0

Analyte	Concentration (ug/L)		RPD (≤25)
	6	7	
Arsenic	110	130	17
Barium	24	23	4
Calcium	170000	170000	0
Magnesium	5400	5300	2
Molybdenum	56	56	0
Potassium	24000	24000	0
Sodium	1900000	1800000	5

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Explosives

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36082-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46B-18A	320-36082-1	Water	02/14/18
MW-46B-P-18A	320-36082-2	Water	02/14/18
TT46-MW01-18A	320-36082-3	Water	02/14/18
ALB08-MW06-18A	320-36082-4	Water	02/14/18
ALB08-MW06-18ADL	320-36082-4DL	Water	02/14/18
USN08-MW03-18A	320-36082-5	Water	02/14/18
USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
ALB08-MW05-18A	320-36082-6	Water	02/14/18
ALB08-MW05-P-18A	320-36082-7	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Detector	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
USN08-MW03-18A	C18	3,4-Dinitrotoluene	41 (79-111)	All compounds	J (all detects) UJ (all non-detects)	A
USN08-MW03-18A	Zorbax CN	3,4-Dinitrotoluene	50 (79-111)	All compounds	J (all detects) UJ (all non-detects)	A

Additionally, surrogate recoveries (%R) were not within QC limits for sample USN08-MW03-18ADL. No data were qualified for samples analyzed at greater than or equal to 5X dilution.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples MW-46B-18A and MW-46B-P-18A and samples ALB08-MW05-18A and ALB08-MW05-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	ALB08-MW05-18A	ALB08-MW05-P-18A	
2-Amino-4,6-dinitrotoluene	0.22	0.075	98 (≤25)
4-Amino-2,6-dinitrotoluene	0.12	0.11	9 (≤25)
2,4-Dinitrotoluene	0.38	0.077	133 (≤25)
HMX	0.21	0.10U	Not calculable
RDX	2.2	0.40	138 (≤25)

X. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ALB08-MW06-18A	2-Amino-4,6-dinitrotoluene HMX RDX	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A
USN08-MW03-18A	RDX	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
ALB08-MW06-18A	1,3,5-Trinitrobenzene	40.8	J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
ALB08-MW06-18A	2-Amino-4,6-dinitrotoluene HMX RDX	R R R	A
USN08-MW03-18A	RDX	R	A

Due to surrogate %R and RPD between two columns, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Explosives - Data Qualification Summary - SDG 320-36082-1

Sample	Compound	Flag	A or P	Reason (Code)
USN08-MW03-18A	All compounds except RDX	J (all detects) UJ (all non-detects)	A	Surrogates (%R) (S)
ALB08-MW06-18A	1,3,5-Trinitrobenzene	J (all detects)	A	Compound quantitation (RPD between two columns) (V)
ALB08-MW06-18A	2-Amino-4,6-dinitrotoluene HMX RDX	R R R	A	Overall assessment of data (D)
USN08-MW03-18A	RDX	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Explosives - Laboratory Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Explosives - Field Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

LDC #: 41853Q40 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/12/18
SDG #: 320-36082-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	Initial calibration/ICV	A A	RSD <= 20%. ICV <= 15%
III.	Continuing calibration	A	CCV <= 15%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	insufficient sample
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	D = 1+2*. 8+9
X.	Compound quantitation RL/LOQ/LODs	SW N	
XI.	Target compound identification	N	
XII	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46B-18A	320-36082-1	Water	02/14/18
2	MW-46B-P-18A	320-36082-2	Water	02/14/18
3	TT46-MW01-18A	320-36082-3	Water	02/14/18
4	ALB08-MW06-18A	320-36082-4	Water	02/14/18
5	ALB08-MW06-18ADL	320-36082-4DL	Water	02/14/18
6	USN08-MW03-18A	320-36082-5	Water	02/14/18
7	USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
8	ALB08-MW05-18A	320-36082-6	Water	02/14/18
9	ALB08-MW05-P-18A	320-36082-7	Water	02/14/18
10				
11				
12				

