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Groundwater Sample Results, Data Validation Report, and the Sample Location Report, SDG 320-32634

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

January 31, 2017

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 January 12, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #40221:

SDG #	Fraction
320-30356-1, 320-30451-1, 320-30476-1 320-30477-1, 320-30525-1, 320-30573-1 320-30601-1, 320-30750-1, 320-30752-1 320-30770-1, 320-32498-1, 320-32508-1 320-32513-1, 320-32539-1, 320-32542-1 320-32593-1, 320-32634-1, 320-32638-1 320-32640-1, 320-32695-1, 320-32745-1 320-32823-1, 320-32853-1, 320-32919-1 320-32960-1, 320-32997-1	Volatiles, Dissolved Metals, Metals, Methane, Ethane, & Ethene, Gasoline Range Organics, Diesel Range Organics, Motor Oil Range Organics, Ethanol, Perfluorinated Alkyl Acids, Wet Chemistry

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, CA, November 2016
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0, July 2013
- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review, January 2017
- USEPA, Contract Laboratory Program 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

46,320 pages-ADV R1 (changed Wet & Methane to Level III) Attachment 1

90/10 EDD

LDC #40221 (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)		PFAs (537)		Methane Ethane Ethene		Alk. (2320B)		Cl,SO_4 O-PO_4-P (9056A)		NO_3-N NO_2-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	W	S	W	S
A	320-30356-1	01/12/18	01/26/18	3	0	2	0	2	0	2	0	-	-	-	-	-	-	2	0	2	0	2	0	2	0	2	0	2	0	2	0						
B	320-30451-1	01/12/18	01/26/18	5	0	4	0	4	0	4	0	-	-	-	-	-	-	4	0	4	0	4	0	4	0	4	0	4	0	4	0						
C	320-30476-1	01/12/18	01/26/18	1	0	1	0	1	0	1	0	-	-	-	-	-	-	1	0	1	0	1	0	1	0	1	0	1	0	1	0						
D	320-30477-1	01/12/18	01/26/18	2	0	1	0	-	-	-	-	-	-	-	-	1	0	-	-	1	0	1	0	-	-	-	-	-	-	-	-						
E	320-30525-1	01/12/18	01/26/18	5	0	4	0	-	-	-	-	-	-	-	-	4	0	-	-	4	0	4	0	-	-	-	-	-	-	-	-						
F	320-30573-1	01/12/18	01/26/18	5	0	4	0	-	-	-	-	-	-	-	-	4	0	-	-	4	0	4	0	-	-	-	-	-	-	-	-						
G	320-30601-1	01/12/18	01/26/18	4	0	3	0	-	-	-	-	-	-	-	-	3	0	-	-	3	0	3	0	-	-	-	-	-	-	-	-						
H	320-30750-1	01/12/18	01/26/18	4	0	3	0	-	-	-	-	-	-	-	-	3	0	-	-	3	0	3	0	-	-	-	-	-	-	-	-						
I	320-30752-1	01/12/18	01/26/18	4	0	4	0	-	-	-	-	-	-	-	-	4	0	4	0	4	0	4	0	-	-	-	-	-	-	-	-						
J	320-30770-1	01/12/18	01/26/18	9	0	8	0	-	-	-	-	-	-	-	-	8	0	8	0	8	0	8	0	-	-	-	-	-	-	-	-						
K	320-32498-1	01/12/18	01/26/18	5	0	-	-	5	0	-	-	-	-	-	-	-	-	5	0	5	0	5	0	-	-	5	0	-	-	5	0						
L	320-32508-1	01/12/18	01/26/18	14	0	-	-	13	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
M	320-32513-1	01/12/18	01/26/18	9	0	-	-	8	0	8	0	-	-	1	0	-	-	8	0	8	0	8	0	-	-	8	0	-	-	8	0						
M	320-32513-1	01/12/18	01/26/18	0	0	-	-	0	0	0	0	-	-	1	0	-	-	0	0	0	0	0	0	-	-	0	0	-	-	0	0						
N	320-32539-1	01/12/18	01/26/18	0	0	4	0	-	-	-	-	-	-	-	-	7	0	-	-	7	0	7	0	-	-	-	-	-	-	-	-						
N	320-32539-1	01/12/18	01/26/18	8	0	3	0	-	-	-	-	-	-	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	-						
O	320-32542-1	01/12/18	01/26/18	5	0	-	-	4	0	1	0	-	-	-	-	-	-	1	0	1	0	1	0	-	-	1	0	-	-	1	0						
P	320-32593-1	01/12/18	01/26/18	3	0	-	-	2	0	7	0	-	-	1	0	-	-	2	0	2	0	2	0	-	-	2	0	-	-	2	0						
Q	320-32634-1	01/12/18	01/26/18	2	0	-	-	2	0	2	0	-	-	2	0	-	-	2	0	2	0	2	0	-	-	2	0	-	-	2	0						
R	320-32638-1	01/12/18	01/26/18	7	0	6	0	-	-	-	-	-	-	-	-	6	0	-	-	6	0	6	0	-	-	-	-	-	-	-	-						
S	320-32640-1	01/12/18	01/26/18	4	0	4	0	-	-	-	-	-	-	-	-	4	0	4	0	4	0	4	0	-	-	-	-	-	-	-	-						
T	320-32695-1	01/12/18	01/26/18	5	0	4	0	-	-	-	-	-	-	-	-	4	0	2	0	2	0	2	0	-	-	-	-	-	-	-	-						
U	320-32745-1	01/12/18	01/26/18	6	0	5	0	4	0	-	-	3	0	-	-	5	0	5	0	5	0	5	0	-	-	-	-	-	-	-	-						
U	320-32745-1	01/12/18	01/26/18	0	0	0	0	1	0	-	-	2	0	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-						
V	320-32823-1	01/12/18	01/26/18	4	0	3	0	3	0	-	-	3	0	-	-	3	0	4	0	4	0	4	0	-	-	-	-	-	-	-	-						
W	320-32853-1	01/12/18	01/26/18	6	0	5	0	5	0	2	0	3	0	-	-	3	0	5	0	5	0	5	0	2	0	2	0	2	0	2	0						
X	320-32919-1	01/12/18	01/26/18	0	0	0	0	0	0	0	0	1	0	-	-	1	0	6	0	6	0	6	0	5	0	5	0	5	0	5	0						
X	320-32919-1	01/12/18	01/26/18	7	0	6	0	6	0	5	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Y	320-32960-1	01/12/18	01/26/18	6	0	5	0	1	0	1	0	-	-	-	-	4	0	1	0	5	0	5	0	1	0	1	0	1	0	1	0						
Z	320-32997-1	01/12/18	01/26/18	8	0	3	0	2	0	2	0	-	-	-	-	5	0	6	0	7	0	7	0	-	-	2	0	-	-	2	0						
Total	T/SC			141	0	82	0	63	0	35	0	12	0	5	0	69	0	70	0	103	0	103	0	15	0	35	0	15	0	35	0	0	0	0	0	0	783

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

V:\LOGIN\AECOM\China Lake\40221ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30356-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
TB-08022017	320-30356-3	Water	08/02/17

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-MW09-17Q2 KCH43-MW10-17Q2 TB-08022017	Di-isopropyl ether Ethyl tert-butyl ether tert-Amyl methyl ether	12 days	7 days	J (all detects) UJ (all non-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.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) 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-08022017 was identified as a trip blank. No contaminants were found.

Sample EB-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Acetone	3.7 ug/L	KCH43-MW09-17Q2 KCH43-MW10-17Q2

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 technical holding times, 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 320-30356-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW09-17Q2 KCH43-MW10-17Q2 TB-08022017	Di-isopropyl ether Ethyl tert-butyl ether tert-Amyl methyl ether	J (all detects) UJ (all non-detects)	A	Technical holding times (H)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

LDC #: 40221A1

SDG #: 320-30356-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

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 / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	
IV.	Continuing calibration / 2nd ICV	A	RSD ≤ 15%. r² ICV ≤ 20%
V.	Laboratory Blanks	A	CCV ≤ 20/50%
VI.	Field blanks	AN	TB = 3, EB-SITE43-08032017 (320-30451-1)
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	KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
2	KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
3	TB-08022017	320-30356-3	Water	08/02/17
4				
5				
6				
7				
8				

Notes:

	MB 320-178129/12		(LL) (HPT)				
	MB 320-178297/13		(HPT)				

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 #: 40221A1

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
1-3 (ND)	W	N	8-2-17		8-14-17	12	~~UJ~~/A (H)
* XXX, AAAA, BBBB only							

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 #: 40221A1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-2

Compound	Blank ID	Sample Identification								
320-30451-1	EB-SITE43-08032017									
F	3.7									

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: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30356-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
KCH43-MW09-17Q2MS	320-30356-1MS	Water	08/02/17
KCH43-MW09-17Q2MSD	320-30356-1MSD	Water	08/02/17

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	107 ug/L	All samples in SDG 320-30356-1

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Calcium Magnesium Nickel Potassium Sodium	130 ug/L 33 ug/L 1.0 ug/L 36 ug/L 640 ug/L	All samples in SDG 320-30356-1

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

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
KCH43-MW09-17Q2MS/MSD (KCH43-MW09-17Q2)	Copper	-	83 (85-118)	J (all detects)	A

For KCH43-MW09-17Q2MS/MSD, no data were qualified for Potassium 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) 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.

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 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
Dissolved Metals - Data Qualification Summary - SDG 320-30356-1

Sample	Analyte	Flag	A or P	Reason (Code)
KCH43-MW09-17Q2	Copper	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

LDC #: 40221A4a

SDG #: 320-30356-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

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	SW	
VI.	Field Blanks	SW	EB= EB-SITE43-08032017 from 320-30451-1
VII.	Matrix Spike/Matrix Spike Duplicates	SW	(3,4)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS/D
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-MW09-17Q2	320-30356-1	Water	08/02/17
2	KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
3	KCH43-MW09-17Q2MS	320-30356-1MS	Water	08/02/17
4	KCH43-MW09-17Q2MSD	320-30356-1MSD	Water	08/02/17
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 40221A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: A

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, ____
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, ____
3,4		Al, Sb, As, 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 #: 40221A4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: M

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		107		535									

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 #: 40221A4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: K

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-SITE43-08032017 from 320-30451-1	Action Limit										
Ca	130	650										
Mg	33	165										
Ni	1.0	5										
K	36	180										
Na	640	3200										

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 #: 40221A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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
	3,4	W	Cu		83 (85-118)		1	J/UJ/A (Det) (Q)

Comments: (3,4) K; Na > 4x

MSD.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30356-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
KCH43-MW09-17Q2MS	320-30356-1MS	Water	08/02/17
KCH43-MW09-17Q2MSD	320-30356-1MSD	Water	08/02/17
KCH43-MW10-17Q2MS	320-30356-2MS	Water	08/02/17
KCH43-MW10-17Q2MSD	320-30356-2MSD	Water	08/02/17
KCH43-MW10-17Q2DUP	320-30356-2DUP	Water	08/02/17

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:

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.

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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
08/03/17	CCV (21:46)	Nitrite as N Nitrate as N	112 (90-110) 113 (90-110)	KCH43-MW09-17Q2 KCH43-MW10-17Q2	NA	-

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	167 ug/L	KCH43-MW10-17Q2
ICB/CCB	Total organic carbon	0.174 mg/L	KCH43-MW10-17Q2

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Chloride Total organic carbon Total dissolved solids	0.12 mg/L 510 ug/L 10000 ug/L	All samples in SDG 320-3356-1

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
KCH43-MW10-17Q2MS/MSD (KCH43-MW10-17Q2)	Nitrate as N	-	112 (88-111)	NA	-

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) 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. 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 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

LDC #: 40221A6

SDG #: 320-30356-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-19-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: A

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	
II	Initial calibration	A	
III.	Calibration verification	SW	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = EB-SITE 43-08032017 (SDG: 320-30451-1)
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
VII.	Duplicate sample analysis	~~SW~~ A	DUP (#7: TSS ok by difference)
VIII.	Laboratory control samples	A	LCS/LCSD
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	KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
2	KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
3	KCH43-MW09-17Q2MS	320-30356-1MS	Water	08/02/17
4	KCH43-MW09-17Q2MSD	320-30356-1MSD	Water	08/02/17
5	KCH43-MW10-17Q2MS	320-30356-2MS	Water	08/02/17
6	KCH43-MW10-17Q2MSD	320-30356-2MSD	Water	08/02/17
7	KCH43-MW10-17Q2DUP	320-30356-2DUP	Water	08/02/17
8				
9				
10				
11				
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: MG
2nd reviewer: M

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1, 2	W	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (PO4) (ALK) CN- NH3 TKN (TOC) CR6+ ClO4 (S=) (TSS)
QC 3,4	↓	pH TDS (Cl) F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
5,6	↓	pH (TDS) Cl F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
7	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ (TSS)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments:

LDC #: 40221A6

VALIDATION FINDINGS WORKSHEET
Calibration

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

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	%R	Associated Samples	Qualifications
1	8-3-17	CCV (21:46)	NO_2-N	112 (90-110)	1, 2, 5, 6, PBW1	J dets/P (R) (Samples: ND)
	↓	↓	NO_3-N	113 (↓)	↓	↓ (↓) (↓)

Comments:

CAL.6

LDC #: 40221A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: AL

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples:** 2 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)											
TOC	167	0.174	870										

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 #: 40221A6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: A

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/3/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-SITE43-08032017		No Qual's.									
Cl	0.12	0.60										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: **8/3/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-SITE43-08032017		No Qual's.									
TOC	510	2550										
TDS	10000	50000										

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 #: 40221A6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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
1	5/6	water	NO_3-N		112 (88-111)		2	J dets/A (Q) (ND)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30356-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
KCH43-MW10-17Q2	320-30356-2	Water	08/02/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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%.

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 method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-SITE43-08032017 (from SDG 320-30451-1) 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 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
Gasoline Range Organics - Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-30356-1

No Sample Data Qualified in this SDG

LDC #: 40221A7

SDG #: 320-30356-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB-SITE43-08032017(320-30451-1)
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	KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
2	KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
3				
4				
5				
6				
7				
8				

Notes:

	MB 320-178127/2						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30356-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW09-17Q2	320-30356-1	Water	08/02/17
KCH43-MW10-17Q2	320-30356-2	Water	08/02/17

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Diesel range organics (C10-C28)	23 ug/L	All samples in SDG 320-30356-1

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. Surrogates

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits for sample KCH43-MW09-17Q2. 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 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.

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
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-30356-1

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 320-30356-1

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 320-30356-1

No Sample Data Qualified in this SDG

LDC #: 40221A8

SDG #: 320-30356-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/15/18

Page: 1 of 1

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	EB-SITE43-080320 17 (320-30451-1)
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	N	
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-MW09-17Q2	320-30356-1	Water	08/02/17
2	KCH43-MW10-17Q2	320-30356-2	Water	08/02/17
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 40221A8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: C

METHOD: GC TPHE (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: ~~SB (SDG: 1730720)~~ Associated Samples: All

Compound	Blank ID	Sample Identification								
320-30451-1	EB-SITE43-08032017									
DRO (C10-C28)	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 #: 40221A8

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

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

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
	1		H	45 (56-125)	No qual (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		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30451-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
TB-08032017	320-30451-4	Water	08/03/17
EB-SITE43-08032017	320-30451-5	Water	08/03/17

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
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2 EB-SITE43-08032017	All compounds	Cooler temperatures were reported between 18.9°C and 22.8°C upon receipt by the laboratory.	Cooler temperature must be 4±2°C.	J (all detects) R (all non-detects)	A

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-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	All compounds	13 days	7 days	J (all detects) UJ (all non-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
08/16/17	Vinyl acetate	82.7	All samples in SDG 320-30451-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08032017 was identified as a trip blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
TB-08032017	08/03/17	2-Butanone	0.38 ug/L	KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2 EB-SITE43-08032017

Sample EB-SITE43-08032017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Acetone	3.7 ug/L	KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2

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
KCH43-MW11-17Q2	2-Butanone Acetone	0.38 ug/L 2.3 ug/L	0.38U 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 320-17964-1/5,6 (All samples in SDG 320-30451-1)	Vinyl acetate	182 (54-146)	177 (54-146)	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.

Due to cooler temperatures, data were rejected in five samples.

Due to cooler temperature and technical holding times, data were qualified as estimated in five samples.

Due to trip 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. 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 320-30451-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2 TB-08032017 EB-SITE43-08032017	All compounds	J (all detects) R (all non-detects)	A	Cooler temperature (V)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	All compounds	J (all detects)	A	Technical holding times (H)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30451-1

Sample	Compound	Modified Final Concentration	A or P	Code
KCH43-MW11-17Q2	2-Butanone Acetone	0.38U ug/L 2.3U ug/L	A	T F

LDC #: 40221B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-30451-1 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	SW/SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration /Ending.	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB = 4. EB = 5
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	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	KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
2	RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
3	RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
4	TB-08032017	320-30451-4	Water	08/03/17
5	EB-SITE43-08032017	320-30451-5	Water	08/03/17
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 #: 40221B1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
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
All	Temp @		18.9°C -	22.8°C			~~A~~ (V)
						(HT=7)	
1	W	N	8-3-1T		8-16-1T	13	~~V~~ ~~P~~ (H)
2	↓	↓	↓		↓	↓	↓
3	↓	↓	↓		↓	↓	↓
(dot3+ND)							

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 #: 40221B

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
	8/6/11	H0816B	HH	82.7		All (ND)	J/UJ/A(C)
		endosulfan I	HH	57.8		All	Text

CONCAL.1SB

LDC #: 40221B1

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: µg/L **Associated sample units:** µg/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: TB Associated Samples: 1-3.5 (T)

Compound	Blank ID	Sample Identification								
	4	1								
Methylene chloride										
Acetone										
Chloroform										
M	0.38	0.38/U								

Blank units: µg/L **Associated sample units:** µg/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-3

Compound	Blank ID	Sample Identification								
	5	1								
Methylene chloride										
Acetone	3.7	2.3/U								
Chloroform										

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 #: 40221B1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: a
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
	LCSD	320-17964-1/5,6	HH	182 (54-146)	177 (54-146)	( )	All (ND)	Detect (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30451-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
EB-SITE43-08032017	320-30451-5	Water	08/03/17

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	33.8 ug/L	All samples in SDG 320-30451-1

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-SITE43-08032017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Calcium Magnesium Nickel Potassium Sodium	130 ug/L 33 ug/L 1.0 ug/L 36 ug/L 640 ug/L	All samples in SDG 320-30451-1

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 320-30451-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

LDC #: 40221B4a

SDG #: 320-30451-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

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	SW	EB = 4
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-MW11-17Q2	320-30451-1	Water	08/03/17
2	RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
3	RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
4	EB-SITE43-08032017	320-30451-5	Water	08/03/17
5				
6				
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Notes:

LDC #: 40221B4a

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)
1-4	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 #: 40221B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: M

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		33.8		169									

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 #: 40221B4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: B
2nd Reviewer: C

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 3

Analyte	Blank ID	Sample Identification											
	4	Action Limit											
Ca	130	650											
Mg	33	165											
Ni	1.0	5											
K	36	180											
Na	640	3200											

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: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30451-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
EB-SITE43-08032017	320-30451-5	Water	08/03/17
KCH43-MW11-17Q2MS	320-30451-1MS	Water	08/03/17
KCH43-MW11-17Q2MSD	320-30451-1MSD	Water	08/03/17
RLS43-MW04-17Q2DUP	320-30451-2DUP	Water	08/03/17
RLS43-MW03-17Q2MS	320-30451-3MS	Water	08/03/17
RLS43-MW03-17Q2MSD	320-30451-3MSD	Water	08/03/17

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:

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-MW11-17Q2	Nitrate as N Nitrite as N	5 days	48 hours	R (all non-detects) R (all non-detects)	P
RLS43-MW04-17Q2	Nitrate as N Nitrite as N	5 days	48 hours	R (all non-detects) R (all non-detects)	P
RLS43-MW03-17Q2	Nitrate as N Nitrite as N	5 days	48 hours	R (all non-detects) R (all non-detects)	P
EB-SITE43-08032017	Nitrate as N Nitrite as N Orthophosphate as P	5 days	48 hours	R (all non-detects) R (all non-detects) R (all non-detects)	P
KCH43-MW11-17Q2	Orthophosphate as P	5 days	48 hours	J (all detects)	P
RLS43-MW04-17Q2	Orthophosphate as P	5 days	48 hours	J (all detects)	P
RLS43-MW03-17Q2	Orthophosphate as P	5 days	48 hours	J (all detects)	P

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	182 ug/L	All samples in SDG 320-30451-1

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-SITE43-08032017	Total organic carbon	510 ug/L	510U ug/L

V. Field Blanks

Sample EB-SITE43-08032017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Chloride Total organic carbon Total dissolved solids	0.12 mg/L 510 ug/L 10000 ug/L	KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2

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. For KCH43-MW11-17Q2MS/MSD, no data were qualified for Sulfate 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.

