

LABORATORY DATA CONSULTANTS, INC.
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GSI Pacific, Inc.
181 S. Kukui Street
Honolulu, HI 96813
ATTN: Ms. Sonia Shjegstad

June 23, 2014

SUBJECT: Revised Makua Military Reservation, Oahu, HI, Data Validation

Dear Ms. Shjegstad

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project #31509:

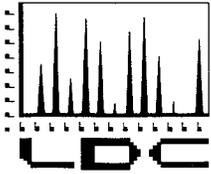
<u>SDG #</u>	<u>Fraction</u>
10247058, 10247062, 10248063, 10247065, 10248731	Dioxins/Dibenzofurans
1345019	Metals

- Ammended Dioxin/Dibenzofuran data qualification due to method blank contamination.
- Ammended metals report qualification due to MS/MSD outlier

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

Sincerely,

Andrew Kong
Project Manager/Senior Chemist



LABORATORY DATA CONSULTANTS, INC.

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GSI Pacific, Inc.
181 S. Kukui Street
Honolulu, HI 96813
ATTN: Ms. Sonia Shjegstad

March 31, 2014

SUBJECT: Makua Military Reservation, Oahu, HI, Data Validation

Dear Ms. Shjegstad

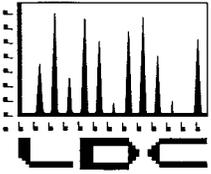
Enclosed are the final validation reports for the fractions listed below. These SDGs were received on March 13, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #31509:

<u>SDG #</u>	<u>Fraction</u>
006555/006556	Volatiles, Semivolatiles, Chlorinated Pesticides, Explosives, 2,4-Dinitrotoluene, Dioxins/Dibenzofurans, Perchlorate, Metals
006557/006558	
006562/006563	
10247058	
10247062	
10247063	
10247065	
10248731	
320-4661-1	
320-4662-1	
320-4883-1	
1343025	
1345019	

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

- Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii, August 2013
- Final Draft Version of the U.S. Department of Defense, DoD, and Department of Energy, DoE, Consolidated Quality Systems Manual, QSM, for Environmental Laboratories, Version 5.0, March 2013
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008



- USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans Data Review, September 2011
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- 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

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Andrew Kong', with a large, sweeping flourish at the end.

Andrew Kong
Project Manager/Senior Chemist

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 27, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Volatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006555/006556

Sample Identification

MAK001O	MAK007O
MAK002O	MAK022O
MAK003O	MAK023O
MAK004O	MAK024O
MAK005O	MAK006OMS
MAK006O	MAK006OMSD
MAK021O	MAK007OMS
MAK008O	MAK007OMSD
MAK009O	
MAK010O	
MAK011O	
MAK012O	
MAK013O	
MAK014O	
MAK015O	
MAK016O	
MAK017O	
MAK018O	
MAK019O	
MAK020O	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The laboratory indicated sample Trip Blank was received frozen and all vials shattered, therefore no results were provided.

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Volatiles - Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Volatiles - Laboratory Blank Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Volatiles - Field Blank Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

LDC #: 31509A1
 SDG #: 006555/006556
 Laboratory: ARDL, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III

Date: 3/25/14
 Page: 1 of 1
 Reviewer: F?
 2nd Reviewer: [Signature]

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.	Technical holding times	A	Sampling dates: 9/9 - 9/27/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD ≤ 15
IV.	Continuing calibration/ICV	A	100/100 ≤ 20
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	^	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	Laboratory indicated TB sample removed from
XVI.	Field duplicates	N	and shattered, therefore no sample results provided.
XVII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001O	11	MAK011O	21	MAK007O	31	1203JFSY
2	MAK002O	12	MAK012O	22	MAK022O	32	1105JFSJ F7
3	MAK003O	13	MAK013O	23	MAK023O	33	1203JFSZ
4	MAK004O	14	MAK014O	24	MAK024O	34	1203JFSX
5	MAK005O	15	MAK015O	25	MAK006OMS	35	
6	MAK006O	16	MAK016O	26	MAK006OMSD	36	
7	MAK021O	17	MAK017O	27	MAK007OMS	37	
8	MAK008O	18	MAK018O	28	MAK007OMSD	38	
9	MAK009O	19	MAK019O	29		39	
10	MAK010O	20	MAK020O	30		40	

all - CE, EE, RRR, FF, SSS + DDD only

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 27, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Semivolatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006555/006556

Sample Identification

MAK001O	MAK007O
MAK002O	MAK022O
MAK003O	MAK023O
MAK004O	MAK024O
MAK005O	MAK006OMS
MAK006O	MAK006OMSD
MAK021O	MAK007OMS
MAK008O	MAK007OMSD
MAK009O	
MAK010O	
MAK011O	
MAK012O	
MAK013O	
MAK014O	
MAK015O	
MAK016O	
MAK017O	
MAK018O	
MAK019O	
MAK020O	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the validation criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Semivolatiles - Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG
006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Semivolatiles - Field Blank Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

LDC #: 31509A2a

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006555/006556

Level III

Laboratory: ARDL, Inc.