Notes:

VALIDATION FINDINGS WORKSHEET

METHOD: ___GC ___HPLC

8310	8330	8151/8321	8141		8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	CC. Trichlorinate	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	DD. Trifluralin	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	EE. Def	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	FF. Prowl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	GG. Ethion	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	HH. Famphur	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	II. Phosmet	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	JJ. Tetrachlorvinphos	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	KK. Demeton (total)	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon		
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton		
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	**8315A**	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	A. Formaldehyde	
N. Naphthalene	N. 4-Nitrotoluene	N. 2,4-Dichlorophenoxybutyric acid	N. Malathion	B. Acetaldehyde	
O. Phenanthrene	O. Nitroglycerin	O.	O. Chlorpyrifos	C. Benzaldehyde	
P. Pyrene	P. Picric acid	P.	P. Fenthion	D. Butyraldehyde	
Q.	Q. 2,4-Dinitrophenol	Q.	Q. Parathion-ethyl	C. Benzaldehyde	
R.	R. 3,5-Dinitroaniline		R. Trichlornate	D. Butyraldehyde	
S.	S. 2-Nitrophenol		S. Merphos		
	T. 4-Nitrophenol		T. Stirofos		
	U. Picramic acid		U. Tokuthion	**Organic acids**	
	V. PETN		V. Fensulfothion	A. Acetic acid	
	W. Hexahydro-1,3,5-trinitroso-1,3,5-triazine		W. Bolstar	B. Butyric acid	
	X. MNX		X. EPN	C. Lactic acid	
	Y. Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine		Y. Azinphos-methyl	D. Propionic acid	
	Z. DNX		Z. Coumaphos	E. Pyruvic acid	
	AA. TNX		AA. Parathion		
			BB. Trichloronate		

LDC #: 41853B40

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: 9
2nd Reviewer: K

METHOD: ___ GC ✓ HPLC

Are surrogates required by the method? Yes____ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications (S)
	6	C18	T	41 (T9-111)	J/UJ/A (det&ND)
		Zorbax CN	T	50 (✓)	✓
				( )	
	T		All	out (-)	No Qual (DF=5x)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	1,2-Dinitrobenzene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC#: 41853Q40

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: M

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

Compound	Concentration (ug/L)		RPD (≤25)
	8	9	
I	0.22	0.075	98
H	0.12	0.11	9
J	0.38	0.077	133
A	0.21	0.10U	NC
B	2.2	0.40	138

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\41853Q40_AECOM.wpd

LDC #: 41853Q40

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: 9
2nd Reviewer: [illegible]

METHOD: ___ GC ✓ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	4	I, A, B > calib range		lots of * (*V)
	6	B		

Comments: See sample calculation verification worksheet for recalculations

LDC #~~41853R10~~

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: __ GC √ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N ~~N/A~~ Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
Y N ~~N/A~~ Did the reported results for detected target compounds agree within 10.0% of the recalculated results?
~~Y~~ N N/A Did the relative percent differences of detected compounds between two columns/detectors ≤40%?
If no, please see findings bellow.

#	Compound Name	Sample ID	%RPD Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	c	4	40.8	Vlots/A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853R40

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 8K

METHOD: ___ GC ✓ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	4	I, A, B		R/A (D)
				↓
	6	B		

Comments: _____

OVRNew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: April 18, 2018

Parameters: Perchlorate

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-36082-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-46B-18A	320-36082-1	Water	02/14/18
MW-46B-18ADL	320-36082-1DL	Water	02/14/18
MW-46B-P-18A	320-36082-2	Water	02/14/18
MW-46B-P-18ADL	320-36082-2DL	Water	02/14/18
TT46-MW01-18A	320-36082-3	Water	02/14/18
ALB08-MW06-18A	320-36082-4	Water	02/14/18
USN08-MW03-18A	320-36082-5	Water	02/14/18
USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
ALB08-MW05-18A	320-36082-6	Water	02/14/18
ALB08-MW05-P-18A	320-36082-7	Water	02/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Appendix A to the Final Basewide Groundwater Sampling and Analysis Plan for Naval Air Weapons Station, China Lake, California (November, 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

H Holding times were exceeded.