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) 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. 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.

Due to technical holding time, data were rejected in four samples.

Due to technical holding, data were qualified as estimated in three 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
Wet Chemistry - Data Qualification Summary - SDG 320-30451-1

Sample	Analyte	Flag	A or P	Reason (Code)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Nitrate as N Nitrite as N	R (all non-detects) R (all non-detects)	P	Technical holding times (H)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Orthophosphate as P	J (all detects)	P	Technical holding times (H)
EB-SITE43-08032017	Nitrate as N Nitrite as N Orthophosphate as P	R (all non-detects) R (all non-detects) R (all non-detects)	P	Technical holding times (H)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30451-1

Sample	Analyte	Modified Final Concentration	A or P	Code
EB-SITE43-08032017	Total organic carbon	510U ug/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

LDC #: 40221B6

SDG #: 320-30451-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-19-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: M

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	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 4
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD (#5/6: SO4-4x)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/LCSD
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	KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
2	RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
3	RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
4	EB-SITE43-08032017	320-30451-5	Water	08/03/17
5	KCH43-MW11-17Q2MS	320-30451-1MS	Water	08/03/17
6	KCH43-MW11-17Q2MSD	320-30451-1MSD	Water	08/03/17
7	RLS43-MW04-17Q2DUP	320-30451-2DUP	Water	08/03/17
8	RLS43-MW03-17Q2MS	320-30451-3MS	Water	08/03/17
9	RLS43-MW03-17Q2MSD	320-30451-3MSD	Water	08/03/17
10				
11				
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→4	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 $S^=$ TSS
QC 5,6	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
7	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
8,9	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments: _____

LDC #: 40221B6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: MG
2nd reviewer: M

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:		9056A	9056A	9056A				
Parameters:		NO_3-N	NO_2-N	PO_4-P				
Technical holding time:		48 hr	48 hr	48 hr.				
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier	
1	10:20 8-3-17	12:30 8-8-17	12:30 8-8-17	(5 days)		Code (H)	J/R/P	(N.D.)
2	12:00 8-3-17	13:05 8-8-17	13:05 8-8-17	( )		( )		( )
3	13:35 8-3-17	13:16 8-8-17	13:16 8-8-17	( )		( )		( )
4	15:10 8-3-17	13:28 8-8-17	13:28 8-8-17	( )		( )		( )
5	10:20 8-3-17	12:42 8-8-17	12:42 8-8-17	( )		( )		(det)
6	10:20 8-3-17	12:53 8-8-17	12:53 8-8-17	( )		( )		(det)
1	10:20 8-3-17			12:30 8-8-17	(5 days)	( )		(det)
2	12:00 8-3-17			13:05 8-8-17	( )	( )		( )
3	13:35 8-3-17			13:16 8-8-17	( )	( )		( )
4	15:10 8-3-17			13:28 8-8-17	( )	( )		(ND)
5	10:20 8-3-17			12:42 8-8-17	( )	( )		(det)
6	10:20 8-3-17			12:53 8-8-17	( )	( )		( )

LDC #: 40221B6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples:** all **Code (B)**

Analyte	Blank ID	Blank ID	Blank Action Limit											
	PB	ICB/CCB (mg/L)		4										
TOC	182		910	510										

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 #: 40221B6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/3/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-3 (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	4		No Qual's.									
Cl	0.12	0.60										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: **8/3/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-3 (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	4		No Qual's.									
TOC	510	2550										
TDS	10000	50000										

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: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30451-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
EB-SITE43-08032017	320-30451-5	Water	08/03/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Gasoline range organics	Cooler temperatures were reported between 18.9°C and 22.8°C upon receipt by the laboratory.	Cooler temperature must be 4±2°C.	J (all detects)	A
EB-SITE43-08032017	Gasoline range organics	Cooler temperatures were reported between 18.9°C and 22.8°C upon receipt by the laboratory.	Cooler temperature must be 4±2°C.	R (all non-detects)	A

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-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Gasoline range organics	13	7	J (all detects)	P

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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 method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-SITE43-08032017 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 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.

Due to cooler temperature, data were rejected in one sample.

Due to cooler temperature and technical holding time, 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 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
Gasoline Range Organics - Data Qualification Summary - SDG 320-30451-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Gasoline range organics	J (all detects)	A	Cooler temperature (V)
EB-SITE43-08032017	Gasoline range organics	R (all non-detects)	A	Cooler temperature (V)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2	Gasoline range organics	J (all detects)	P	Technical holding times (H)

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-30451-1

No Sample Data Qualified in this SDG

LDC #: 40221B7

SDG #: 320-30451-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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	SW	Temp @ 18.9-22.8°C - ✓ R/A (1-3=dets) (V1)
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	A	
VI.	Field blanks	ND	EB = 4
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	KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
2	RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
3	RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
4	EB-SITE43-08032017	320-30451-5	Water	08/03/17
5				
6				
7				
8				

Notes:

LDC #: 40221B7

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: a
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	Total # of Days (HT=7)	Qualifier
1-3 (dets+ND)	W	N	8-3-17		8-16-17	13	✓(W)/P (H)
1-3 (dets)	Temp	(W)	18.9-22.8 °C				✓A/A (V*1)
4 (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: January 25, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30451-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
EB-SITE43-08032017	320-30451-5	Water	08/03/17

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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All samples in SDG 320-30451-1	All compounds	Cooler temperatures were reported between 18.9°C and 22.8°C upon receipt by the laboratory.	Cooler temperature must be 4±2°C.	J (all detects) 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 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-SITE43-08032017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Diesel range organics (C10-C28)	23 ug/L	KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2

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-MW11-17Q2	Diesel range organics (C10-C28)	100 ug/L	100U ug/L
RLS43-MW03-17Q2	Diesel range organics (C10-C28)	90 ug/L	90U 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 cooler temperature, data were qualified as estimated in four 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
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-30451-1

Sample	Compound	Flag	A or P	Reason (Code)
KCH43-MW11-17Q2 RLS43-MW04-17Q2 RLS43-MW03-17Q2 EB-SITE43-08032017	All compounds	J (all detects) UJ (all non-detects)	A	Cooler temperatures (V)

NAWS China Lake, CTO 005
Diesel Range Organics & Motor Oil Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-30451-1

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 320-30451-1

Sample	Compound	Modified Final Concentration	A or P	Code
KCH43-MW11-17Q2	Diesel range organics (C10-C28)	100U ug/L	A	F
RLS43-MW03-17Q2	Diesel range organics (C10-C28)	90U ug/L	A	F

LDC #: 40221B8

SDG #: 320-30451-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/18/18

Page: 1 of 1

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	SW/A	Temp @ 18.9-22.8°C — 1/MY/A(V1)
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=4
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	KCH43-MW11-17Q2	320-30451-1	Water	08/03/17
2	RLS43-MW04-17Q2	320-30451-2	Water	08/03/17
3	RLS43-MW03-17Q2	320-30451-3	Water	08/03/17
4	EB-SITE43-08032017	320-30451-5	Water	08/03/17
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11				
12				

Notes:

LDC #: 40221B8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 4

METHOD: GC_HPLC__
Y N N/A Field blanks were identified in this SDG.
Y N N/A Were target compounds detected in the field blanks?
Blank units: µg/L **Associated sample units:** µg/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-3 (F)

Compound	Blank ID	Sample Identification								
	4		1	3						
DRO(C10-C28)	23		100/U	90/U						

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound 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: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30476-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW02-17Q2	320-30476-1	Water	08/07/17

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-MW02-17Q2	All compounds	9 days	7 days	UJ (all non-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
08/16/17	Vinyl acetate	82.7	All samples in SDG 320-30476-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08072017 (from SDG 320-30477-1) was identified as a trip blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
TB-08072017	08/07/17	Acetone	2 ug/L	All samples in SDG 320-30476-1

Sample EB-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Acetone	3.7 ug/L	All samples in SDG 320-30476-1

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.

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 320-179641/5,6 (All samples in SDG 320-30476-1)	Vinyl acetate	182 (54-146)	177 (54-146)	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 technical holding times and continuing calibration %D, 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 320-30476-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS43-MW02-17Q2	All compounds	UJ (all non-detects)	A	Technical holding times (H)
RLS43-MW02-17Q2	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

LDC #: 40221C1

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-30476-1

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/SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15% · r² ICV ≤ 20%
IV.	Continuing calibration Bzndig	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB-080720 17(320-30477-1)
VII.	Surrogate spikes	A	EB-SITE43-080320 17(320-30451-1)
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	RLS43-MW02-17Q2	320-30476-1	Water	08/07/17
2				
3				
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 #: 40221c1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 6 of 1
Reviewer:
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) (HT=7)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1 (ND)	W	N	8-7-17		8-16-17	9	~~UJ/P~~ (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 #: 40221CT

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: K
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
	8/16/17	H0816B	HH	82.7		All (ND)	J/UJ/A(C)
	8/16/17	Endig CCV	HH	57.8		All	Text

CONCAL.1SB

LDC #: 42221C1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 12

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

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: µg/L **Associated sample units:** µg/L

Sampling date: 8/7/17

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples: All

Compound	Blank ID	Sample Identification								
TB-080720 17										
Methylene chloride										
Acetone	2									
Chloroform										

Blank units:_____ **Associated sample units:**_____

Sampling date:_____

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
Chloroform										

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 #: 40221C1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: R
2nd Reviewer: R

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All (F)

Compound	Blank ID	Sample Identification								
320-30451-1	EB-SITE43-08032017									
F	3.7									

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 #: 40221c1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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	D320+T964V/5,6	HH	182 (54-146)	177 (54-146)	( )	All (ND)	~~Det~~ P(L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30476-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW02-17Q2	320-30476-1	Water	08/07/17

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	33.8 ug/L	All samples in SDG 320-30476-1

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Calcium Magnesium Nickel Potassium Sodium	130 ug/L 33 ug/L 1.0 ug/L 36 ug/L 640 ug/L	All samples in SDG 320-30476-1

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 320-30476-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

LDC #: 40221C4a

SDG #: 320-30476-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer: JB

2nd Reviewer: R

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-SITE43-08032017 from 320-30451-1
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-MW02-17Q2	320-30476-1	Water	08/07/17
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 40221C4a

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	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, ___
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 #: 40221C4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: [illegible]

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		33.8		169									

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 #: 40221C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: AL

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-SITE43-08032017 from 320-30451-1	Action Limit										
Ca	130	650										
Mg	33	165										
Ni	1.0	5										
K	36	180										
Na	640	3200										

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: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30476-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW02-17Q2	320-30476-1	Water	08/07/17
RLS43-MW02-17Q2MS	320-30476-1MS	Water	08/07/17
RLS43-MW02-17Q2MSD	320-30476-1MSD	Water	08/07/17
RLS43-MW02-17Q2DUP	320-30476-1DUP	Water	08/07/17
RLS43-MW02-17Q2RE	320-30476-1RE	Water	08/07/17

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:

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.

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Chloride Total organic carbon Total dissolved solids	0.12 mg/L 510 ug/L 10000 ug/L	All samples in SDG 320-30476-1

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) 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)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/LCSD (RLS43-MW02-17Q2)	Sulfide	60 (70-140)	58 (70-140)	UJ (all non-detects)	P

Relative percent differences (RPD) 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
RLS43-MW02-17Q2	Bicarbonate alkalinity	Results exceed upper range of titration.	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	Compound	Flag	A or P
RLS43-MW02-17Q2	Bicarbonate alkalinity	R	A

Due to LCS/LCSD %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 320-30476-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS43-MW02-17Q2	Sulfide	UJ (all non-detects)	P	Laboratory control samples (%R) (L)
RLS43-MW02-17Q2	Bicarbonate alkalinity	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

LDC #: 40221C6

SDG #: 320-30476-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-19-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: TC

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-SITE43-08032017 (SDG: 320-30451-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VII.	Duplicate sample analysis	A	DUP (#5: TSS OK by difference)
VIII.	Laboratory control samples	SW	LCS/LCSD
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 1	RLS43-MW02-17Q2	320-30476-1	Water	08/07/17
2 1	RLS43-MW02-17Q2MS	320-30476-1MS	Water	08/07/17
3 1	RLS43-MW02-17Q2MSD	320-30476-1MSD	Water	08/07/17
4 1	RLS43-MW02-17Q2DUP	320-30476-1DUP	Water	08/07/17
5 2	RLS43-MW02-17Q2 RE	320-30476-1 RE	Water	8/7/17
6				
7				
8				
9				
10				
11				
12				
13 1	PBW 1			
14 2	PBW2			

Notes:

LDC #: 40221C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 S= TSS
5	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC 2,3	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
↓ 4	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 TSS
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 40221C6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: π

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 8/3/17 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-SITE43-08032017		No Qual's.									
Cl	0.12	0.60										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-SITE43-08032017		No Qual's.									
TOC	510	2550										
TDS	10000	50000										

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 #: 40221C6

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

METHOD: Inorganics, 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 laboratory control sample (LCS) analyzed for each matrix in this SDG?

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

LEVEL IV ONLY:

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

#	LCS/LCSD ID	Matrix	Analyte	LCS %R (limits)	LCSD %R (limits)	RPD (limits)	Associated Samples	Qualifications
1	LCS/LCSD	water	Sulfide	60 (70-140)	58 (70-140)		1	J/UJ/P (L) (ND)

Comments:

LDC #: 40221C6

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MG
2nd Reviewer: AL

METHOD: Inorganics, Method see cover

#	Date	Matrix	Analyte	Finding	Associated Samples	Qualifications
1		water	Bicarb. Alk.	(result exceeds upper range of titration)	1	J dets / A (*X) (det)

Comments:

SMPRESV.6

LDC #: 40221C6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: Inorganics, Method see cover

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		1	Reject: Bicarb. Alk.	1	R/A (D) (det)

Comments:

OVR.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30476-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW02-17Q2	320-30476-1	Water	08/07/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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 Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
RLS43-MW02-17Q2	Gasoline range organics	9	7	J (all detects)	P

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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 method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-SITE43-08032017 (from SDG 320-30451-1) 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 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.

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
Gasoline Range Organics - Data Qualification Summary - SDG 320-30476-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS43-MW02-17Q2	Gasoline range organics	J (all detects)	P	Technical holding times (H)

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-30476-1

No Sample Data Qualified in this SDG

LDC #: 40221C7

SDG #: 320-30476-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer:

2nd Reviewer:

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	RSD ≤ 20%. r² ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB-SITE43-08032017 (320-30451-1)
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	RLS43-MW02-17Q2	320-30476-1	Water	08/07/17
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 40221 C1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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 (HT=7)	Qualifier
11 (of 13)	W	N	8-7-17		8-16-17	9	J/UJ/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.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30476-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS43-MW02-17Q2	320-30476-1	Water	08/07/17

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-SITE43-08032017 (from SDG 320-30451-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-SITE43-08032017	08/03/17	Diesel range organics (C10-C28)	23 ug/L	All samples in SDG 320-30476-1

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-MW02-17Q2	Diesel range organics (C10-C28)	67 ug/L	67U 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 320-30476-1

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 320-30476-1

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 320-30476-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS43-MW02-17Q2	Diesel range organics (C10-C28)	67U ug/L	A	F

LDC #: 40221C8

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-30476-1

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	RSD ≤ 20%. r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	SN	EB-SITE43-08032017 (320-30451-1)
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-MW02-17Q2	320-30476-1	Water	08/07/17
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 40221C8

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: K

METHOD: GC TPHE (EPA SW 846 Method 8015B)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/3/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: ~~SB (SDG. 1730720)~~ Associated Samples: All (F)

Compound	Blank ID	Sample Identification								
320-30451-1	EB-SITE43-08032017	1								
DRO (C10-C28)	23	67/U								

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: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30477-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW01-17Q2	320-30477-1	Water	08/07/17
TB-08072017	320-30477-2	Water	08/07/17

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
08/16/17	Vinyl acetate	82.7	All samples in SDG 320-30477-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08072017 was identified as a trip blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
TB-08072017	08/07/17	Acetone	4.0 ug/L	RLS13-MW01-17Q2

Sample EB-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Acetone	3.8 ug/L	RLS13-MW01-17Q2

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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-17964-1/5,6 (All samples in SDG 320-30477-1)	Vinyl acetate	182 (54-146)	177 (54-146)	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 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 320-30477-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS13-MW01-17Q2 TB-08072017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

LDC #: 40221D1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-30477-1 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/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%, r² ICV ≤ 20%
IV.	Continuing calibration [illegible]	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB = 2, EB-MichelsonLab-08152017 (320-30750-1)
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-MW01-17Q2	320-30477-1	Water	08/07/17
2	TB-08072017	320-30477-2	Water	08/07/17
3				
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 #: 40221O1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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
	8/16/17	H0816B	HH	82.7		All (ND)	UMY/A (C)
	8/16/17	2nd Dig CCV	HH	57.8		All	Text

CONCAL.1SB

LDC #: 40321B1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 7

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

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: Ug/L **Associated sample units:** Ug/L

Sampling date: 8/7/17

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples: 1

Compound	Blank ID	Sample Identification								
	2									
Acetone	4.0									
Methylene chloride										
Chloroform										

Blank units:_____ **Associated sample units:**_____

Sampling date:_____

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								
Acetone										
Methylene chloride										

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 #: 40221D1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: 7

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1 (F)

Compound	Blank ID	Sample Identification								
320-30750-1	EB-MichelsonLab-08152017									
F	3.8									

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 #: 40221D1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: CL
2nd Reviewer: DT

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 320-179641/		HH	182 (54-146)	177 (54-146)	( )	All (ND)	~~Lots~~ P(L)
		15,6		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30477-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW01-17Q2	320-30477-1	Water	08/07/17

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	33.8 ug/L	All samples in SDG 320-30477-1

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Calcium Magnesium Iron Potassium Sodium	100 ug/L 31 ug/L 31 ug/L 30 ug/L 150 ug/L	All samples in SDG 320-30477-1

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 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

LDC #: 40221D4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

SDG #: 320-30477-1

Page: 1 of 1

Laboratory: Test America, Inc.