Date: 3/25/14

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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.	Technical holding times	A	Sampling dates: 9/9 - 9/27/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD ≤ 15
IV.	Continuing calibration/ICV	A	100/CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	Δ	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001O	11	MAK011O	21	MAK007O	31	B6639
2	MAK002O	12	MAK012O	22	MAK022O	32	B6640
3	MAK003O	13	MAK013O	23	MAK023O	33	
4	MAK004O	14	MAK014O	24	MAK024O	34	
5	MAK005O	15	MAK015O	25	MAK006OMS	35	
6	MAK006O	16	MAK016O	26	MAK006OMSD	36	
7	MAK021O	17	MAK017O	27	MAK007OMS	37	
8	MAK008O	18	MAK018O	28	MAK007OMSD	38	
9	MAK009O	19	MAK019O	29		39	
10	MAK010O	20	MAK020O	30		40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 27, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Chlorinated Pesticides
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006555/006556

Sample Identification

MAK001O	MAK007O
MAK002O	MAK022O
MAK003O	MAK023O
MAK004O	MAK024O
MAK005O	MAK006OMS
MAK006O	MAK006OMSD
MAK021O	MAK007OMS
MAK008O	MAK007OMSD
MAK009O	
MAK010O	
MAK011O	
MAK012O	
MAK013O	
MAK014O	
MAK015O	
MAK016O	
MAK017O	
MAK018O	
MAK019O	
MAK020O	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081B for Chlorinated Pesticides.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration

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.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not reviewed in this SDG.

XI. GPC Calibration

GPC cleanup was not reviewed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Chlorinated Pesticides - Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG
006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG
006555/006556**

No Sample Data Qualified in this SDG

LDC #: 31509A3a
 SDG #: 006555/006556
 Laboratory: ARDL, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 3/26/14
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081B)

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.	Technical holding times	Δ	Sampling dates: 9/9/13 - 9/27/13
II.	GC Instrument Performance Check	Δ	% PSD P
III.	Initial calibration	Δ	% PSD ≤ 20
IV.	Continuing calibration/ICV	Δ	ICV/CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	Δ	LC5
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	Δ	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:

T. [Signature]

1	MAK0010	11	MAK0110	21	MAK0070	31	B10112
2	MAK0020	12	MAK0120	22	MAK0220	32	B10114
3	MAK0030	13	MAK0130	23	MAK0230	33	
4	MAK0040	14	MAK0140	24	MAK0240	34	
5	MAK0050	15	MAK0150	25	MAK006OMS	35	
6	MAK0060	16	MAK0160	26	MAK006OMSD	36	
7	MAK0210	17	MAK0170	27	MAK007OMS	37	
8	MAK0080	18	MAK0180	28	MAK007OMSD	38	
9	MAK0090	19	MAK0190	29		39	
10	MAK0100	20	MAK0200	30		40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 27, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Explosives
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006555/006556

Sample Identification

MAK001O	MAK007O
MAK002O	MAK022O
MAK003O	MAK023O
MAK004O	MAK024O
MAK005O	MAK006OMS
MAK006O	MAK006OMSD
MAK021O	MAK007OMS
MAK008O	MAK007OMS
MAK009O	MAK007OMS
MAK010O	
MAK011O	
MAK012O	
MAK013O	
MAK014O	
MAK015O	
MAK016O	
MAK017O	
MAK018O	
MAK019O	
MAK020O	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330A for Explosives.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) 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 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

V. Surrogate Recovery

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

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

IX. Compound Quantitation

Raw data were not reviewed for this SDG.

X. System Performance

Raw data were not reviewed for this SDG.

XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XII. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Explosives - Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Laboratory Blank Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Field Blank Data Qualification Summary - SDG 006555/006556**

No Sample Data Qualified in this SDG

LDC #: 31509A40

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006555/006556

Level III

Laboratory: ARDL, Inc.