S Surrogate recovery was outside QC limits.

C Calibration %RSD, r, r^2 or %D were noncompliant

R Calibration RRF was <0.05.

B Presumed contamination from preparation (method blank)

L Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits

Q MS/MSD recovery was poor

E MS/MSD or Duplicate RPD was high.

I Internal standard performance was unsatisfactory

M Instrument Performance Check (BFB or DFTPP) was noncompliant

T Presumed contamination from trip blank.

F Presumed contamination from FB or ER.

D The analysis with this flag should not be used because another more technically sound analysis is available.

P Instrument performance for pesticides was poor

V Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed at the required frequency.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 50.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Interference Check Samples

Interference check samples (ICS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples MW-46B-18A and MW-46B-P-18A, samples MW-46B-18ADL and MW-46B-P-18ADL, and samples ALB08-MW05-18A and ALB08-MW05-P-18A were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	MW-46B-18A	MW-46B-P-18A	
Perchlorate	460	620	30 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	MW-46B-18ADL	MW-46B-P-18ADL	
Perchlorate	430	480	11 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	ALB08-MW05-18A	ALB08-MW05-P-18A	
Perchlorate	0.34	0.58	52 (≤25)

XI. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
MW-46B-18A	18-O Perchlorate	4967100 (10010857-30032571)	Perchlorate	J (all detects)	P
MW-46B-P-18A	18-O Perchlorate	4559523 (10010857-30032571)	Perchlorate	J (all detects)	P

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
USN08-MW03-18A	18-O Perchlorate	5140388 (10010857-30032571)	Perchlorate	J (all detects)	P

XII. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
MW-46B-18A MW-46B-P-18A USN08-MW03-18A	Perchlorate	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
MW-46B-18A MW-46B-P-18A USN08-MW03-18A	Perchlorate	R	A

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

NAWS China Lake, CTO 005
Perchlorate - Data Qualification Summary - SDG 320-36082-1

Sample	Compound	Flag	A or P	Reason (Code)
MW-46B-18A MW-46B-P-18A USN08-MW03-18A	Perchlorate	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perchlorate - Field Blank Data Qualification Summary - SDG 320-36082-1

No Sample Data Qualified in this SDG

LDC #: 41853Q87 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/3/18
SDG #: 320-36082-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer:

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤15%
IV.	Continuing calibration	A	CCV≤15%. LODV≤50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS
X.	Interference Check Sample	A	ICS
XI.	Field duplicates	SW	D=1+3, 2+4, 9+10
XII.	Internal standards	SW	
XIII.	Compound quantitation RL/LOQ/LODs	N	
XIV.	Target compound identification	N	
XV.	System performance	N	
XVI.	Overall assessment of data	SW	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-46B-18A	320-36082-1	Water	02/14/18
2	MW-46B-18ADL	320-36082-1DL	Water	02/14/18
3	MW-46B-P-18A	320-36082-2	Water	02/14/18
4	MW-46B-P-18ADL	320-36082-2DL	Water	02/14/18
5	TT46-MW01-18A	320-36082-3	Water	02/14/18
6	ALB08-MW06-18A	320-36082-4	Water	02/14/18
7	USN08-MW03-18A	320-36082-5	Water	02/14/18
8	USN08-MW03-18ADL	320-36082-5DL	Water	02/14/18
9	ALB08-MW05-18A	320-36082-6	Water	02/14/18
10	ALB08-MW05-P-18A	320-36082-7	Water	02/14/18
11				
12				

LDC#: 41853Q87

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: T
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (PA SW 846 Method 6850)