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	SW	
VI.	Field Blanks	SW	EB= EB-MichelsonLab-08152017 from 320-30750-1
VII.	Matrix Spike/Matrix Spike Duplicates	N	O.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	RLS13-MW01-17Q2	320-30477-1	Water	08/07/17
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: H0221D4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: M

If 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, 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 #: 40221D4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: R

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		33.8		169									

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 #: 40221D4a

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: 8/15/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-MichelsonLab-08152017 from 320-30750-1	Action Limit										
Ca	100	500										
Mg	31	155										
Fe	31	155										
K	30	150										
Na	150	750										

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: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30477-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW01-17Q2	320-30477-1	Water	08/07/17
RLS13-MW01-17Q2MS	320-30477-1MS	Water	08/07/17
RLS13-MW01-17Q2MSD	320-30477-1MSD	Water	08/07/17

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Chloride Sulfate	0.15 mg/L 0.16 mg/L	All samples in SDG 320-30477-1

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 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

LDC #: 40221D6

SDG #: 320-30477-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-19-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: TC

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB=EB-MichelsonLab-08152017 (SDG: 320-30750-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
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	RLS13-MW01-17Q2	320-30477-1	Water	08/07/17
2	RLS13-MW01-17Q2MS	320-30477-1MS	Water	08/07/17
3	RLS13-MW01-17Q2MSD	320-30477-1MSD	Water	08/07/17
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14	PBW			

Notes:

LDC #: 40221D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: AL

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC 2, 3	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 40221D6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 8/15/17 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-MichelsonLab-08152017		No Qual's.									
Cl	0.15	0.75										
SO4	0.16	0.80										

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 Report# 40221D51

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30477-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW01-17Q2	320-30477-1	Water	08/07/17

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-MichelsonLab-08152017 (from SDG 320-30750-1) 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) 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 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30477-1

No Sample Data Qualified in this SDG

LDC #: 40221D51

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-30477-1

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%. r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB-MichelsonLab-08152017 (320-30750-1)
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	RLS13-MW01-17Q2	320-30477-1	Water	08/07/17
2				
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: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30525-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
TB-08082017	320-30525-5	Water	08/08/17
RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17

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
08/20/17	Vinyl acetate	73.5	All samples in SDG 320-30525-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08082017 was identified as a trip blank. No contaminants were found.

Sample EB-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Acetone	3.8 ug/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2

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-MW03-17Q2	Acetone	2.7 ug/L	2.7U 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. Relative percent differences (RPD) were within QC limits.

The laboratory has indicated compounds Di-isopropyl ether, Ethyl tert-butyl ether, and tert-Amyl methyl ether were not spiked in RLS07-MW02-17Q2MS/MSD. Percent recoveries (%R) for these analytes in the LCS/LCSD 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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-180271/5,9 (All samples in SDG 320-30525-1)	Vinyl acetate	174 (54-146)	177 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples RLS07-MW02-17Q2 and RLS07-MW02-P-17Q2 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-MW02-17Q2	RLS07-MW02-P-17Q2	
1,1-Dichloroethane	0.47	0.47	0 (≤25)
1,1-Dichloroethene	0.73	0.44	50 (≤25)
1,2-Dichloroethane	1.1	0.99	11 (≤25)
Chloroform	1.7	1.7	0 (≤25)
cis-1,2-Dichloroethene	4.8	5.3	10 (≤25)
Tetrachloroethene	2.6	2.4	8 (≤25)
Trichloroethene	100	96	4 (≤25)
1,2-Dichloroethene, total	4.8	5.3	10 (≤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 five 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 320-30525-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2 TB-08082017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30525-1

Sample	Compound	Modified Final Concentration	A or P	Code
RLS13-MW03-17Q2	Acetone	2.7U ug/L	A	F

LDC #: 40221E1

SDG #: 320-30525-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 11/8/18

Reviewer: Q

2nd Reviewer: K

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 Hendig	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW/A	TB = 5, EB - Michelson Lab 08152017 (320-30750-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
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	RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
2	RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
3	RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
4	RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
5	TB-08082017	320-30525-5	Water	08/08/17
6	RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
7	RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
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 #: 40221(2)

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: a
2nd Reviewer: n

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
	8/20/17	H0820C	HH	T3.5		All (ND)	~~J/UJ/A~~ (C)
	8/21/17	H0820M and eg CCV	HH	T9.0		All	Tox+

CONCAL.1SB

LDC #: 40221E1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 4
2nd Reviewer: TC

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-4 (F)

Compound	Blank ID	Sample Identification								
320-30750-1	EB-MichelsonLab-08152017	1								
F	3.8	2.7								

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 #: 40221E1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		S/T	Lab indicated that XXX, AAAA, BBBB					Text
			were not spiked in MS/MSD.					
			~~LCS~~ %R in LCS/D are within QC					
			limits	( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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LDC #: 40221

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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 ID 320-18025/5,9		HH	174 (54-146)	177 (54-146)	( )	All (ND)	Hd3/P(L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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LDC#: 40221E1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: TL

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

Compound	Concentration (ug/L)		(≤25)
	3	4	RPD
I	0.47	0.47	0
H	0.73	0.44	50
L	1.1	0.99	11
K	1.7	1.7	0
QQQ	4.8	5.3	10
AA	2.6	2.4	8
S	100	96	4
J	4.8	5.3	10

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221E1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30525-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17

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	33.8 ug/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2
PB (prep blank)	Calcium	45.6 ug/L	RLS07-MW02-P-17Q2
ICB/CCB	Sodium	0.420 mg/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Calcium Magnesium Iron Potassium Sodium	100 ug/L 31 ug/L 31 ug/L 30 ug/L 150 ug/L	All samples in SDG 320-30525-1

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

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For RLS07-MW02-17Q2MS/MSD, no data were qualified for Arsenic, Calcium, Magnesium, Molybdenum, Potassium, 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 RLS07-MW02-17Q2 and RLS07-MW02-P-17Q2 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-MW02-17Q2	RLS07-MW02-P-17Q2	
Antimony	3.0	2.7	11 (≤25)
Arsenic	920	850	8 (≤25)
Barium	17	16	6 (≤25)
Calcium	460000	470000	2 (≤25)
Chromium	1.6	1.5	6 (≤25)
Copper	1.7	6.3	115 (≤25)
Magnesium	220000	210000	5 (≤25)
Manganese	180	170	6 (≤25)
Molybdenum	2300	2300	0 (≤25)
Nickel	3.3	3.2	3 (≤25)
Potassium	51000	52000	2 (≤25)
Selenium	80	75	6 (≤25)
Sodium	460000	410000	11 (≤25)
Vanadium	67	65	3 (≤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 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

LDC #: 40221E4a

SDG #: 320-30525-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer: VB

2nd Reviewer: AL

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-MichelsonLab-08152017 from 320-30750-1
VII.	Matrix Spike/Matrix Spike Duplicates	A	(5,6) As, Ca, Mg, Mo, K, Na >4x
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	RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
2	RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
3	RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
4	RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
5	RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
6	RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 4022164a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: M

ll circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	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, ___
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, U, ___
5,6		Al, Sb, As, 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 #: 40221E4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: [illegible]

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: 1 - 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (mg/l)	Action Level									
Na		33.8		169									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 4

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (mg/l)	Action Level									
Ca		45.6		228									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1 - 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (mg/l)	Action Level									
Na			0.420	0.0021									

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 #: 40221E4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: KB
2nd Reviewer: R

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-MichelsonLab-08152017 from 320-30750-1	Action Limit										
Ca	100	500										
Mg	31	155										
Fe	31	155										
K	30	150										
Na	150	750										

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#: 40221E4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: VB
2nd Reviewer: PC

METHOD: Metals (EPA Method ~~6010B~~ 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	3	4	
Antimony	3.0	2.7	11
Arsenic	920	850	8
Barium	17	16	6
Calcium	460000	470000	2
Chromium	1.6	1.5	6
Copper	1.7	6.3	115
Magnesium	220000	210000	5
Manganese	180	170	6
Molybdenum	2300	2300	0
Nickel	3.3	3.2	3
Potassium	51000	52000	2
Selenium	80	75	6
Sodium	460000	410000	11
Vanadium	67	65	3

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 26, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30525-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
RLS13-MW03-17Q2RE	320-30525-1RE	Water	08/08/17
RLS13-MW05-17Q2RE	320-30525-2RE	Water	08/08/17
RLS07-MW02-17Q2RE	320-30525-3RE	Water	08/08/17
RLS07-MW02-P-17Q2RE	320-30525-4RE	Water	08/08/17
RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
RLS07-MW02-17Q2MSRE	320-30525-3MSRE	Water	08/08/17
RLS07-MW02-17Q2MSDRE	320-30525-3MSDRE	Water	08/08/17

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
RLS13-MW03-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	62.48 hours 62.48 hours 62.48 hours	48 hours 48 hours 48 hours	J (all detects) UJ (all non-detects)	A
RLS13-MW05-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	60.33 hours 60.33 hours 60.33 hours	48 hours 48 hours 48 hours	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A
RLS07-MW02-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	58.20 hours 58.20 hours 58.20 hours	48 hours 48 hours 48 hours	J (all detects) UJ (all non-detects)	A
RLS07-MW02-P-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	58.90 hours 58.90 hours 58.90 hours	48 hours 48 hours 48 hours	J (all detects) UJ (all non-detects)	A

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 with the following exceptions:

Sample	Analyte	Finding
RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2	Nitrate as N Nitrite as N Orthophosphate as P	No CCB associated with these samples.

No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chloride	0.0986 mg/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2
ICB/CCB	Chloride	0.101 mg/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Chloride Sulfate	0.15 mg/L 0.16 mg/L	RLS13-MW03-17Q2 RLS13-MW05-17Q2 RLS07-MW02-17Q2 RLS07-MW02-P-17Q2

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
RLS07-MW02-17Q2MS/MSD (RLS07-MW02-17Q2)	Orthophosphate as P	55 (80-116)	54 (80-116)	UJ (all non-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 method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples RLS07-MW02-17Q2 and RLS07-MW02-P-17Q2 and samples RLS07-MW02-17Q2RE and RLS07-MW02-P-17Q2RE 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-MW02-17Q2	RLS07-MW02-P-17Q2	
Chloride	220	210	5 (≤25)
Nitrate as N	5.5	5.8	5 (≤25)
Nitrite as N	0.21	0.22	5 (≤25)
Sulfate	2700	2700	0 (≤25)

Analyte	Concentration (mg/L)		RPD (Limits)
	RLS07-MW02-17Q2RE	RLS07-MW02-P-17Q2RE	
Nitrate as N	5.6	5.4	4 (≤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 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
RLS13-MW03-17Q2RE RLS13-MW05-17Q2RE RLS07-MW02-17Q2RE RLS07-MW02-P-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	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 320-30525-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS07-MW02-17Q2	Orthophosphate as P	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)
RLS13-MW03-17Q2RE RLS13-MW05-17Q2RE RLS07-MW02-17Q2RE RLS07-MW02-P-17Q2RE	Nitrate as N Nitrite as N Orthophosphate as P	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

LDC #: 40221E6
SDG #: 320-30525-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 1-19-18
Page: 1 of 1
Reviewer: MG
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	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB=EB-MichelsonLab-08152017 (SDG: 320-30750-1)
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	D= 3+4, D= 7+8
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	1	RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
2	1	RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
3	1	RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
4	1	RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
5	2	RLS13-MW03-17Q2RE	320-30525-1RE	Water	08/08/17
6	2	RLS13-MW05-17Q2RE	320-30525-2RE	Water	08/08/17
7	2	RLS07-MW02-17Q2RE	320-30525-3RE	Water	08/08/17
8	2	RLS07-MW02-P-17Q2RE	320-30525-4RE	Water	08/08/17
9	1	RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
10	1	RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
11	2	RLS07-MW02-17Q2MSRE	320-30525-3MSRE	Water	08/08/17
12	2	RLS07-MW02-17Q2MSDRE	320-30525-3MSDRE	Water	08/08/17
13	1	PBW1			
14	2	PBW2			

Notes:

LDC #: 40221E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→4	W	pH TDS (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
5→8	↓	pH TDS Cl F (NO3) (NO2) SO4 (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
QC 9, 10	↓	pH TDS (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
↓ 11, 12	↓	pH TDS Cl F (NO3) (NO2) SO4 (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments:

LDC #: 40221E6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: MG
2nd reviewer: AL

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:		9056A	9056A	9056A			
Parameters:		NO_3-N	NO_2-N	PO_4-P			
Technical holding time:		48 hr	48 hr	48 hr			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
5	09:05 8-8-17	23:34 8-10-17	23:34 8-10-17	23:34 8-10-17	(62.48 hr)	Code (H)	J/UJ/A (det & ND
6	11:25 8-8-17	23:45 8-10-17	23:45 8-10-17	23:45 8-10-17	(60.33)	( )	(all ND
7	13:45 8-8-17	23:57 8-10-17	23:57 8-10-17	23:57 8-10-17	(58.20)	( )	(det & ND
8	14:00 8-8-17	00:54 8-11-17	00:54 8-11-17	00:54 8-11-17	(58.90)	( )	(↓
11	13:45 8-8-17	00:08 8-11-17	00:08 8-11-17	00:08 8-11-17	(58.38)	( )	(all det
12	13:45 8-8-17	00:43 8-11-17	00:43 8-11-17	00:43 8-11-17	(58.97 ↓)	(↓)	↓ (↓)

LDC #: 40221E6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 9056A

Conc. units: mg/L **Associated Samples:** 1-4 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit											
	PB	ICB/CCB (mg/L)		No Qual's.										
Cl	0.0986	0.101	0.505											

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 #: 40221E6
SDG #: –

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 9056A

#	Date	Blank ID	Analyte	Finding	Associated Samples	Qualifications
1			NO3-N	No Closing CCB	1 → 4	text
			NO2-N			
			PO4-P	(missed injection, per narrative)		

Comments:

LDC #: 40221E6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: TC

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/15/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-4 (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-MichelsonLab-08152017		No Qual's.									
Cl	0.15	0.75										
SO4	0.16	0.80										

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 #: 40221E6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 9056A

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
1	9/10	Water	PO4-P	55 (80-116)	54 (80-116)		3	J/UJ/A (Q) (N.D.)

Comments:

LDC#: 40221E6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: M

Inorganics, Method 9056A

Analyte	Concentration (mg/L)		RPD (≤25)	
	3	4		
Chloride	220	210	5	
Nitrate as N	5.5	5.8	5	
Nitrite as N	0.21	0.22	5	
Sulfate	2700	2700	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221E6.WPD

Analyte	Concentration (mg/L)		RPD (≤25)	
	7	8		
Nitrate as N	5.6	5.4	4	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221E6.WPD

LDC #: 40221E6

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: Inorganics, Method 9056A

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		5→8	Reject: NO_3-N, NO_2-N, PO_4-P	5→8	R/A (D) (det & ND)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30525-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
RLS07-MW02-17Q2DUP	320-30525-3DUP	Water	08/08/17

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-MichelsonLab-EB-041717 (from SDG 320-27514-1) was identified as an equipment blank. No contaminants were found.

VI. 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.

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 RLS07-MW02-17Q2 and RLS07-MW02-P-17Q2 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-MW02-17Q2	RLS07-MW02-P-17Q2	
Methane	0.44	0.31	35 (≤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.

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 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30525-1

No Sample Data Qualified in this SDG

LDC #: 40221E51

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: 320-30525-1

Laboratory: Test America, Inc.

Date: 1/18/18

Page: 1 of 1

Reviewer:

2nd Reviewer:

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-Michelson Lab-08152017 (320-30750-1)
VI.	Matrix spike/Matrix spike duplicates /DUP	A/A	
VII.	Laboratory control samples	A	LCS
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	RLS13-MW03-17Q2	320-30525-1	Water	08/08/17
2	RLS13-MW05-17Q2	320-30525-2	Water	08/08/17
3	RLS07-MW02-17Q2	320-30525-3	Water	08/08/17
4	RLS07-MW02-P-17Q2	320-30525-4	Water	08/08/17
5	RLS07-MW02-17Q2MS	320-30525-3MS	Water	08/08/17
6	RLS07-MW02-17Q2MSD	320-30525-3MSD	Water	08/08/17
7	RLS07-MW02-17Q2DUP	320-30525-3DUP	Water	08/08/17
8				
9				
10				
11				
12				
13				

Notes:

LDC#: 40221E51

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: PG
2nd Reviewer: [illegible]

METHOD: GC (RSK-175)
Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤25%)
	3	4	
Methane	0.44	0.31	35

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221E51.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 24, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30573-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
MK69-MW01-17Q2	320-30573-3	Water	08/09/17
MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
TB-08092017	320-30573-5	Water	08/09/17

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
08/20/17	Vinyl acetate	73.5	All samples in SDG 320-30573-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08092017 was identified as a trip blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
TB-08092017	08/09/17	Acetone	2.8 ug/L	RLS34-MW05-17Q2 RLS34-MW01-17Q2 MK69-MW01-17Q2 MK69-MW01-P-17Q2

Sample EB-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Acetone	3.8 ug/L	RLS34-MW05-17Q2 RLS34-MW01-17Q2 MK69-MW01-17Q2 MK69-MW01-P-17Q2

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
MK69-MW01-P-17Q2	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 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.

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 320-180271/5,9 (All samples in SDG 320-30573-1)	Vinyl acetate	174 (54-146)	177 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples MK69-MW01-17Q2 and MK69-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	MK69-MW01-17Q2	MK69-MW01-P-17Q2	
Acetone	5.0	2.3	74 (≤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 five samples.

Due to trip 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. 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 320-30573-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS34-MW05-17Q2 RLS34-MW01-17Q2 MK69-MW01-17Q2 MK69-MW01-P-17Q2 TB-08092017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30573-1

Sample	Compound	Modified Final Concentration	A or P	Code
MK69-MW01-P-17Q2	Acetone	2.3U ug/L	A	T, F

LDC #: 40221F1

SDG #: 320-30573-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 8/18/18

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/A	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration /Enclosure	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	TB=5, EB-MichelsonLab-08152017 (320-30750-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
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	RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
2	RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
3	MK69-MW01-17Q2	320-30573-3	Water	08/09/17
4	MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
5	TB-08092017	320-30573-5	Water	08/09/17
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 #40221F1

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
	8/20/17	H0820C	HH	73.5		All (ND)	J/UJ/A(c)
	8/21/17	Endig CV	HH	79.0		All	Text

CONCAL.1SB

LDC #: 40224F5

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: µg/L **Associated sample units:** µg/L
Sampling date: 8/9/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples: 1-4 (T)

Compound	Blank ID	Sample Identification									
	5	4									
Acetone	2.8	2.3									
Methylene chloride											
Chloroform											

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification									
Acetone											
Methylene chloride											

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 #: 40221F1

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-4 (F)

Compound	Blank ID	Sample Identification								
320-30750-1	EB-MichelsonLab-08152017	4								
F	3.8	2.3								

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 #: 10221F

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
		LCSD 320-180371/5,9	HH	ITT (54-146)	ITT (54-146)	( )	All (ND)	~~J/UJ~~ P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC#40221F1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

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

Compound	Concentration (ug/L)		(≤25) RPD
	3	4	
F	5.0	2.3	74

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221F1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30573-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
MK69-MW01-17Q2	320-30573-3	Water	08/09/17
MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17

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	33.8 ug/L	All samples in SDG 320-30573-1
ICB/CCB	Magnesium	0.0279 mg/L	RLS34-MW05-17Q2

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Calcium Magnesium Iron Potassium Sodium	100 ug/L 31 ug/L 31 ug/L 30 ug/L 150 ug/L	All samples in SDG 320-30573-1

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) 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.