Compound	Concentration (ug/L)		RPD (≤25)
	1	3	
Perchlorate	460	620	30

Compound	Concentration (ug/L)		RPD (≤25)
	2	4	
Perchlorate	430	480	11

Compound	Concentration (ug/L)		RPD (≤25)
	9	10	
Perchlorate	0.34	0.58	52

LDC #: 41853283T

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: CY
2nd Reviewer: MC

METHOD: LC/MS Perchlorate

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications (+)
		1	18OP	496[100(100]085T-3[03=5T(])		Y/N/A (bias)
		3		4559533 ( )	( )	
		T		5140388 ( )	( )	

18O-Perchlorate

LDC #: 41853Q8T

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: 9
2nd Reviewer: A

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

Y N (N/A) Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N (N/A) Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	1,3,7	Perchlorate > calib range		J detects/UJ (*V)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 41853B8T

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: / **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	5,7-1,3,7	All		R/A (B)

Comments: _____

OVRNew.wpd

LDC #: 41853

EDD POPULATION COMPLETENESS WORKSHEET

Date: 4/23

2nd Reviewer: BA

The LDC job number listed above was entered by JE.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	- 10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	Y	
IIb.	- Reason Codes used? If so, note which codes.	—	
IIc.	- Additional Information (QC Level, Validator, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y	
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	—	
IIId.	-Does the detect flag require changing for blank qualifier? If so, are all U results marked ND?	Y/Y	
IIIe.	- Do blank concentrations in report match EDD where data was qualified due to blank contamination?	Y	
IIIf.	- Were multiple results reported due to dilutions/reanalysis? If so, were results qualified appropriately?	Y/Y	
IIIg.	-Are there any discrepancies between the data packet and the EDD?	N	

Notes: *see discrepancy sheet

LOCATION_NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	SDG	COORD_X	COORD_Y	ANALYTICAL_METHOD_GRP_DESC	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIX_DESC	COLLECT_DATE
ITC44-MW16	SITE 00044	CHINA_LAKE_NAWS	BH | WLM	Borehole/Soil boring | Monitoring well	320-35990-1	6657868.54	2437605.28	Perfluoroalkyl Compounds	ITC44-MW16-18A	WG	Ground water	12-Feb-18
TT44-MW02	SITE 00044	CHINA_LAKE_NAWS	WLM	Monitoring well	320-35990-1	6659518.38	2438748.96	Perfluoroalkyl Compounds	TT44-MW02-18A	WG	Ground water	12-Feb-18
ITC44-MW17	SITE 00044	CHINA_LAKE_NAWS	BH | WLM	Borehole/Soil boring | Monitoring well	320-35990-1	6657910.82	2438953.93	Perfluoroalkyl Compounds	ITC44-MW17-18A	WG	Ground water	12-Feb-18
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ETC44-MW04	SITE 00044	CHINA_LAKE_NAWS	BH | WLM	Borehole/Soil boring | Monitoring well	320-35990-1	6658479.89	2438679.86	Perfluoroalkyl Compounds	ETC44-MW04-18A	WG	Ground water	12-Feb-18
ITC44-MW16	SITE 00044	CHINA_LAKE_NAWS	BH | WLM	Borehole/Soil boring | Monitoring well	320-35990-1	6657868.54	2437605.28	Perfluoroalkyl Compounds	ITC44-MW16-18A	WG	Ground water	12-Feb-18
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26S40E09A01	SITE 00044	CHINA_LAKE_NAWS	WLM	Monitoring well	320-35990-1	6659323.1	2439363.78	Perfluoroalkyl Compounds	26S40E09A01-18A	WG	Ground water	12-Feb-18
26S40E09A01	SITE 00044	CHINA_LAKE_NAWS	WLM	Monitoring well	320-35990-1	6659323.1	2439363.78	Perfluoroalkyl Compounds	26S40E09A01-18A	WG	Ground water	12-Feb-18
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