XI. Field Duplicates

Samples MK69-MW01-17Q2 and MK69-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MK69-MW01-17Q2	MK69-MW01-P-17Q2	
Arsenic	38	38	0 (≤25)
Barium	16	15	6 (≤25)
Calcium	72000	72000	0 (≤25)
Chromium	1.9	1.9	0 (≤25)
Magnesium	14000	14000	0 (≤25)
Molybdenum	46	45	2 (≤25)
Potassium	12000	12000	0 (≤25)
Selenium	4.2	4.2	0 (≤25)
Sodium	120000	120000	0 (≤25)
Vanadium	20	20	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 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

LDC #: 40221F4a

SDG #: 320-30573-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer: VS

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-MichaelJonLab-08152017 From 320-30750-1
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCSD
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	RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
2	RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
3	MK69-MW01-17Q2	320-30573-3	Water	08/09/17
4	MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 40221-F4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: R

Il circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	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 #: 40221F4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: [illegible]

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		33.8		169									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (mg/L)	Action Level									
Mg			0.0279	0.0001395									

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 #: 40221F4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: LB
2nd Reviewer: AC

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-MichelsonLab-08152017 from 320-30750-1	Action Limit										
Ca	100	500										
Mg	31	155										
Fe	31	155										
K	30	150										
Na	150	750										

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#: 40221F4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: B
2nd Reviewer: M

METHOD: Metals (EPA Method ~~6010B~~/7000)
6020A

Analyte	Concentration (ug/L)		RPD (≤25)
	3	4	
Arsenic	38	38	0
Barium	16	15	6
Calcium	72000	72000	0
Chromium	1.9	1.9	0
Magnesium	14000	14000	0
Molybdenum	46	45	2
Potassium	12000	12000	0
Selenium	4.2	4.2	0
Sodium	120000	120000	0
Vanadium	20	20	0

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 26, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30573-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
MK69-MW01-17Q2	320-30573-3	Water	08/09/17
MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
RLS34-MW01-17Q2MS	320-30573-2MS	Water	08/09/17
RLS34-MW01-17Q2MSD	320-30573-2MSD	Water	08/09/17
MK69-MW01-P-17Q2MS	320-30573-4MS	Water	08/09/17
MK69-MW01-P-17Q2MSD	320-30573-4MSD	Water	08/09/17

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 methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

Sample EB-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Chloride Sulfate	0.15 mg/L 0.16 mg/L	All samples in SDG 320-30573-1

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

Samples MK69-MW01-17Q2 and MK69-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)
	MK69-MW01-17Q2	MK69-MW01-P-17Q2	
Chloride	110	110	0 (≤25)
Nitrate as N	6.4	6.5	2 (≤25)
Sulfate	160	150	6 (≤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 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 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

LDC #: 40221F6

SDG #: 320-30573-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-19-18

Page: 1 of 1

Reviewer: MG

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB = EB-MichelsonLab-08152017 (SDG: 320-30750-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	D = 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	RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
2	RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
3	MK69-MW01-17Q2	320-30573-3	Water	08/09/17
4	MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
5	RLS34-MW01-17Q2MS	320-30573-2MS	Water	08/09/17
6	RLS34-MW01-17Q2MSD	320-30573-2MSD	Water	08/09/17
7	MK69-MW01-P-17Q2MS	320-30573-4MS	Water	08/09/17
8	MK69-MW01-P-17Q2MSD	320-30573-4MSD	Water	08/09/17
9				
10				
11				
12				
13				
14	PBW			

Notes:

LDC #: 40221F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→4	W	pH TDS (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
QC 5,6	↓	pH TDS (Cl) F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
↓ 7,8	↓	pH TDS (Cl) F NO3 NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments:

LDC #: 40221F6

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 8/15/17 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-MichelsonLab-08152017		No Qual's.									
Cl	0.15	0.75										
SO4	0.16	0.80										

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#: 40221F6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

Inorganics, Method 9056A

Analyte	Concentration (mg/L)		RPD (≤25)	
	3	4		
Chloride	110	110	0	
Nitrate as N	6.4	6.5	2	
Sulfate	160	150	6	

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30573-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
MK69-MW01-17Q2	320-30573-3	Water	08/09/17
MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17

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
RLS34-MW05-17Q2	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-MichelsonLab-08152017 (from SDG 320-30750-1) 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) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

VIII. Field Duplicates

Samples MK69-MW01-17Q2 and MK69-MW01-P-17Q2 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.

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 320-30573-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS34-MW05-17Q2	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 320-30573-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30573-1

No Sample Data Qualified in this SDG

LDC #: 40221F51 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18

SDG #: 320-30573-1 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	TW / 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-MichelsonLab-08152017 (320-30750-1)
VI.	Matrix spike/Matrix spike duplicates	N	CS
VII.	Laboratory control samples	A	LCS
VIII.	Field duplicates	ND	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	RLS34-MW05-17Q2	320-30573-1	Water	08/09/17
2	RLS34-MW01-17Q2	320-30573-2	Water	08/09/17
3	MK69-MW01-17Q2	320-30573-3	Water	08/09/17
4	MK69-MW01-P-17Q2	320-30573-4	Water	08/09/17
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 40221F1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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(NO)	Headspace	(8mm)					~~UJ/A~~ (V*1)

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: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30601-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW02-17Q2	320-30601-1	Water	08/10/17
TT68-MW03-17Q2	320-30601-2	Water	08/10/17
TT33-MW01-17Q2	320-30601-3	Water	08/10/17
TB-08102017	320-30601-4	Water	08/10/17
TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17

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
08/23/17	Acetone Vinyl acetate 1,2,4-Trichlorobenzene Naphthalene 1,2,3-Trichlorobenzene	22.5 57.0 20.1 28.3 20.1	All samples in SDG 320-30601-1	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

The percent differences (%D) of the ending continuing calibration verifications (CCVs) 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-08102017 was identified as a trip blank. No contaminants were found.

Sample EB-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Acetone	3.8 ug/L	TT68-MW02-17Q2 TT68-MW03-17Q2 TT33-MW01-17Q2

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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
TT33-MW01-17Q2MS/MSD (TT33-MW01-17Q2)	Vinyl acetate	156 (54-146)	154 (54-146)	NA	-

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

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
TT33-MW01-17Q2MS/MSD (TT33-MW01-17Q2)	Acetone	30 (≤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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-180685/5,6 (All samples in SDG 320-30601-1)	Vinyl acetate	162 (54-146)	153 (54-146)	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 continuing calibration %D, 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
Volatiles - Data Qualification Summary - SDG 320-30601-1

Sample	Compound	Flag	A or P	Reason (Code)
TT68-MW02-17Q2 TT68-MW03-17Q2 TT33-MW01-17Q2 TB-08102017	Acetone Vinyl acetate 1,2,4-Trichlorobenzene Naphthalene 1,2,3-Trichlorobenzene	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) 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 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

LDC #: 40221G1 **VALIDATION COMPLETENESS WORKSHEET** Date: 11/8/18
SDG #: 320-30601-1 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 /Endeg	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB=4, EB-Michelson Lab-08152017 (320-30750-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
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	TT68-MW02-17Q2	320-30601-1	Water	08/10/17
2	TT68-MW03-17Q2	320-30601-2	Water	08/10/17
3	TT33-MW01-17Q2	320-30601-3	Water	08/10/17
4	TB-08102017	320-30601-4	Water	08/10/17
5	TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
6	TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17
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 #: 40226F1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Q
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
	8/23/17	H0823D	F	22.5		All (ND)	~~UJ/A~~ (C)
			HH	57.0			
			KKK	20.1			
			MMM	28.3			
			NNN	20.1			

CONCAL.1SB

LDC #: 40221G1

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-3 (F)

Compound	Blank ID	Sample Identification								
320-30750-1	EB-MichelsonLab-08152017									
F	3.8									

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 #: 40221 E1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		5/6	HH	156 (54-146)	154 (54-146)	( )	3 (ND)	Lets/A (Q)
			F	( )	( )	30 (≤20)		↓ (E)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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LDC #: 40221F1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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/LCSD 320-180685/5,6		HH	162 (54-146)	153 (54-146)	( )	All (NO)	~~Not~~ P(L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30601-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW02-17Q2	320-30601-1	Water	08/10/17
TT68-MW03-17Q2	320-30601-2	Water	08/10/17
TT33-MW01-17Q2	320-30601-3	Water	08/10/17
TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17

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)	Calcium	45.6 ug/L	All samples in SDG 320-30601-1

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Calcium Magnesium Iron Potassium Sodium	100 ug/L 31 ug/L 31 ug/L 30 ug/L 150 ug/L	All samples in SDG 320-30601-1

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

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For TT33-MW01-17Q2MS/MSD, no data were qualified for Calcium, Magnesium, Molybdenum, 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) 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.

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 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

LDC #: 40221G4a

SDG #: 320-30601-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer:

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	SW	EB=EB-MichelsonLab-08152017 From 320-30750-1
VII.	Matrix Spike/Matrix Spike Duplicates	A	(4,5); Ca, Mg, Mo, Na > 4x
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS ID
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	TT68-MW02-17Q2	320-30601-1	Water	08/10/17
2	TT68-MW03-17Q2	320-30601-2	Water	08/10/17
3	TT33-MW01-17Q2	320-30601-3	Water	08/10/17
4	TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
5	TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 40221G4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: A

ll 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, ___
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, ___
4,5	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, 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 #: 40221G4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JB
2nd Reviewer: [illegible]

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									
Ca		45.6		228									

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 #: 40221G4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: R

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-MichelsonLab-08152017 from 320-30750-1	Action Limit										
Ca	100	500										
Mg	31	155										
Fe	31	155										
K	30	150										
Na	150	750										

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: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30601-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW02-17Q2	320-30601-1	Water	08/10/17
TT68-MW03-17Q2	320-30601-2	Water	08/10/17
TT33-MW01-17Q2	320-30601-3	Water	08/10/17
TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Chloride Sulfate	0.15 mg/L 0.16 mg/L	All samples in SDG 320-30601-1

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. For TT33-MW01-17Q2MS/MSD, no data were qualified for Sulfate 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.

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 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

LDC #: 40221G6

SDG #: 320-30601-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	SW	EB= EB - MichelsonLab-08152017 (SDG 320-30750-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD (SO4: 4x)
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	TT68-MW02-17Q2	320-30601-1	Water	08/10/17
2	TT68-MW03-17Q2	320-30601-2	Water	08/10/17
3	TT33-MW01-17Q2	320-30601-3	Water	08/10/17
4	TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
5	TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17
6				
7				
8				
9				
10				
11				
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221G6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: A

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1 → 3	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC 4.5	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 40221G6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/15/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-MichelsonLab-08152017		No Qual's.									
Cl	0.15	0.75										
SO4	0.16	0.80										

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: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30601-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW02-17Q2	320-30601-1	Water	08/10/17
TT68-MW03-17Q2	320-30601-2	Water	08/10/17
TT33-MW01-17Q2	320-30601-3	Water	08/10/17
TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17
TT33-MW01-17Q2DUP	320-30601-3DUP	Water	08/10/17

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-MichelsonLab-08152017 (from SDG 320-30750-1) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates/Duplicate Samples 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) 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 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30601-1

No Sample Data Qualified in this SDG

LDC #: 40221G51 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-30601-1 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	ND	EB-Michelson Lab-08152017 (320-30750-1)
VI.	Matrix spike/Matrix spike duplicates /DUP	A/A	
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	TT68-MW02-17Q2	320-30601-1	Water	08/10/17
2	TT68-MW03-17Q2	320-30601-2	Water	08/10/17
3	TT33-MW01-17Q2	320-30601-3	Water	08/10/17
4	TT33-MW01-17Q2MS	320-30601-3MS	Water	08/10/17
5	TT33-MW01-17Q2MSD	320-30601-3MSD	Water	08/10/17
6	TT33-MW01-17Q2DUP	320-30601-3DUP	Water	08/10/17
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: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30750-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW01-17Q2	320-30750-1	Water	08/15/17
TT07-MW01-17Q2	320-30750-2	Water	08/15/17
EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
TB-08152017	320-30750-4	Water	08/15/17

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
08/24/17	Chloroethane	23.7	All samples in SDG 320-30750-1	UJ (all non-detects)	A

The percent differences (%D) of the ending continuing calibration verifications (CCVs) 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-08152017 was identified as a trip blank. No contaminants were found.

Sample EB-MichelsonLab-08152017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Acetone	3.8 ug/L	TT68-MW01-17Q2 TT07-MW01-17Q2

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 continuing calibration %D, 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
Volatiles - Data Qualification Summary - SDG 320-30750-1

Sample	Compound	Flag	A or P	Reason (Code)
TT68-MW01-17Q2 TT07-MW01-17Q2 EB-MichelsonLab-08152017 TB-08152017	Chloroethane	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

LDC #: 40221H1

SDG #: 320-30750-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

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 / Zero	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB = 3. TB = 4
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	TT68-MW01-17Q2	320-30750-1	Water	08/15/17
2	TT07-MW01-17Q2	320-30750-2	Water	08/15/17
3	EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
4	TB-08152017	320-30750-4	Water	08/15/17
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 #: 40221H1

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
	8/24/17	H08240I	D	23.7		All (ND)	J/UJ/A

CONCAL.1SB

LDC #: 40221H1

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: 8/15/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-2

Compound	Blank ID	Sample Identification								
320-30750-1	EB-MichelsonLab-08152017									
F	3.8									

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: January 24, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30750-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW01-17Q2	320-30750-1	Water	08/15/17
TT07-MW01-17Q2	320-30750-2	Water	08/15/17
EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
TT68-MW01-17Q2MS	320-30750-1MS	Water	08/15/17
TT68-MW01-17Q2MSD	320-30750-1MSD	Water	08/15/17

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-MichelsonLab-08152017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Calcium Magnesium Iron Potassium Sodium	100 ug/L 31 ug/L 31 ug/L 30 ug/L 150 ug/L	All samples in SDG 320-30750-1

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

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
TT68-MW01-17Q2MS/MSD (TT68-MW01-17Q2)	Molybdenum	124 (83-115)	136 (83-115)	J (all detects)	A

For TT68-MW01-17Q2MS/MSD, no data were qualified for Calcium, Magnesium, Potassium, 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) 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.

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 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
Dissolved Metals - Data Qualification Summary - SDG 320-30750-1

Sample	Analyte	Flag	A or P	Reason (Code)
TT68-MW01-17Q2	Molybdenum	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

LDC #: 40221H4a

SDG #: 320-30750-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

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=3
VII.	Matrix Spike/Matrix Spike Duplicates	SW	(4,5)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS/D
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	TT68-MW01-17Q2	320-30750-1	Water	08/15/17
2	TT07-MW01-17Q2	320-30750-2	Water	08/15/17
3	EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
4	TT68-MW01-17Q2MS	320-30750-1MS	Water	08/15/17
5	TT68-MW01-17Q2MSD	320-30750-1MSD	Water	08/15/17
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

DC #: 40221 #4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: AC

ll 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, ___
0C		Al, Sb, As, 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, ___
4,5	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, 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 #: 40221H4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

CODEF

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/15/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 2

Analyte	Blank ID	Sample Identification										
	3	Action Limit	1	2								
Ca	100	500										
Mg	31	155										
Fe	31	155	~~60~~ JB	~~60~~ B								
K	30	150										
Na	150	750										

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 #: 40221#4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JB
2nd Reviewer: H

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
	(4,5)	W	Mo	124 (83-115)	136 (83-115)		1	J det/A (Det) (Q)

Comments: (4,5) Ca, Mg, K, Na > 4x

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30750-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW01-17Q2	320-30750-1	Water	08/15/17
TT07-MW01-17Q2	320-30750-2	Water	08/15/17
EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
TT68-MW01-17Q2MS	320-30750-1MS	Water	08/15/17
TT68-MW01-17Q2MSD	320-30750-1MSD	Water	08/15/17

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 with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chloride	0.129 mg/L	TT68-MW01-17Q2 TT07-MW01-17Q2

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-MichelsonLab-08152017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-MichelsonLab-08152017	08/15/17	Chloride Sulfate	0.15 mg/L 0.16 mg/L	TT68-MW01-17Q2 TT07-MW01-17Q2

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 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

LDC #: 40221H6

SDG #: 320-30750-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: AC

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 3
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
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	TT68-MW01-17Q2	320-30750-1	Water	08/15/17
2	TT07-MW01-17Q2	320-30750-2	Water	08/15/17
3	EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
4	TT68-MW01-17Q2MS	320-30750-1MS	Water	08/15/17
5	TT68-MW01-17Q2MSD	320-30750-1MSD	Water	08/15/17
6				
7				
8				
9				
10				
11				
12	PBW 1			
13	PBW 2			
14	PBW 3			

Notes:

LDC #: 40221H6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→3	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC 4.5	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 40221H6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1,2 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit											
	PB	ICB/CCB (mg/L)		No Qual's.										
Cl	0.129		0.645											

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 #: 40221H6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/15/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1,2 (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	3		No Qual's.									
Cl	0.15	0.75										
SO4	0.16	0.80										

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: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30750-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT68-MW01-17Q2	320-30750-1	Water	08/15/17
TT07-MW01-17Q2	320-30750-2	Water	08/15/17
EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17

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-MichelsonLab-08152017 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 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30750-1

No Sample Data Qualified in this SDG

LDC #: 40221H51 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-30750-1 Level III Page: 1 of 1
Laboratory: Test America, Inc. Reviewer:
2nd Reviewer:

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 = 3
VI.	Matrix spike/Matrix spike duplicates	N	MS
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	TT68-MW01-17Q2	320-30750-1	Water	08/15/17
2	TT07-MW01-17Q2	320-30750-2	Water	08/15/17
3	EB-MichelsonLab-08152017	320-30750-3	Water	08/15/17
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Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30752-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW06-17Q2	320-30752-1	Water	08/15/17
TT15-MW05-17Q2	320-30752-2	Water	08/15/17
TT15-MW02-17Q2	320-30752-3	Water	08/15/17
TT15-MW04-17Q2	320-30752-4	Water	08/15/17

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
08/24/17	Chloroethane	23.7	All samples in SDG 320-30752-1	UJ (all non-detects)	A

The percent differences (%D) of the ending continuing calibration verifications (CCVs) 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-08152017 (from SDG 320-30750-1) was identified as a trip blank. No contaminants were found.

Sample EB-AREA ROU-08162017 (from SDG 320-30770-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-AREA ROU-08162017	08/16/17	Acetone	3.4 ug/L	All samples in SDG 320-30752-1

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
TT15-MW04-17Q2	Acetone	2.4 ug/L	2.4U 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 continuing calibration %D, data were qualified as estimated in four 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 320-30752-1

Sample	Compound	Flag	A or P	Reason (Code)
TT15-MW06-17Q2 TT15-MW05-17Q2 TT15-MW02-17Q2 TT15-MW04-17Q2	Chloroethane	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30752-1

Sample	Compound	Modified Final Concentration	A or P	Code
TT15-MW04-17Q2	Acetone	2.4U ug/L	A	F

LDC #: 40221I1

SDG #: 320-30752-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

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/A	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration /Ending	AN	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ANQ	TB-08152017 (320-30750-1) EB-AREA ROU-08162017 (320-30770-1)
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	TT15-MW06-17Q2	320-30752-1	Water	08/15/17
2	TT15-MW05-17Q2	320-30752-2	Water	08/15/17
3	TT15-MW02-17Q2	320-30752-3	Water	08/15/17
4	TT15-MW04-17Q2	320-30752-4	Water	08/15/17
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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 #: 40221I1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 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
	8/24/17	H082401	D	23.7		All (ND)	J/UJ/A (C)

CONCAL.1SB

LDC #: 40221I1

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/16/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All (F)

Compound	Blank ID	Sample Identification								
320-30770-1	EB-AREA ROU-08162017	4								
F	3.4	2.4								

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: January 25, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30752-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW06-17Q2	320-30752-1	Water	08/15/17
TT15-MW05-17Q2	320-30752-2	Water	08/15/17
TT15-MW02-17Q2	320-30752-3	Water	08/15/17
TT15-MW04-17Q2	320-30752-4	Water	08/15/17

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-AREA-ROU-08162017 (from SDG 320-30770-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-AREA-ROU-08162017	08/16/17	Calcium Potassium Sodium	70 ug/L 65 ug/L 750 ug/L	All samples in SDG 320-30752-1

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) 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.

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 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

LDC #: 40221I4a

SDG #: 320-30752-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer: B

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 = EB-AREA-ROU-08162017 from 320-30770-1
VII.	Matrix Spike/Matrix Spike Duplicates	N	C.S.
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
X.	Laboratory control samples	A	LCS/D
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	TT15-MW06-17Q2	320-30752-1	Water	08/15/17
2	TT15-MW05-17Q2	320-30752-2	Water	08/15/17
3	TT15-MW02-17Q2	320-30752-3	Water	08/15/17
4	TT15-MW04-17Q2	320-30752-4	Water	08/15/17
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Notes:

DC #: 40221 I 4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JB
2nd reviewer: A

If circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	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 #: 40221I4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: VB
2nd Reviewer:

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/16/17 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Analyte	Blank ID	Sample Identification										
	EB-AREA ROU-08162017 from SDG 320-30770-1	Action Limit										
Ca	70	350										
K	65	325										
Na	750	3750										

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: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30752-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW06-17Q2	320-30752-1	Water	08/15/17
TT15-MW05-17Q2	320-30752-2	Water	08/15/17
TT15-MW02-17Q2	320-30752-3	Water	08/15/17
TT15-MW04-17Q2	320-30752-4	Water	08/15/17
TT15-MW02-17Q2MS	320-30752-3MS	Water	08/15/17
TT15-MW02-17Q2MSD	320-30752-3MSD	Water	08/15/17

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:

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	0.129 mg/L	All samples in SDG 320-30752-1

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.

V. Field Blanks

Sample EB-AREA ROU-08162017 (from SDG 320-30770-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-AREA ROU-08162017	08/16/17	Chloride	0.13 mg/L	All samples in SDG 320-30752-1

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 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 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

LDC #: 40221I6

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

SDG #: 320-30752-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: MG

2nd Reviewer: K

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB=EB-AREA ROU-08162017 (SDG 320-30770-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
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	TT15-MW06-17Q2	320-30752-1	Water	08/15/17
2	TT15-MW05-17Q2	320-30752-2	Water	08/15/17
3	TT15-MW02-17Q2	320-30752-3	Water	08/15/17
4	TT15-MW04-17Q2	320-30752-4	Water	08/15/17
5	TT15-MW02-17Q2MS	320-30752-3MS	Water	08/15/17
6	TT15-MW02-17Q2MSD	320-30752-3MSD	Water	08/15/17
7				
8				
9				
10				
11				
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221I6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: A

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→4	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC5.6	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 40221I6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: AR

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qual's.									
Cl	0.129		0.645										

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 #: 40221I6

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, EPA Method See cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: **8/16/17** Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: all (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	EB-AREA ROU-08162017		No Qual's.									
Cl	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: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30752-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TT15-MW06-17Q2	320-30752-1	Water	08/15/17
TT15-MW05-17Q2	320-30752-2	Water	08/15/17
TT15-MW02-17Q2	320-30752-3	Water	08/15/17
TT15-MW04-17Q2	320-30752-4	Water	08/15/17

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 ROU-08162017 (from SDG 320-30770-1) 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) 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 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30752-1

No Sample Data Qualified in this SDG

LDC #: 40221I51

SDG #: 320-30752-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer:

2nd Reviewer:

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-AREA ROU-08162017 (320-30770-1)
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	TT15-MW06-17Q2	320-30752-1	Water	08/15/17
2	TT15-MW05-17Q2	320-30752-2	Water	08/15/17
3	TT15-MW02-17Q2	320-30752-3	Water	08/15/17
4	TT15-MW04-17Q2	320-30752-4	Water	08/15/17
5				
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Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30770-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-17Q2	320-30770-1	Water	08/16/17
TT15-MW03-17Q2	320-30770-2	Water	08/16/17
RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
TT15-MW01-17Q2	320-30770-4	Water	08/16/17
TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
TB-08162017	320-30770-9	Water	08/16/17

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
08/25/17	Vinyl acetate	86.8	All samples in SDG 320-30770-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-08162017 was identified as a trip blank. No contaminants were found.

Sample EB-AREA ROU-08162017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB-AREA ROU-08162017	08/16/17	Acetone	3.4 ug/L	RLS15-MW03-17Q2 TT15-MW03-17Q2 RLS15-MW02-17Q2 TT15-MW01-17Q2 TT15-MW01-P-17Q2 RLS15-MW01-17Q2 VSI15-MW02-17Q2

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
VSI15-MW02-17Q2	Acetone	3.2 ug/L	3.2U 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 320-181209/5,6 (All samples in SDG 320-30770-1)	Vinyl acetate	185 (54-146)	185 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples TT15-MW01-17Q2 and TT15-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	TT15-MW01-17Q2	TT15-MW01-P-17Q2	
cis-1,2-Dichloroethene	0.28	0.21	29 (≤25)
1,2-Dichloroethene, total	0.28	0.21	29 (≤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 nine 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 320-30770-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS15-MW03-17Q2 TT15-MW03-17Q2 RLS15-MW02-17Q2 TT15-MW01-17Q2 TT15-MW01-P-17Q2 RLS15-MW01-17Q2 VSI15-MW02-17Q2 EB-AREA ROU-08162017 TB-08162017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-30770-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-30770-1

Sample	Compound	Modified Final Concentration	A or P	Code
VSI15-MW02-17Q2	Acetone	3.2U ug/L	A	F

LDC #: 40221J1

SDG #: 320-30770-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer: Q

2nd Reviewer: A

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 /Ending	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB=8, TB=9
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=4+5
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-MW03-17Q2	320-30770-1	Water	08/16/17
2	TT15-MW03-17Q2	320-30770-2	Water	08/16/17
3	RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
4	TT15-MW01-17Q2	320-30770-4	Water	08/16/17
5	TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
6	RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
7	VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
8	EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
9	TB-08162017	320-30770-9	Water	08/16/17
10				
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 #: 40224 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
	8/25/17	H0825B	HH	86.8		All (ND)	J/UJ/A(C)
	8/25/17	Ending CCV	HH	62.7		All	Text

CONCAL.1SB

LDC #: 40221J1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
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: 8/16/17
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-7 (F)

Compound	Blank ID	Sample Identification								
320-30770-1	EB-AREA ROU-08162017	7								
F	3.4	3.2								

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 #: 40224 S1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: CL
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	D320-181209/5.6	HH	185 (54-146)	185 (54-146)	( )	All (ND)	J detects (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 40221J1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: R

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

Compound	Concentration (ug/L)		(≤25) RPD
	4	5	
QQQ	0.28	0.21	29
J	0.28	0.21	29

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221J1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Dissolved Metals

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30770-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-17Q2	320-30770-1	Water	08/16/17
TT15-MW03-17Q2	320-30770-2	Water	08/16/17
RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
TT15-MW01-17Q2	320-30770-4	Water	08/16/17
TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
RLS15-MW03-17Q2MS	320-30770-1MS	Water	08/16/17
RLS15-MW03-17Q2MSD	320-30770-1MSD	Water	08/16/17

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 Copper Zinc	39.8 ug/L 1.86 ug/L 4.89 ug/L	All samples in SDG 320-30770-1
ICB/CCB	Potassium	0.0266 mg/L	TT15-MW03-17Q2 RLS15-MW02-17Q2 TT15-MW01-17Q2

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-MW03-17Q2	Copper	1.0 ug/L	1.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
RLS15-MW02-17Q2	Copper	1.6 ug/L	1.6U ug/L
TT15-MW01-17Q2	Zinc	5.0 ug/L	5.0U ug/L
RLS15-MW01-17Q2	Zinc	4.2 ug/L	4.2U ug/L

VI. Field Blanks

Sample EB-AREA ROU-08162017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-AREA ROU-08162017	08/16/17	Calcium Potassium Sodium	70 ug/L 65 ug/L 750 ug/L	RLS15-MW03-17Q2 TT15-MW03-17Q2 RLS15-MW02-17Q2 TT15-MW01-17Q2 TT15-MW01-P-17Q2 RLS15-MW01-17Q2 VSI15-MW02-17Q2

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

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-MW03-17Q2MS/MSD (RLS15-MW03-17Q2)	Copper	79 (85-118)	79 (85-118)	J (all detects)	A

For RLS15-MW03-17Q2MS/MSD, no data were qualified for Calcium, Magnesium, Potassium, 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 TT15-MW01-17Q2 and TT15-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	TT15-MW01-17Q2	TT15-MW01-P-17Q2	
Arsenic	780	800	3 (≤25)
Barium	88	84	5 (≤25)
Calcium	50000	49000	2 (≤25)
Iron	67	33	68 (≤25)
Magnesium	17000	16000	6 (≤25)
Manganese	29	28	4 (≤25)
Molybdenum	140	150	7 (≤25)
Nickel	1.5	1.1	31 (≤25)
Potassium	52000	50000	4 (≤25)
Sodium	1900000	1900000	0 (≤25)
Zinc	5.0	10U	Not calculable

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 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
Dissolved Metals - Data Qualification Summary - SDG 320-30770-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS15-MW03-17Q2	Copper	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 320-30770-1

Sample	Analyte	Modified Final Concentration	A or P	Code
RLS15-MW03-17Q2	Copper	1.0U ug/L	A	B
RLS15-MW02-17Q2	Copper	1.6U ug/L	A	B
TT15-MW01-17Q2	Zinc	5.0U ug/L	A	B
RLS15-MW01-17Q2	Zinc	4.2U ug/L	A	B

NAWS China Lake, CTO 005
Dissolved Metals - Field Blank Data Qualification Summary - SDG 320-30770-1

No Sample Data Qualified in this SDG

LDC #: 40221J4a

SDG #: 320-30770-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/22/18

Page: 1 of 1

Reviewer: VB

2nd Reviewer: R

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 = 8
VII.	Matrix Spike/Matrix Spike Duplicates	SW	(9,10)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(4,5)
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-MW03-17Q2	320-30770-1	Water	08/16/17
2	TT15-MW03-17Q2	320-30770-2	Water	08/16/17
3	RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
4	TT15-MW01-17Q2	320-30770-4	Water	08/16/17
5	TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
6	RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
7	VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
8	EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
9	RLS15-MW03-17Q2MS	320-30770-1MS	Water	08/16/17
10	RLS15-MW03-17Q2MSD	320-30770-1MSD	Water	08/16/17
11				
12				
13				

Notes:

DC #: 40221J4a

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)
1-8	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, ___
9,10	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, ___
		Al, Sb, As, 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 #: 40221J4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
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	1	3	4	6					
Na		39.8		199									
Cu		1.86		9.3	1.0	1.6							
Zn		4.89		24.45			5.0	4.2					

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 2 - 4

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (mg/l)	Action Level									
K			0.0266	0.000133									

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 #: 40221J4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JS
2nd Reviewer: [illegible]

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/16/17 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 - 7

Analyte	Blank ID	Sample Identification											
	8	Action Limit											
Ca	70	350											
K	65	325											
Na	750	3750											

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 #: 40221J4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JB
2nd Reviewer: M

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
	(9,10)	W ~~Cu~~	Cu	79 (85-118)	79 (85-118)		1	J/UJ/A (Det) (Q)

Comments: (9,10); Ca, Mg, K, Na > 4x

LDC#: 40221J4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: YS

2nd Reviewer: AC

METHOD: Metals (EPA Method ~~6010B~~ 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	4	5	
Arsenic	780	800	3
Barium	88	84	5
Calcium	50000	49000	2
Iron	67	33	68
Magnesium	17000	16000	6
Manganese	29	28	4
Molybdenum	140	150	7
Nickel	1.5	1.1	31
Potassium	52000	50000	4
Sodium	1900000	1900000	0
Zinc	5.0	10U	NC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30770-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-17Q2	320-30770-1	Water	08/16/17
TT15-MW03-17Q2	320-30770-2	Water	08/16/17
RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
TT15-MW01-17Q2	320-30770-4	Water	08/16/17
TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
RLS15-MW03-17Q2MS	320-30770-1MS	Water	08/16/17
RLS15-MW03-17Q2MSD	320-30770-1MSD	Water	08/16/17

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:

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	0.129 mg/L	EB-AREA ROU-08162017

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 ROU-08162017	Chloride	0.13 mg/L	0.13U mg/L

V. Field Blanks

Sample EB-AREA ROU-08162017 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB-AREA ROU-08162017	08/16/17	Chloride	0.13 mg/L	RLS15-MW03-17Q2 TT15-MW03-17Q2 RLS15-MW02-17Q2 TT15-MW01-17Q2 TT15-MW01-P-17Q2 RLS15-MW01-17Q2 VSI15-MW02-17Q2

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. For RLS15-MW03-17Q2MS/MSD, no data were qualified for Sulfate 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.

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 TT15-MW01-17Q2 and TT15-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	TT15-MW01-17Q2	TT15-MW01-P-17Q2	
Bicarbonate alkalinity	410000 ug/L	410000 ug/L	0 (≤25)

Analyte	Concentration		RPD (Limits)
	TT15-MW01-17Q2	TT15-MW01-P-17Q2	
Chloride	2300 mg/L	2300 mg/L	0
Sulfate	650 mg/L	640 mg/L	2

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 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 320-30770-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-30770-1

Sample	Compound	Modified Final Concentration	A or P	Code
EB-AREA ROU-08162017	Chloride	0.13U mg/L	A	B

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-30770-1

No Sample Data Qualified in this SDG

LDC #: 40221J6

SDG #: 320-30770-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: [illegible]

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	SW	EB = 8
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD (SO_4: 4x)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	D = 4+5
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-MW03-17Q2	320-30770-1	Water	08/16/17
2	TT15-MW03-17Q2	320-30770-2	Water	08/16/17
3	RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
4	TT15-MW01-17Q2	320-30770-4	Water	08/16/17
5	TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
6	RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
7	VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
8	EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
9	RLS15-MW03-17Q2MS	320-30770-1MS	Water	08/16/17
10	RLS15-MW03-17Q2MSD	320-30770-1MSD	Water	08/16/17
11				
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221J6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→8	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC 9, 10	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 40221J6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 8 **Code:** (B)

Analyte	Blank ID	Blank ID	Blank Action Limit											
	PB	ICB/CCB (mg/L)		8										
Cl	0.129		0.645	0.13										

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 #: 40221J6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: AK

METHOD: Inorganics, EPA Method 9056A
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 8/16/17 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-7 (>5x)

Analyte	Blank ID	Action Limit	Sample Identification									
	8		No Qual's.									
Cl	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#: 40221J6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: MG
2nd Reviewer: AL

Inorganics, Method see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	4	5		
Bicarbonate Alkalinity (ug/L)	410000	410000	0	
Chloride	2300	2300	0	
Sulfate	650	640	2	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221J6.WPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-30770-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS15-MW03-17Q2	320-30770-1	Water	08/16/17
TT15-MW03-17Q2	320-30770-2	Water	08/16/17
RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
TT15-MW01-17Q2	320-30770-4	Water	08/16/17
TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
VSI15-MW02-17Q2DUP	320-30770-7DUP	Water	08/16/17

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
TT15-MW01-P-17Q2	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. 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 ROU-08162017 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) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

VIII. Field Duplicates

Samples TT15-MW01-17Q2 and TT15-MW01-P-17Q2 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	TT15-MW01-17Q2	TT15-MW01-P-17Q2	
Methane	5.7	6.1	7 (≤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 320-30770-1

Sample	Compound	Flag	A or P	Reason (Code)
TT15-MW01-P-17Q2	All compounds	J (all detects) UJ (all non-detects)	A	Sample condition (headspace) (V)

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-30770-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-30770-1

No Sample Data Qualified in this SDG

LDC #: 40221J51

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-30770-1

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 = 8
VI.	Matrix spike/Matrix spike duplicates Bup	N/A	CS
VII.	Laboratory control samples	A	LCS
VIII.	Field duplicates	SW	D = 4+5
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-MW03-17Q2	320-30770-1	Water	08/16/17
2	TT15-MW03-17Q2	320-30770-2	Water	08/16/17
3	RLS15-MW02-17Q2	320-30770-3	Water	08/16/17
4	TT15-MW01-17Q2	320-30770-4	Water	08/16/17
5	TT15-MW01-P-17Q2	320-30770-5	Water	08/16/17
6	RLS15-MW01-17Q2	320-30770-6	Water	08/16/17
7	VSI15-MW02-17Q2	320-30770-7	Water	08/16/17
8	EB-AREA ROU-08162017	320-30770-8	Water	08/16/17
9	VSI15-MW02-17Q2DUP	320-30770-7DUP	Water	08/16/17
10				
11				
12				
13				

Notes:

LDC #: 40224151

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
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
5	Headspace		(6-7 mm)				V/W/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#: 40221J51

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: PG
2nd Reviewer: A

METHOD: GC (RSK-175)
Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤25%)
	4	5	
Methane	5.7	6.1	7

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221J51.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32498-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC02-MW21-17SA	320-32498-1	Water	10/17/17
ITC02-MW12-17SA	320-32498-2	Water	10/17/17
ITC02-MW29-17SA	320-32498-3	Water	10/17/17
ITC45-MW11-17SA	320-32498-4	Water	10/17/17
ITC45-MW14-17SA	320-32498-5	Water	10/17/17

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
10/30/17	Acetone	22.4	All samples in SDG 320-32498-1	UJ (all non-detects)	A

The percent differences (%D) of the ending continuing calibration verifications (CCVs) 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

No field blanks were identified in this SDG.

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 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
Volatiles - Data Qualification Summary - SDG 320-32498-1

Sample	Compound	Flag	A or P	Reason (Code)
ITC02-MW21-17SA ITC02-MW12-17SA ITC02-MW29-17SA ITC45-MW11-17SA ITC45-MW14-17SA	Acetone	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-32498-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32498-1

No Sample Data Qualified in this SDG

LDC #: 40221K1

SDG #: 320-32498-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

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 A	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
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	ITC02-MW21-17SA	320-32498-1	Water	10/17/17
2	ITC02-MW12-17SA	320-32498-2	Water	10/17/17
3	ITC02-MW29-17SA	320-32498-3	Water	10/17/17
4	ITC45-MW11-17SA	320-32498-4	Water	10/17/17
5	ITC45-MW14-17SA	320-32498-5	Water	10/17/17
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 #: 40221K1

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
	10/30/17	H103001A	F	22.4		All (ND)	J/UJ/A(C)

CONCAL.1SB

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32498-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC02-MW21-17SA	320-32498-1	Water	10/17/17
ITC02-MW12-17SA	320-32498-2	Water	10/17/17
ITC02-MW29-17SA	320-32498-3	Water	10/17/17
ITC45-MW11-17SA	320-32498-4	Water	10/17/17
ITC45-MW14-17SA	320-32498-5	Water	10/17/17
ITC02-MW21-17SAMS	320-32498-1MS	Water	10/17/17
ITC02-MW21-17SAMSD	320-32498-1MSD	Water	10/17/17
ITC45-MW11-17SAMS	320-32498-4MS	Water	10/17/17
ITC45-MW11-17SAMSD	320-32498-4MSD	Water	10/17/17

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:

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.

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

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For ITC02-MW21-17SAMS/MSD, no data were qualified for Sulfate 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.

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) 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. 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 320-32498-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-32498-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-32498-1

No Sample Data Qualified in this SDG

LDC #: 40221K6

SDG #: 320-32498-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: R

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD (#6/7: SO_4-4x)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/LCSD
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	ITC02-MW21-17SA	320-32498-1	Water	10/17/17
2	ITC02-MW12-17SA	320-32498-2	Water	10/17/17
3	ITC02-MW29-17SA	320-32498-3	Water	10/17/17
4	ITC45-MW11-17SA	320-32498-4	Water	10/17/17
5	ITC45-MW14-17SA	320-32498-5	Water	10/17/17
6	ITC02-MW21-17SAMS	320-32498-1MS	Water	10/17/17
7	ITC02-MW21-17SAMSD	320-32498-1MSD	Water	10/17/17
8	ITC45-MW11-17SAMS	320-32498-4MS	Water	10/17/17
9	ITC45-MW11-17SAMSD	320-32498-4MSD	Water	10/17/17
10				
11	PBW1			
12	PBW2			
13	PBW3			
14	PBW4			

Notes:

LDC #: 40221K6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→5	W	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (PO4) (ALK) CN- NH3 TKN (TOC) CR6+ ClO4 ____ ____
QC 6,7	↓	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
↓ 8,9	↓	pH TDS Cl F NO3 NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32498-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC02-MW21-17SA	320-32498-1	Water	10/17/17
ITC02-MW12-17SA	320-32498-2	Water	10/17/17
ITC02-MW29-17SA	320-32498-3	Water	10/17/17
ITC45-MW11-17SA	320-32498-4	Water	10/17/17
ITC45-MW14-17SA	320-32498-5	Water	10/17/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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%.

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 method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-192129/12	10/31/17	Gasoline range organics (C4-C12)	26.7 ug/L	All samples in SDG 320-32498-1

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
ITC02-MW21-17SA	Gasoline range organics (C4-C12)	25 ug/L	25U ug/L
ITC02-MW12-17SA	Gasoline range organics (C4-C12)	26 ug/L	26U ug/L
ITC02-MW29-17SA	Gasoline range organics (C4-C12)	31 ug/L	31U ug/L
ITC45-MW11-17SA	Gasoline range organics (C4-C12)	29 ug/L	29U 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 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.

Due to laboratory 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 320-32498-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-32498-1

Sample	Compound	Modified Final Concentration	A or P	Code
ITC02-MW21-17SA	Gasoline range organics (C4-C12)	25U ug/L	A	B
ITC02-MW12-17SA	Gasoline range organics (C4-C12)	26U ug/L	A	B
ITC02-MW29-17SA	Gasoline range organics (C4-C12)	31U ug/L	A	B
ITC45-MW11-17SA	Gasoline range organics (C4-C12)	29U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-32498-1

No Sample Data Qualified in this SDG

LDC #: 40221K7

SDG #: 320-32498-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer: V

2nd Reviewer: R

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%, 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	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	ITC02-MW21-17SA	320-32498-1	Water	10/17/17
2	ITC02-MW12-17SA	320-32498-2	Water	10/17/17
3	ITC02-MW29-17SA	320-32498-3	Water	10/17/17
4	ITC45-MW11-17SA	320-32498-4	Water	10/17/17
5	ITC45-MW14-17SA	320-32498-5	Water	10/17/17
6				
7				
8				

Notes:

LDC #: 40221KT

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: 1 GC

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.

Blank extraction date: — **Blank analysis date:** 10/31/17
Conc. units: ng/L **Associated samples:** All (B)

Compound	Blank ID	Sample Identification								
MB 320-192129/12		1	2	3	4					
GRO(C4-C12)	26.7		25	26	31	29				

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".

V:\Validation Worksheets\GC\BLANKS.GC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32508-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-8-17SA	320-32508-1	Water	10/17/17
NAF-1-17SA	320-32508-2	Water	10/17/17
NAF-7-17SA	320-32508-3	Water	10/17/17
NAF-11-17SA	320-32508-4	Water	10/17/17
NAF-16-17SA	320-32508-5	Water	10/17/17
NAF-23-17SA	320-32508-6	Water	10/17/17
NAF-12-17SA	320-32508-7	Water	10/17/17
NAF-14-17SA	320-32508-8	Water	10/17/17
NAF-10-17SA	320-32508-9	Water	10/17/17
NAF-3-17SA	320-32508-10	Water	10/17/17
NAF-6-17SA	320-32508-11	Water	10/17/17
NAF-6-17SARE	320-32508-11RE	Water	10/17/17
NAF-13-17SA	320-32508-12	Water	10/17/17
NAF-13-17SARE	320-32508-12RE	Water	10/17/17
NAF-17-17SA	320-32508-13	Water	10/17/17
NAF-17-17SARE	320-32508-13RE	Water	10/17/17
TB-10172017	320-32508-14	Water	10/17/17

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
NAF-16-17SA	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 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
NAF-6-17SARE	All compounds	15 days	14 days	J (all detects) UJ (all non-detects)	A
NAF-13-17SARE	All compounds	29 days	14 days	R (all non-detects)	A
NAF-17-17SARE	All compounds	29 days	14 days	J (all detects) R (all non-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
10/30/17	Acetone	22.4	NAF-8-17SA NAF-1-17SA NAF-7-17SA NAF-11-17SA NAF-16-17SA NAF-23-17SA NAF-12-17SA NAF-14-17SA NAF-10-17SA TB-10172017	J (all detects) UJ (all non-detects)	A
11/01/17	Bromomethane	23.2	NAF-6-17SARE	UJ (all non-detects)	A
11/15/17	Vinyl acetate	23.9	NAF-13-17SARE NAF-17-17SARE	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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
NAF-3-17SA NAF-6-17SA NAF-17-17SA	All compounds	No method blank associated with these samples.	Method blanks must be analyzed prior to samples.	J (all detects)	A
NAF-13-17SA	All compounds	No method blank associated with these samples.	Method blanks must be analyzed prior to samples.	NA	-

No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-10172017 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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-192365/5^A, 6^A (NAF-6-17SARE)	Vinyl acetate	167 (54-146)	172 (54-146)	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 with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
NAF-12-17SA	tert-Butyl alcohol-d9	281202 (285772-1143086)	tert-Butyl alcohol	UJ (all non-detects)	P
NAF-10-17SA	tert-Butyl alcohol-d9	265027 (285772-1143086)	tert-Butyl alcohol	UJ (all non-detects)	P

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.

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
NAF-6-17SARE NAF-13-17SARE NAF-17-17SARE	All compounds	R	A

Due to headspace, continuing calibration %D, absence of method blank, and internal standard area, data were qualified as estimated in thirteen 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 320-32508-1

Sample	Compound	Flag	A or P	Reason (Code)
NAF-16-17SA	All compounds	J (all detects) UJ (all non-detects)	A	Sample condition (headspace) (V)
NAF-8-17SA NAF-1-17SA NAF-7-17SA NAF-11-17SA NAF-16-17SA NAF-23-17SA NAF-12-17SA NAF-14-17SA NAF-10-17SA TB-10172017	Acetone	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
NAF-3-17SA NAF-6-17SA NAF-17-17SA	All compounds	J (all detects)	A	Laboratroy blanks (no method blank) (V)
NAF-12-17SA NAF-10-17SA	tert-Butyl alcohol	UJ (all non-detects)	P	Internal standards (area) (I)
NAF-6-17SARE NAF-13-17SARE NAF-17-17SARE	All compounds	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-32508-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32508-1

No Sample Data Qualified in this SDG

LDC #: 40221L1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-32508-1 Level III 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	SW/SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. r² ICV ≤ 20%
IV.	Continuing calibration /Endrin	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	SW	
VI.	Field blanks	ND	TB=17
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	SW	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	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 1	NAF-8-17SA	320-32508-1	Water	10/17/17
2 1	NAF-1-17SA	320-32508-2	Water	10/17/17
3 1	NAF-7-17SA	320-32508-3	Water	10/17/17
4 1	NAF-11-17SA	320-32508-4	Water	10/17/17
5 1	NAF-16-17SA	320-32508-5	Water	10/17/17
6 1	NAF-23-17SA	320-32508-6	Water	10/17/17
7 1	NAF-12-17SA	320-32508-7	Water	10/17/17
8 1	NAF-14-17SA	320-32508-8	Water	10/17/17
9 1	NAF-10-17SA	320-32508-9	Water	10/17/17
10 2	NAF-3-17SA	320-32508-10	Water	10/17/17
11 2	NAF-6-17SA	320-32508-11	Water	10/17/17
12 3	NAF-6-17SARE	320-32508-11RE	Water	10/17/17
13 2	NAF-13-17SA	320-32508-12	Water	10/17/17

LDC #: 40221L1

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: 320-32508-1

Laboratory: Test America, Inc.

Date: 1/18/18

Page: 1 of 1

Reviewer: a

2nd Reviewer: rt

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

	Client ID	Lab ID	Matrix	Date
14 4	NAF-13-17SARE	320-32508-12RE	Water	10/17/17
15 3	NAF-17-17SA	320-32508-13	Water	10/17/17
16 4	NAF-17-17SARE	320-32508-13RE	Water	10/17/17
17 1	TB-10172017	320-32508-14	Water	10/17/17
18				
19				
20				
21				
22				

Notes:

1	MB 320-19198	3/43	(HP10)				
3	MB 320-192365	9	(HP7)				
4	MB 320-194714	11	↓				

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 #: 40221

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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
5 (dets+ND)	Headspace						~~UJ/A~~ (*1)
12 (dets+ND)	W	Y	10-17-17		11-1-17	15	~~UJ/A~~ (H)
14 (ND)	↓	↓	↓		11-15-17	29	~~UJ/A~~ (H)
16 (dets+ND)	↓	↓	↓		↓	↓	↓

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 #: 40221-1

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
	10/30/17	H103001A	F	22.4		1-9.17.MB (dcbf3+N(D))	J/UJ/A(C)
	11/1/17	HA1101A	B	23.2		12.MB (ND)	J/UJ/A(C)
	11/1/17	Zwlag CCV	HH	55.5		12.MB	Text
	11/14/17	H111401	HH	23.9		14,16.MB(ND)	J/UJ/A(C)
	11/15/17	Zwlag CCV	HH	50.5		14,16.MB	Text

CONCAL.1SB

LDC #: 40231-1

VALIDATION FINDINGS WORKSHEET
Blanks

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 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:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
	Lab indicated there is not Method Blank ~~in the~~ was assid with									
Methylene chloride	samples #10, 11, 13, 15. samples were re-analyzed outside the									
Acetone	holding time.									
	Sample 10, 11, 13, 15 - No method Blank - Lots / A									

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 #: 40221L1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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	D320-19236S/5A	HH	16T (54-146)	17T (54-146)	( )	12. MB (ND)	~~Not~~ P(L)
		16A		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		

LDC #: 40221 4

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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
		7 (ND)	TBA-d9	281202 (285772-1143086)		J/UJ/P (222)
		9 (ND)	↓	265027 (↓)		↓ (222)

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 40221C1

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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
		12, 14, 16	All		R/A (D)

Comments:

OVR.1SB

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32508-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-8-17SA	320-32508-1	Water	10/17/17
NAF-1-17SA	320-32508-2	Water	10/17/17
NAF-7-17SA	320-32508-3	Water	10/17/17
NAF-11-17SA	320-32508-4	Water	10/17/17
NAF-16-17SA	320-32508-5	Water	10/17/17
NAF-23-17SA	320-32508-6	Water	10/17/17
NAF-12-17SA	320-32508-7	Water	10/17/17
NAF-14-17SA	320-32508-8	Water	10/17/17
NAF-10-17SA	320-32508-9	Water	10/17/17
NAF-3-17SA	320-32508-10	Water	10/17/17
NAF-3-17SARE	320-32508-10RE	Water	10/17/17
NAF-6-17SA	320-32508-11	Water	10/17/17
NAF-6-17SARE	320-32508-11RE	Water	10/17/17
NAF-13-17SA	320-32508-12	Water	10/17/17
NAF-13-17SARE	320-32508-12RE	Water	10/17/17
NAF-17-17SA	320-32508-13	Water	10/17/17
NAF-17-17SARE	320-32508-13RE	Water	10/17/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
NAF-16-17SA	Gasoline range organics (C4-C12)	A headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	J (all detects)	A

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
NAF-6-17SARE	Gasoline range organics (C4-C12)	15	14	UJ (all non-detects)	P
NAF-13-17SARE NAF-17-17SARE	Gasoline range organics (C4-C12)	29	14	R (all non-detects)	P

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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 method with the exception of samples NAF-3-17SARE, NAF-6-17SA, NAF-13-17SA, and NAF-17-17SA. Since the samples were non-detect, no data was qualified.

No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MB 320-191982/13	10/30/17	Gasoline range organics (C4-C12)	29.5 ug/L	NAF-3-17SA
MB 320-192129/12	10/31/17	Gasoline range organics (C4-C12)	26.7 ug/L	NAF-8-17SA NAF-1-17SA NAF-7-17SA NAF-11-17SA NAF-16-17SA NAF-23-17SA NAF-12-17SA NAF-14-17SA NAF-10-17SA

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-3-17SA	Gasoline range organics (C4-C12)	26 ug/L	26U ug/L
NAF-8-17SA	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
NAF-1-17SA	Gasoline range organics (C4-C12)	19 ug/L	19U ug/L
NAF-7-17SA	Gasoline range organics (C4-C12)	20 ug/L	20U ug/L
NAF-11-17SA	Gasoline range organics (C4-C12)	24 ug/L	24U ug/L
NAF-16-17SA	Gasoline range organics (C4-C12)	21 ug/L	21U ug/L
NAF-23-17SA	Gasoline range organics (C4-C12)	25 ug/L	25U ug/L
NAF-12-17SA	Gasoline range organics (C4-C12)	27 ug/L	27U ug/L
NAF-14-17SA	Gasoline range organics (C4-C12)	24 ug/L	24U ug/L
NAF-10-17SA	Gasoline range organics (C4-C12)	34 ug/L	34U 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 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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS 320-191982/11 (NAF-3-17SA)	Gasoline range organics (C4-C12)	119 (78-118)	119 (78-118)	J (all detects)	P

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.

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
NAF-3-17SARE NAF-6-17SARE NAF-13-17SARE NAF-17-17SARE	Gasoline range organics (C4-C12)	R	A

Due to headspace and LCS/LCSD %R, data were qualified as estimated in three samples.

Due to laboratory blank contamination, data were qualified as not detected 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 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
Gasoline Range Organics - Data Qualification Summary - SDG 320-32508-1

Sample	Compound	Flag	A or P	Reason (Code)
NAF-16-17SA	Gasoline range organics (C4-C12)	J (all detects)	A	Sample condition (headspace) (V)
NAF-3-17SA	Gasoline range organics (C4-C12)	J (all detects)	P	Laboratory control samples (%R) (L)
NAF-3-17SARE NAF-6-17SARE NAF-13-17SARE NAF-17-17SARE	Gasoline range organics (C4-C12)	R	A	Overall assessment of data (D)

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-32508-1

Sample	Compound	Modified Final Concentration	A or P	Code
NAF-3-17SA	Gasoline range organics (C4-C12)	26U ug/L	A	B
NAF-8-17SA	Gasoline range organics (C4-C12)	21U ug/L	A	B
NAF-1-17SA	Gasoline range organics (C4-C12)	19U ug/L	A	B
NAF-7-17SA	Gasoline range organics (C4-C12)	20U ug/L	A	B
NAF-11-17SA	Gasoline range organics (C4-C12)	24U ug/L	A	B
NAF-16-17SA	Gasoline range organics (C4-C12)	21U ug/L	A	B
NAF-23-17SA	Gasoline range organics (C4-C12)	25U ug/L	A	B
NAF-12-17SA	Gasoline range organics (C4-C12)	27U ug/L	A	B
NAF-14-17SA	Gasoline range organics (C4-C12)	24U ug/L	A	B
NAF-10-17SA	Gasoline range organics (C4-C12)	34U ug/L	A	B

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-32508-1

No Sample Data Qualified in this SDG

LDC #: 40221L7

SDG #: 320-32508-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 2

Reviewer: [illegible]

2nd Reviewer: [illegible]

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	SW/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	N	
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	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 2	NAF-8-17SA	320-32508-1	Water	10/17/17
2 2	NAF-1-17SA	320-32508-2	Water	10/17/17
3 2	NAF-7-17SA	320-32508-3	Water	10/17/17
4 2	NAF-11-17SA	320-32508-4	Water	10/17/17
5 2	NAF-16-17SA	320-32508-5	Water	10/17/17
6 2	NAF-23-17SA	320-32508-6	Water	10/17/17
7 2	NAF-12-17SA	320-32508-7	Water	10/17/17
8 2	NAF-14-17SA	320-32508-8	Water	10/17/17
9 2	NAF-10-17SA	320-32508-9	Water	10/17/17
10 1	NAF-3-17SA	320-32508-10	Water	10/17/17
11 3	NAF-3-17SARE	320-32508-10RE	Water	10/17/17
12 3	NAF-6-17SA	320-32508-11	Water	10/17/17
13 4	NAF-6-17SARE	320-32508-11RE	Water	10/17/17

LDC #: 40221L7

SDG #: 320-32508-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260)

	Client ID	Lab ID	Matrix	Date
14 3	NAF-13-17SA	320-32508-12	Water	10/17/17
15 5	NAF-13-17SARE	320-32508-12RE	Water	10/17/17
16 3	NAF-17-17SA	320-32508-13	Water	10/17/17
17 5	NAF-17-17SARE	320-32508-13RE	Water	10/17/17
18				
19				
20				
21				
22				

Notes:

1	MB 320-191982/13			5	MB320-194119/1		
~~2~~	~~MB 320-191983/13~~						
2	MB 320-192129/12						
~~4~~ 3	MB 320-192369/9						

LDC #: 40224T

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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
5		Headspace					Y/UN/A (V*1)
13	W	Y	10-17-17		11-1-17	15	Y/UN/A (H)
15	↓	↓	↓		11-15-17	29	Y/R/A (H)
17					↓	↓	↓
(NO)							

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 #: 40221CT

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: 2

METHOD: 1 GC

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.

Blank extraction date:_____ **Blank analysis date:**_____
Conc. units:_____ **Associated samples:**_____

Compound	Blank ID	Sample Identification								
Lab indicated that there is not Method Blank analyzed in the batch ass'd with sample #11, 12, 14, 16. However all samples were ND. No data was qualified.										

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 #: 40221LT

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: / GC

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.

Blank extraction date: — **Blank analysis date:** 10/30/17
Conc. units: ug/L **Associated samples:** 10 (B)

Compound	Blank ID	Sample Identification								
	MB320-191982/13	10								
GRO C4-C12	29.5	26								

Blank extraction date: — **Blank analysis date:** 10/31/17 **Associated samples:** 1-9 (B)
Conc. units: ug/L

Compound	Blank ID	Sample Identification								
	MB320-191129/12	1	2	3	4	5	6	7	8	9
GRO C4-C12	26.7	21	19	20	24	21	25	27	24	34

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 #: 40221CT

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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".

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

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

Level IV/D Only

Y N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS 320-19198/11	4ROCl-C12	119 (78-118)	119 (78-118)	( )	10 (dots)	~~Dots~~ P(L)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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LDC #: 40221LT

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
	11, 13, 15, 17	All		R/UJ (0)

Comments: _____

OVRNew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32513-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
26S40E09A01-17SA	320-32513-1	Water	10/18/17
ITC44-MW16-17SA	320-32513-2	Water	10/18/17
ITC02-MW20-17SA	320-32513-3	Water	10/18/17
JMM01-MW03-17SA	320-32513-4	Water	10/18/17
ITC01-MW15-17SA	320-32513-5	Water	10/18/17
ITC45-MW32-17SA	320-32513-6	Water	10/18/17
ITC45-MW30-17SA	320-32513-7	Water	10/18/17
ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
TB-10182017	320-32513-9	Water	10/18/17

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
11/01/17	Bromomethane Vinyl acetate	23.2 73.9	All samples in SDG 320-32513-1	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 TB-10182017 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 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.

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 320-192365/5^A, 6^A (All samples in SDG 320-32513-1)	Vinyl acetate	167 (54-146)	172 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples ITC45-MW30-17SA and ITC45-MW30-17SA-P 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-MW30-17SA	ITC45-MW30-17SA-P	
Chloroform	0.19	0.20	5 (≤25)
Trichloroethene	3.8	3.7	3 (≤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 nine 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 320-32513-1

Sample	Compound	Flag	A or P	Reason (Code)
26S40E09A01-17SA ITC44-MW16-17SA ITC02-MW20-17SA JMM01-MW03-17SA ITC01-MW15-17SA ITC45-MW32-17SA ITC45-MW30-17SA ITC45-MW30-17SA-P TB-10182017	Bromomethane 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 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

LDC #: 40221M1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-32513-1 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 /Bromo	SW	CCV ≤ 20/30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 9
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	SW	D = 7+8
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	26S40E09A01-17SA	320-32513-1	Water	10/18/17
2	ITC44-MW16-17SA	320-32513-2	Water	10/18/17
3	ITC02-MW20-17SA	320-32513-3	Water	10/18/17
4	JMM01-MW03-17SA	320-32513-4	Water	10/18/17
5	ITC01-MW15-17SA	320-32513-5	Water	10/18/17
6	ITC45-MW32-17SA	320-32513-6	Water	10/18/17
7	ITC45-MW30-17SA	320-32513-7	Water	10/18/17
8	ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
9	TB-10182017	320-32513-9	Water	10/18/17
10				
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 #: 40221M1

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
	11/1/17	HA1101A	B	23.2		All (ND)	J/UJ/A(C)
			HH	73.9			
	11/1/17	[illegible]	HH	55.5		All	Text

CONCAL.1SB

LDC #: 40221N1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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/0320-19365/5M	HH	167 (54-146)	172 (54-146)	( )	All (ND)	✓ Sheet 3 of 4
		16M		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 40221M1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

Compound	Concentration (ug/L)		(≤25) RPD
	7	8	
K	0.19	0.20	5
S	3.8	3.7	3

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221M1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32513-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
26S40E09A01-17SA	320-32513-1	Water	10/18/17
ITC44-MW16-17SA	320-32513-2	Water	10/18/17
ITC02-MW20-17SA	320-32513-3	Water	10/18/17
JMM01-MW03-17SA	320-32513-4	Water	10/18/17
ITC01-MW15-17SA	320-32513-5	Water	10/18/17
ITC45-MW32-17SA	320-32513-6	Water	10/18/17
ITC45-MW30-17SA	320-32513-7	Water	10/18/17
ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
26S40E09A01-17SAMS	320-32513-1MS	Water	10/18/17
26S40E09A01-17SAMSD	320-32513-1MSD	Water	10/18/17
26S40E09A01-17SADUP	320-32513-1DUP	Water	10/18/17

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:

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.

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

No field blanks were identified in this SDG.

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) 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-MW30-17SA and ITC45-MW30-17SA-P were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)
	ITC45-MW30-17SA	ITC45-MW30-17SA-P	
Bicarbonate alkalinity	280000 ug/L	290000 ug/L	4 (≤25)
Chloride	740 mg/L	740 mg/L	0 (≤25)
Nitrate as N	18 mg/L	18 mg/L	0 (≤25)
Sulfate	380 mg/L	380 mg/L	0 (≤25)
Total dissolved solids	2500000 ug/L	2400000 ug/L	4 (≤25)
Total organic carbon	4300 ug/L	4300 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 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

LDC #: 40221M6

SDG #: 320-32513-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

2nd Reviewer: R

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/LCSD
IX.	Field duplicates	SW	D= 7+8
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	26S40E09A01-17SA	320-32513-1	Water	10/18/17
2	ITC44-MW16-17SA	320-32513-2	Water	10/18/17
3	ITC02-MW20-17SA	320-32513-3	Water	10/18/17
4	JMM01-MW03-17SA	320-32513-4	Water	10/18/17
5	ITC01-MW15-17SA	320-32513-5	Water	10/18/17
6	ITC45-MW32-17SA	320-32513-6	Water	10/18/17
7	ITC45-MW30-17SA	320-32513-7	Water	10/18/17
8	ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
9	26S40E09A01-17SAMS	320-32513-1MS	Water	10/18/17
10	26S40E09A01-17SAMSD	320-32513-1MSD	Water	10/18/17
11	26S40E09A01-17SADUP	320-32513-1DUP	Water	10/18/17
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221M6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→8	W	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (PO4) (ALK) CN- NH3 TKN (TOC) CR6+ ClO4 ____ ____
QC 9,10	↓	pH (TDS) (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN (TOC) CR6+ ClO4 ____ ____
↓ 11	↓	pH TDS Cl F NO3 NO2 SO4 PO4 (ALK) CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments: _____

LDC#: 40221M6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

Inorganics, Method see cover

Analyte	Concentration (mg/L)		RPD (≤25)	
	7	8		
Bicarbonate Alkalinity (ug/L)	280000	290000	4	
Chloride	740	740	0	
Nitrate as N	18	18	0	
Sulfate	380	380	0	
TDS (ug/L)	2500000	2400000	4	
TOC (ug/L)	4300	4300	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221M6.WPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32513-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
26S40E09A01-17SA	320-32513-1	Water	10/18/17
ITC44-MW16-17SA	320-32513-2	Water	10/18/17
ITC02-MW20-17SA	320-32513-3	Water	10/18/17
JMM01-MW03-17SA	320-32513-4	Water	10/18/17
ITC01-MW15-17SA	320-32513-5	Water	10/18/17
ITC45-MW32-17SA	320-32513-6	Water	10/18/17
ITC45-MW30-17SA	320-32513-7	Water	10/18/17
ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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.

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 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 methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ITC45-MW30-17SA and ITC45-MW30-17SA-P 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 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
Gasoline Range Organics - Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

LDC #: 40221M7

SDG #: 320-32513-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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%, r² / ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%.
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient samples
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	NO	D = 7+8
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	26S40E09A01-17SA	320-32513-1	Water	10/18/17
2	ITC44-MW16-17SA	320-32513-2	Water	10/18/17
3	ITC02-MW20-17SA	320-32513-3	Water	10/18/17
4	JMM01-MW03-17SA	320-32513-4	Water	10/18/17
5	ITC01-MW15-17SA	320-32513-5	Water	10/18/17
6	ITC45-MW32-17SA	320-32513-6	Water	10/18/17
7	ITC45-MW30-17SA	320-32513-7	Water	10/18/17
8	ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
9				
10				
11				
12				
13				

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32513-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
26S40E09A01-17SA	320-32513-1	Water	10/18/17
ITC44-MW16-17SA	320-32513-2	Water	10/18/17
ITC02-MW20-17SA	320-32513-3	Water	10/18/17
JMM01-MW03-17SA	320-32513-4	Water	10/18/17
ITC01-MW15-17SA	320-32513-5	Water	10/18/17
ITC45-MW32-17SA	320-32513-6	Water	10/18/17
ITC45-MW30-17SA	320-32513-7	Water	10/18/17
ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17

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.

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 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

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 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 320-190353/4-A,5-A (All samples in SDG 320-32513-1)	Motor oil range organics (C28-C40)	123 (41-113)	122 (41-113)	NA	-

Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ITC45-MW30-17SA and ITC45-MW30-17SA-P 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-MW30-17SA	ITC45-MW30-17SA-P	
Diesel range organics (C10-C28)	54	49	10 (≤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.

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
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-32513-1

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 320-32513-1

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 320-32513-1

No Sample Data Qualified in this SDG

LDC #: 40221M8

SDG #: 320-32513-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

Page: 1 of 1

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%. ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	SW	LCS/D
IX.	Field duplicates	SW	D=T+8
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	26S40E09A01-17SA	320-32513-1	Water	10/18/17
2	ITC44-MW16-17SA	320-32513-2	Water	10/18/17
3	ITC02-MW20-17SA	320-32513-3	Water	10/18/17
4	JMM01-MW03-17SA	320-32513-4	Water	10/18/17
5	ITC01-MW15-17SA	320-32513-5	Water	10/18/17
6	ITC45-MW32-17SA	320-32513-6	Water	10/18/17
7	ITC45-MW30-17SA	320-32513-7	Water	10/18/17
8	ITC45-MW30-17SA-P	320-32513-8	Water	10/18/17
9				
10				
11				
12				

Notes:

LDC #: 40224M8

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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".

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

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

Level IV/D Only

Y N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-196353/4-A	DTR	( )	( )	( )		
	IBA	MRDC28-040	123 (41-113)	122 (41-113)	( )	All (ND)	✓ det s/p (L)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC#: 40221M8

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: PG
2nd Reviewer: A

METHOD: GC TPHE (EPA SW 846 Method 8015B)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤25%)
	7	8	
DRO (C10-C28)	54	49	10

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221M8.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Perfluorinated Alkyl Acids

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32513-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
26S40E09A01-17SA**	320-32513-1**	Water	10/18/17
ITC44-MW16-17SA	320-32513-2	Water	10/18/17

**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.

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 25.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 25.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 25.0% 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. 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 for samples which underwent Level IV validation. 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. 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
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 320-32513-1

No Sample Data Qualified in this SDG

LDC #: 40221M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/19/18

SDG #: 320-32513-1 Level III/IV Page: 1 of 1

Laboratory: Test America, Inc. Reviewer:

2nd Reviewer:

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	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD<20%. Tune TOD ≤ 25%. ICV ≤ 25%
IV.	Continuing calibration	A	CCV ≤ 25%
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/D
X.	Field duplicates	N	
XI.	Internal standards	A	
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; 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	26S40E09A01-17SA**	320-32513-1**	Water	10/18/17
2	ITC44-MW16-17SA	320-32513-2	Water	10/18/17
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 40221N96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: TC

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~~ 25% 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~~ 25%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ ~~30~~ 25%?	✓			
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 #: 40221N90

VALIDATION FINDINGS CHECKLIST

Reviewer: G
2nd Reviewer: C

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 #: 40221M96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC ✓ HPLC LMS

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (1.0 std)	Recalculated CF (1.0 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICA2	11/1/17	PFOA	1.0489	1.0489	1.0725	1.0725	10.4	10.4
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 #: 40221M96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC ✓ HPLC MS

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
CF = A/C

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	2017-11.02.043	11/3/17	PFOA	1.0775	1.078	1.078	0.5	0.5
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 #: 40021M96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Reviewer: 9
2nd Reviewer: 9

METHOD: ___ GC ✓ HPLC/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* (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: 320-191150

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)										
2,4,6-Trinitrotoluene (8330)										
~~TPOX~~	40.0	40.0	37.9	39.4	95	95	99	99	4	4

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 #: 40221M96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: _ GC ✓ HPLC/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% 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 Compound Name PFOA

Concentration = (129084)(2.50)(10)(1) / (5574429)(1.0725)(0.322.6)

= 1.67 ng/L

#	Sample ID	Compound	Reported Concentrations (ng/L)	Recalculated Results Concentrations ( )	Qualifications
	1	PFOA	1.7		

Comments:

SAMPCALew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 29, 2018

Parameters: Volatiles

Validation Level: Level IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32539-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17SA	320-32539-1	Water	10/19/17
RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
RLS34-MW01-17SA	320-32539-3	Water	10/19/17
RLS13-MW01-17SA	320-32539-4	Water	10/19/17
RLS07-MW02-17SA	320-32539-5	Water	10/19/17
RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
MK69-MW01-17SA	320-32539-7	Water	10/19/17
TB-10192017	320-32539-8	Water	10/19/17
RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17

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.

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
11/01/17	Bromomethane Vinyl acetate	23.2 73.9	RLS34-MW05-17SA RLS34-MW05-17SA-P RLS13-MW01-17SA RLS07-MW02-17SA RLS07-MW02-17SA-P MK69-MW01-17SA TB-10192017	UJ (all non-detects) UJ (all non-detects)	A
11/02/17	Vinyl acetate	70.4	RLS34-MW01-17SA	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-10192017 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
MK69-MW01-17SAMS/MSD (MK69-MW01-17SA)	Vinyl acetate	169 (54-146)	167 (54-146)	NA	-
RLS34-MW01-17SAMS/MSD (RLS34-MW01-17SA)	Vinyl acetate	171 (54-146)	174 (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 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 320-194837/5^A, 6^A (RLS34-MW05-17SA RLS34-MW05-17SA-P RLS13-MW01-17SA RLS07-MW02-17SA RLS07-MW02-17SA-P MK69-MW01-17SA TB-10192017)	Vinyl acetate	167 (54-146)	172 (54-146)	NA	-
LCS/D 320-194837/5^A, 6^A (RLS34-MW01-17SA)	Vinyl acetate	168 (54-146)	165 (54-146)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples RLS34-MW05-17SA and RLS34-MW05-17SA-P and samples RLS07-MW02-17SA and RLS07-MW02-17SA-P were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	RLS34-MW05-17SA	RLS34-MW05-17SA-P	
Acetone	2.2	2.1	5 (≤25)

Compound	Concentration (ug/L)		RPD (Limits)
	RLS07-MW02-17SA	RLS07-MW02-17SA-P	
1,2-Dichloroethane	1.2	1.2	0 (≤25)
Chloroform	1.8	1.8	0 (≤25)
cis-1,2-Dichloroethene	0.56	0.57	2 (≤25)
Tetrachloroethene	2.6	2.7	4 (≤25)
Trichloroethene	50	51	2 (≤25)
1,2-Dichloroethene, total	0.56	0.57	2 (≤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 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 320-32539-1

Sample	Compound	Flag	A or P	Reason (Code)
RLS34-MW05-17SA RLS34-MW05-17SA-P RLS13-MW01-17SA RLS07-MW02-17SA RLS07-MW02-17SA-P MK69-MW01-17SA TB-10192017	Bromomethane Vinyl acetate	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (C)
RLS34-MW01-17SA	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

LDC #: 40221N1

SDG #: 320-32539-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 1/18/18

Page: 1 of 1

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	RSD ≤ 15%, r² ICV ≤ 20%
IV.	Continuing calibration /Ending	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 8
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	SW	D = 5+6, 1+2
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	RLS34-MW05-17SA	320-32539-1	Water	10/19/17
2	RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
3	RLS34-MW01-17SA	320-32539-3	Water	10/19/17
4	RLS13-MW01-17SA	320-32539-4	Water	10/19/17
5	RLS07-MW02-17SA	320-32539-5	Water	10/19/17
6	RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
7	MK69-MW01-17SA	320-32539-7	Water	10/19/17
8	TB-1019217	320-32539-8	Water	10/19/17
9	RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
10	RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
11	MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
12	MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17
13				

LDC #: 40221N1

VALIDATION FINDINGS CHECKLIST

Page: 1 of 3
Reviewer: Q
2nd Reviewer: Q

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 #: 40221N1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 7

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 #: 40221N1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 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
	11/1/17	HA1101A	B	23.2		1-2, 4-8, 11-12	J/UJ/A (c)
			HH	73.9		MB (ND)	✓
	11/1/17	Ending CCV	HH	55.5		✓	Text
	11/2/17	HA1102A	HH	70.4		3, 9-10, MB	J/UJ/A (c)
	11/2/17	Ending CCV	HH	67.0		3, 9-10, MB	Text

LDC #: 40221 N1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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	HH	169 (54-146)	167 (54-146)	( )	7 (ND)	~~detects~~/A (Q)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		9/10	HH	171 (54-146)	174 (54-146)	( )	3 (ND)	~~detects~~/A (Q)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 40221N1

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
	LCS/D	320-192365/5MA	HH	167 (54-146)	172 (54-146)	( )	1-2.4-8.MB	detects (L)
		6MA		( )	( )	( )	(ND)	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
	LCS/D	320-195199/5MA,	HH	168 (54-146)	165 (54-146)	( )	3. MB (ND)	detects (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 40221N1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: A

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

Compound	Concentration (ug/L)		(≤25) RPD
	1	2	
F	2.2	2.1	5
~~J~~			~~??~~

Compound	Concentration (ug/L)		(≤25) RPD
	5	6	
L	1.2	1.2	0
K	1.8	1.8	0
QQQ	0.56	0.57	2
AA	2.6	2.7	4
S	50	51	2
J	0.56	0.57	2

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2017\40221N1.wpd

LDC #: 40221N1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
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	10/20/17	F (1st internal standard)	0.4692	0.4692	0.4739	0.4739	3.6	3.6
	(HP7)		S (2nd internal standard)	0.2801	0.2801	0.2799	0.2799	6.5	6.5
			AA (3rd internal standard)	0.4377	0.4377	0.4269	0.4269	8.1	8.1
			KKK (4th internal standard)	0.9036	0.9036	0.8978	0.8978	5.8	5.8
2	ICAL	10/26/17	XXX (1st internal standard)	1.2559	1.2559	1.2341	1.2341	4.2	4.2
	(HP7)		S (2nd internal standard)						
			AA (3rd internal standard)						
			BB (4th internal standard)						
3			K (1st internal standard)						
			S (2nd internal standard)						
			AA (3rd internal standard)						
			BB (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 #: 40221N1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: PG
2nd Reviewer: Z

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

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	HA1101A	11/1/17	F	(1st internal standard)	0.4739	0.4797	0.4797	1.2	1.2
			S	(2nd internal standard)	0.2799	0.3066	0.3066	9.5	9.5
			AA	(3rd internal standard)	0.4269	0.4455	0.4455	4.4	4.3
			KKK	(4th internal standard)	0.8978	0.9274	0.9274	3.3	3.3
2	HA1102A	11/2/17	F	(1st internal standard)	0.4739	0.4314	0.4314	9.0	9.0
			S	(2nd internal standard)	0.2799	0.2948	0.2948	5.3	5.3
			AA	(3rd internal standard)	0.4269	0.4420	0.4420	3.5	3.5
			KKK	(4th internal standard)	0.8978	0.9429	0.9429	5.0	5.0
3			F	(1st internal standard)					
			S	(2nd internal standard)					
			AA	(3rd internal standard)					
			KKK	(4th internal standard)					
4			F	(1st internal standard)					
			S	(2nd internal standard)					
			AA	(3rd internal standard)					
			KKK	(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 #: 40221N1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: M

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: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	20.0	19.6	98	98	0
1,2-Dichloroethane-d4	↓	21.0	105	105	↓
Toluene-d8	↓	20.1	101	101	↓
Bromofluorobenzene	↓	21.4	107	107	↓

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 #: 40221N1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: 9/10

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked 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	Recalculated
1,1-Dichloroethene	100	100	0.73	101	102	100	100	101	101	1	1
Trichloroethene	↓	↓	240	340	339	97	100	97	99	0	0
Benzene	↓	↓	ND	105	105	105	105	105	105	0	0
Toluene	↓	↓	↓	104	105	104	104	105	105	1	1
Chlorobenzene	↓	↓	↓	101	100	101	101	100	100	0	0

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 #: 40221N1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 9
2nd Reviewer:

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: 320-192365

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	20.8	20.5	104	104	103	103	1	1
Trichloroethene			21.7	21.3	108	108	106	106	2	2
Benzene			21.2	20.5	106	106	103	103	3	3
Toluene			21.1	20.6	106	106	103	103	3	2
Chlorobenzene			20.0	20.0	100	100	100	100	0	0

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 #: 40221 N1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: a
2nd reviewer: A

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. 3, 5:

Conc. = $\frac{(334555)(10.0)(5)}{(24697)(0.2799)(\quad)(\quad)}$

= 242.9 ug

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	3	5	240		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Metals

Validation Level: Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32539-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17SA**	320-32539-1**	Water	10/19/17
RLS34-MW05-17SA-P**	320-32539-2**	Water	10/19/17
RLS34-MW01-17SA**	320-32539-3**	Water	10/19/17
RLS13-MW01-17SA	320-32539-4	Water	10/19/17
RLS07-MW02-17SA	320-32539-5	Water	10/19/17
RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
MK69-MW01-17SA	320-32539-7	Water	10/19/17
RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17

**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

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.

For RLS34-MW01-17SAMS/MSD, no data were qualified for Calcium, Magnesium, Molybdenum, Potassium, and Sodium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For MK69-MW01-17SAMS/MSD, no data were qualified for Calcium, Magnesium, Potassium, 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 RLS34-MW05-17SA** and RLS34-MW05-17SA-P** and samples RLS07-MW02-17SA and RLS07-MW02-17SA-P were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS34-MW05-17SA**	RLS34-MW05-17SA-P**	
Antimony	2.4	2.3	4 (≤25)
Arsenic	850	850	0 (≤25)
Barium	19	19	0 (≤25)
Cadmium	0.51	0.50	2 (≤25)
Calcium	420000	400000	5 (≤25)
Magnesium	230000	230000	0 (≤25)
Molybdenum	5500	5200	6 (≤25)
Selenium	160	160	0 (≤25)
Potassium	47000	46000	2 (≤25)
Sodium	2200000	2100000	5 (≤25)
Vanadium	140	50	95 (≤25)

Analyte	Concentration (ug/L)		RPD (Limits)
	RLS07-MW02-17SA	RLS07-MW02-17SA-P	
Antimony	2.4	2.0	18 (≤25)
Arsenic	620	510	19 (≤25)
Barium	12	9.4	24 (≤25)
Calcium	510000	410000	22 (≤25)
Magnesium	190000	160000	17 (≤25)
Molybdenum	1800	1500	18 (≤25)
Selenium	71	56	24 (≤25)
Potassium	45000	36000	22 (≤25)
Sodium	350000	290000	19 (≤25)
Vanadium	42	34	21 (≤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.

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
Metals - Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Metals - Laboratory Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Metals - Field Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

LDC #: 40221N4a

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/23/18

SDG #: 320-32539-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: JB

2nd Reviewer: M

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 ~~SW~~	
VII.	Matrix Spike/Matrix Spike Duplicates	A	(8,9); Ca, Mg, Mo, K, Na > 4x / (10,11); Ca, Mg, K, Na > 4x
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(1,2) (5,6)
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; 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	RLS34-MW05-17SA**	320-32539-1**	Water	10/19/17
2	RLS34-MW05-17SA-P**	320-32539-2**	Water	10/19/17
3	RLS34-MW01-17SA**	320-32539-3**	Water	10/19/17
4	RLS13-MW01-17SA	320-32539-4	Water	10/19/17
5	RLS07-MW02-17SA	320-32539-5	Water	10/19/17
6	RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
7	MK69-MW01-17SA	320-32539-7	Water	10/19/17
8	RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
9	RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
10	MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
11	MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17
12				
13				

Notes:

LDC #: 40221N4a

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: M

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?	✓			

LDC #: 40221N4a

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer: AC

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.			✓	

LDC #: 40221N4a

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)
1-7	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, 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, ___
8-11	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, ___
		Al, Sb, As, 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#: 40221N4a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: VS
2nd Reviewer: AC

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	1	2	
Antimony	2.4	2.3	4
Arsenic	850	850	0
Barium	19	19	0
Cadmium	0.51	0.50	2
Calcium	420000	400000	5
Magnesium	230000	230000	0
Molybdenum	5500	5200	6
Selenium	160	160	0
Potassium	47000	46000	2
Sodium	2200000	2100000	5
Vanadium	140	50	95

Analyte	Concentration (ug/L)		RPD (≤25)
	5	6	
Antimony	2.4	2.0	18
Arsenic	620	510	19
Barium	12	9.4	24
Calcium	510000	410000	22
Magnesium	190000	160000	17
Molybdenum	1800	1500	18

LDC#: 40221N4a

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: JB
2nd Reviewer: M

METHOD: Metals (EPA Method 6020A/7000)

Analyte	Concentration (ug/L)		RPD (≤25)
	5	6	
Selenium	71	56	24
Potassium	45000	36000	22
Sodium	350000	290000	19
Vanadium	42	34	21

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221N4a.wpd

LDC #: 40221N4a

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 = Found x 100 / True

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 (Initial calibration)						
ICV	ICP/MS (Initial calibration) 12:34	Fe	834.600 ug/L	0.8000 mg/L	104%	104%	Y
ICV ~~CCV~~ JB	CVAA (Initial calibration) 17:55	Hg	1.93 ug/L	0.00200 mg/L	97%	97%	Y
	ICP (Continuing calibration)						
CCV ~~ICV~~ JB	ICP/MS (Continuing calibration) 17:44	Ag	51.167 ug/L ~~48.368 ug/L~~ JB	0.0500 mg/L	102%	102%	Y
CCV	CVAA (Continuing calibration) 18:54	Hg	4.81 ug/L	0.00500 mg/L	96%	96%	Y

Comments:

CALCLC.4C4

LDC #: 40221N4a
SDG #: 320-32539-1

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

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:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (ug/L)
SDR = Serial Dilution Result (ug/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	Zn	96.517 ug/L	0.100 mg/L	97%	97%	Y
LCS	Laboratory control sample	Pb	211.490 ug/L	200 ug/L	106%	106%	Y
MS	Matrix spike -4	Hg	ND (SSR-SR) 0.972 ug/L	1.00 ug/L	97%	97%	Y
MSD	Duplicate	Hg	0.999 ug/L	FOUND: 0.972 ug/L	3 RPD	3 RPD	Y
SD	ICP serial dilution -3	As	1032.175 ug/L	SR = 1000 ug/L	3.2% D	3.0% D	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 40221N4a
SDG #: 320-32539-1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer: [illegible]

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 V #3 were recalculated and verified using the following equation:

Concentration = (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:

V #3 from Raw Data: 17.854 ug/L × 5 (DF) = 89.27 ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	1	Ba	19	19	Y
	2	Se	160	160	Y
	3	V	89	89	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32539-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17SA	320-32539-1	Water	10/19/17
RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
RLS34-MW01-17SA	320-32539-3	Water	10/19/17
RLS13-MW01-17SA	320-32539-4	Water	10/19/17
RLS07-MW02-17SA	320-32539-5	Water	10/19/17
RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
MK69-MW01-17SA	320-32539-7	Water	10/19/17
RLS34-MW01-17SAMS	320-32539-3MS	Water	10/19/17
RLS34-MW01-17SAMSD	320-32539-3MSD	Water	10/19/17
MK69-MW01-17SAMS	320-32539-7MS	Water	10/19/17
MK69-MW01-17SAMSD	320-32539-7MSD	Water	10/19/17

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

No field blanks were identified in this SDG.

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
RLS34-MW01-17SAMS/MSD (RLS34-MW01-17SA)	Orthophosphate as P	26 (80-116)	26 (80-116)	R (all non-detects)	A

For MK69-MW01-17SAMS/MSD, no data were qualified for Nitrate as Nitrogen 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.

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 RLS34-MW05-17SA and RLS34-MW05-17SA-P and samples RLS07-MW02-17SA and RLS07-MW02-17SA-P were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)
	RLS34-MW05-17SA	RLS34-MW05-17SA-P	
Chloride	460	460	0 (≤25)
Nitrate as N	6.1	6.0	2 (≤25)
Nitrite as N	0.45	0.48	6 (≤25)
Sulfate	5700	5800	2 (≤25)

Analyte	Concentration (mg/L)		RPD (Limits)
	RLS07-MW02-17SA	RLS07-MW02-17SA-P	
Chloride	270	260	4 (≤25)
Nitrate as N	6.2	6.2	0 (≤25)
Sulfate	2400	2400	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 method.

Due to MS/MSD %R, data were rejected 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 rejected (R) are unusable for all purposes. 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 320-32539-1

Sample	Analyte	Flag	A or P	Reason (Code)
RLS34-MW01-17SA	Orthophosphate as P	R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (Q)

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

LDC #: 40221N6

SDG #: 320-32539-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

Page: 1 of 1

Reviewer: MG

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS /MSD
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	SW	D = 1+2 , D = 5+6
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	RLS34-MW05-17SA	320-32539-1	Water	10/19/17
2	RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
3	RLS34-MW01-17SA	320-32539-3	Water	10/19/17
4	RLS13-MW01-17SA	320-32539-4	Water	10/19/17
5	RLS07-MW02-17SA	320-32539-5	Water	10/19/17
6	RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
7	MK69-MW01-17SA	320-32539-7	Water	10/19/17
8	RLS34-MW01-17SAMS	320-32539-3MS	Water	10/19/17
9	RLS34-MW01-17SAMSD	320-32539-3MSD	Water	10/19/17
10	MK69-MW01-17SAMS	320-32539-7MS	Water	10/19/17
11	MK69-MW01-17SAMSD	320-32539-7MSD	Water	10/19/17
12				
13	PBW1			
14	PBW2			

Notes:

LDC #: 40221N6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer: A

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→7	W	pH TDS (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
QC 8→11	↓	pH TDS (Cl) F (NO3) (NO2) (SO4) (PO4) ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 ____ ____

Comments:

LDC #: 40221N6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 9056A

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
1	8/9	water	PO4-P	26 (80-116)	26 (80-116)		3	J/R/A (Q) (N.D.)

Comments: mg ~~#9/10: NO3-N -4x~~ #10/11: NO3-N -4x

LDC#: 40221N6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd Reviewer: [illegible]

Inorganics, Method 9056A

Analyte	Concentration (mg/L) 1	Concentration (mg/L) 2	RPD (≤25)	
Chloride	460	460	0	
Nitrate as N	6.1	6.0	2	
Nitrite as N	0.45	0.48	6	
Sulfate	5700	5800	2	

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Analyte	Concentration (mg/L) 5	Concentration (mg/L) 6	RPD (≤25)	
Chloride	270	260	4	
Nitrate as N	6.2	6.2	0	
Sulfate	2400	2400	0	

V:\FIELD DUPLICATES\Field Duplicates\FD_inorganic\2018\40221N6.WPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Methane, Ethane, & Ethene

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32539-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
RLS34-MW05-17SA	320-32539-1	Water	10/19/17
RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
RLS34-MW01-17SA	320-32539-3	Water	10/19/17
RLS13-MW01-17SA	320-32539-4	Water	10/19/17
RLS07-MW02-17SA	320-32539-5	Water	10/19/17
RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
MK69-MW01-17SA	320-32539-7	Water	10/19/17
RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
RLS34-MW01-17SADUP	320-32539-3DUP	Water	10/19/17
MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17
MK69-MW01-17SADUP	320-32539-7DUP	Water	10/19/17

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

No field blanks were identified in this SDG.

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 method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

Samples RLS34-MW05-17SA and RLS34-MW05-17SA-P and samples RLS07-MW02-17SA and RLS07-MW02-17SA-P 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 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Laboratory Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Methane, Ethane, & Ethene - Field Blank Data Qualification Summary - SDG 320-32539-1

No Sample Data Qualified in this SDG

LDC #: 40221N51 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/18/18
SDG #: 320-32539-1 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%. r² ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Matrix spike/Matrix spike duplicates/DUP	A/A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	ND	D=5+6, 1+2
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	RLS34-MW05-17SA	320-32539-1	Water	10/19/17
2	RLS34-MW05-17SA-P	320-32539-2	Water	10/19/17
3	RLS34-MW01-17SA	320-32539-3	Water	10/19/17
4	RLS13-MW01-17SA	320-32539-4	Water	10/19/17
5	RLS07-MW02-17SA	320-32539-5	Water	10/19/17
6	RLS07-MW02-17SA-P	320-32539-6	Water	10/19/17
7	MK69-MW01-17SA	320-32539-7	Water	10/19/17
8	RLS34-MW01-17SAMS	320-32536-3MS	Water	10/19/17
9	RLS34-MW01-17SAMSD	320-32536-3MSD	Water	10/19/17
10	RLS34-MW01-17SADUP	320-32539-3DUP	Water	10/19/17
11	MK69-MW01-17SAMS	320-32536-7MS	Water	10/19/17
12	MK69-MW01-17SAMSD	320-32536-7MSD	Water	10/19/17
13	MK69-MW01-17SADUP	320-32539-7DUP	Water	10/19/17
14				
15				
16				
17				
18				

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32542-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-15-17SA	320-32542-1	Water	10/19/17
NAF-2-17SA	320-32542-2	Water	10/19/17
NAF-2-17SA-P	320-32542-3	Water	10/19/17
ITC45-MW33-17SA	320-32542-4	Water	10/19/17
TB10192017	320-32542-5	Water	10/19/17
NAF-15-17SAMS	320-32542-1MS	Water	10/19/17
NAF-15-17SAMSD	320-32542-1MSD	Water	10/19/17

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
11/02/17	Vinyl acetate	70.4	All samples in SDG 320-32542-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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 TB10192017 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
NAF-15-17SAMS/MSD (NAF-15-17SA)	Vinyl acetate	172 (54-146)	172 (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 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 320-192519/5^A, 6^A (All samples in SDG 320-32542-1)	Vinyl acetate	168 (54-146)	165 (54-146)	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 continuing calibration %D, data were qualified as estimated 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
Volatiles - Data Qualification Summary - SDG 320-32542-1

Sample	Compound	Flag	A or P	Reason (Code)
NAF-15-17SA NAF-2-17SA NAF-2-17SA-P ITC45-MW33-17SA TB10192017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

LDC #: 40221O1

SDG #: 320-32542-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

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 A	RSD ≤ 15% r², ICV ≤ 20%
IV.	Continuing calibration /ending	SW	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 5.
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
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	NAF-15-17SA	320-32542-1	Water	10/19/17
2	NAF-2-17SA	320-32542-2	Water	10/19/17
3	NAF-2-17SA-P	320-32542-3	Water	10/19/17
4	ITC45-MW33-17SA	320-32542-4	Water	10/19/17
5	TB10192017	320-32542-5	Water	10/19/17
6	NAF-15-17SAMS	320-32542-1MS	Water	10/19/17
7	NAF-15-17SAMSD	320-32542-1MSD	Water	10/19/17
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 #: 40221 01

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Q
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
	11/2/17	HA1102A	HH	70.4		All (ND)	J/UJ/A(C)
	11/2/17	Endeg CCV	HH	67.0		All	Text

CONCAL.1SB

LDC #: 40221O1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		6/7	HH	172 (54-146)	173 (54-146)	( )	1 (ND)	~~1 (ND)~~ A (Q)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 402101

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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/0320-19519/5A, 6A		HH	168 (54-146)	165 (54-146)	( )	All (ND)	Det/P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 26, 2018

Parameters: Wet Chemistry

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32542-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW33-17SA	320-32542-4	Water	10/19/17
ITC45-MW33-17SAMS	320-32542-4MS	Water	10/19/17
ITC45-MW33-17SAMSD	320-32542-4MSD	Water	10/19/17

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:

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.

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 dissolved solids	11000 ug/L	All samples in SDG 320-32542-1

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.

V. Field Blanks

No field blanks were identified in this SDG.

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) 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. 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 320-32542-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Wet Chemistry - Field Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

LDC #: 40221O6

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-22-18

SDG #: 320-32542-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: MG

2nd Reviewer: [illegible]

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	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/LCSD
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	ITC45-MW33-17SA	320-32542-4	Water	10/19/17
2	ITC45-MW33-17SAMS	320-32542-4MS	Water	10/19/17
3	ITC45-MW33-17SAMSD	320-32542-4MSD	Water	10/19/17
4				
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7				
8				
9				
10				
11				
12				
13				
14	PBW			

Notes:

LDC #: 4022106

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: MG
2nd reviewer: AC

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1	W	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
QC 2,3	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____

Comments:

LDC #: 40221O6

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: MG
2nd Reviewer: T

METHOD: Inorganics, Method See Cover

Conc. units: ug/L **Associated Samples:** all (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qual's.									
TDS	11000		55000										

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 Report# 40221O7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 29, 2018

Parameters: Gasoline Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32542-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
NAF-15-17SA	320-32542-1	Water	10/19/17
NAF-2-17SA	320-32542-2	Water	10/19/17
NAF-2-17SA-P	320-32542-3	Water	10/19/17
ITC45-MW33-17SA	320-32542-4	Water	10/19/17

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:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260

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.

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 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 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 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
Gasoline Range Organics - Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 320-32542-1

No Sample Data Qualified in this SDG

LDC #: 40221O7

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-32542-1

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer:

2nd Reviewer:

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	N	
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	NAF-15-17SA	320-32542-1	Water	10/19/17
2	NAF-2-17SA	320-32542-2	Water	10/19/17
3	NAF-2-17SA-P	320-32542-3	Water	10/19/17
4	ITC45-MW33-17SA	320-32542-4	Water	10/19/17
5				
6				
7				
8				

Notes:

LDC Report# 40221O8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Diesel Range Organics & Motor Oil Range Organics

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32542-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW33-17SA	320-32542-4	Water	10/19/17

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.

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 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

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 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 320-190353/4-A,5-A (All samples in SDG 320-32542-1)	Motor oil range organics (C28-C40)	123 (41-113)	122 (41-113)	NA	-

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
Diesel Range Organics & Motor Oil Range Organics - Data Qualification Summary - SDG 320-32542-1

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 320-32542-1

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 320-32542-1

No Sample Data Qualified in this SDG

LDC #: 40221O8

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/18/18

SDG #: 320-32542-1

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	RSD ≤ 20%. ICV ≤ 20%
III.	Continuing calibration	A	CCV ≤ 20%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	~~FB~~
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	ITC45-MW33-17SA	320-32542-4	Water	10/19/17
2				
3				
4				
5				
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8				
9				
10				
11				
12				

Notes:

LDC #: 40221108

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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".

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

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

Level IV/D Only

Y N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-190753/4A/5A	MRO C28-C40	123 (41-113)	122 (41-113)	( )	All (ND)	[illegible]
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
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			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS China Lake, CTO 005

LDC Report Date: January 25, 2018

Parameters: Volatiles

Validation Level: Level III

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 320-32593-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ITC45-MW19-17SA	320-32593-6	Water	10/23/17
ITC44-MW17-17SA	320-32593-7	Water	10/23/17
TB-10232017	320-32593-8	Water	10/23/17

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
11/02/17	Vinyl acetate	70.4	All samples in SDG 320-32593-1	UJ (all non-detects)	A

The percent differences (%D) of the ending calibrations were less than or equal to 50.0% for all compounds 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-10232017 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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
LCS/D 320-192519/5^A, 6^A (All samples in SDG 320-32593-1)	Vinyl acetate	168 (54-146)	165 (54-146)	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 continuing calibration %D, 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 320-32593-1

Sample	Compound	Flag	A or P	Reason (Code)
ITC45-MW19-17SA ITC44-MW17-17SA TB-10232017	Vinyl acetate	UJ (all non-detects)	A	Continuing calibration (%D) (C)

NAWS China Lake, CTO 005
Volatiles - Laboratory Blank Data Qualification Summary - SDG 320-32593-1

No Sample Data Qualified in this SDG

NAWS China Lake, CTO 005
Volatiles - Field Blank Data Qualification Summary - SDG 320-32593-1

No Sample Data Qualified in this SDG