Date: 3/25/14

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/9 - 9/27/13
II.	Initial calibration	A	% PSD ≤ 20
III.	Calibration verification/ICV	A	ICV/CCV ≤ 15
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	ccs
VIII.	Target compound identification	N	
IX.	Compound quantitation/RL/LOQ/LODs	N	
X.	System Performance	N	
XI.	Overall assessment of data	A	
XII.	Field duplicates	N	
XIII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK0010	11	MAK0110	21	MAK0070	31	B6638
2	MAK0020	12	MAK0120	22	MAK0220	32	B6637
3	MAK0030	13	MAK0130	23	MAK0230	33	
4	MAK0040	14	MAK0140	24	MAK0240	34	
5	MAK0050	15	MAK0150	25	MAK006OMS	35	
6	MAK0060	16	MAK0160	26	MAK006OMSD	36	
7	MAK0210	17	MAK0170	27	MAK007OMS	37	
8	MAK0080	18	MAK0180	28	MAK007OMSD	38	
9	MAK0090	19	MAK0190	29		39	
10	MAK0100	20	MAK0200	30		40	

Notes: All- reported RDX, nitroglycerine + 2,4-D^NDT only

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 23, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Volatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006557/006558

Sample Identification

MAK001C	MAK029C
MAK002C	MAK030C
MAK004C	MAK031C
MAK005C	MAK028C
MAK006C	MAK032CMS
MAK007C	MAK032CMSD
MAK008C	MAK030CMS
MAK009C	MAK030CMSD
MAK010C	
MAK014C	
MAK015C	
MAK018C	
MAK019C	
MAK020C	
MAK022C	
MAK024C	
MAK025C	
MAK026C	
MAK027C	
MAK032C	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The laboratory indicated sample Trip Blank was received frozen and all vials shattered, therefore no results were provided.

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Volatiles - Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Volatiles - Laboratory Blank Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Volatiles - Field Blank Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

LDC #: 31509B1
 SDG #: 006557/006558
 Laboratory: ARDL, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 3/25/14
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

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.	Technical holding times	Δ	Sampling dates: 9/9/13 - 9/23/13
II.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	Δ	% RSD ≤ 15
IV.	Continuing calibration/ICV	A	10N/10W ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	Δ	LC
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	Laboratory indicated TB samples arrived frozen and shattered; therefore, no sample results are provided.
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples:
Rune

1	MAK001C	11	MAK015C	21	MAK029C	31	1203JFSW
2	MAK002C	12	MAK018C	22	MAK030C	32	1203JFSX
3	MAK004C	13	MAK019C	23	MAK031C	33	
4	MAK005C	14	MAK020C	24	MAK028C	34	
5	MAK006C	15	MAK022C	25	MAK032CMS	35	
6	MAK007C	16	MAK024C	26	MAK032CMSD	36	
7	MAK008C	17	MAK025C	27	MAK030CMS	37	
8	MAK009C	18	MAK026C	28	MAK030CMSD	38	
9	MAK010C	19	MAK027C	29		39	
10	MAK014C	20	MAK032C	30		40	

All - CE, EE, PRR, FF, SSS + DDD only

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 23, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Semivolatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006557/006558

Sample Identification

MAK001C	MAK029C
MAK002C	MAK030C
MAK004C	MAK031C
MAK005C	MAK028C
MAK006C	MAK032CMS
MAK007C	MAK032CMSD
MAK008C	MAK030CMS
MAK009C	MAK030CMSD
MAK010C	
MAK014C	
MAK015C	
MAK018C	
MAK019C	
MAK020C	
MAK022C	
MAK024C	
MAK025C	
MAK026C	
MAK027C	
MAK032C	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the validation criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Semivolatiles - Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG
006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Semivolatiles - Field Blank Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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.	Technical holding times	A	Sampling dates: <u>9/9/13 - 9/23/13</u>
II.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	Δ	<u>% PSD ≤ 15</u>
IV.	Continuing calibration/ICV	Δ	<u>104/cov ≤ 20</u>
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	<u>105</u>
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001C	11	MAK015C	21	MAK029C	31	<u>B6634</u>
2	MAK002C	12	MAK018C	22	MAK030C	32	<u>B6635</u>
3	MAK004C	13	MAK019C	23	MAK031C	33	
4	MAK005C	14	MAK020C	24	MAK028C	34	
5	MAK006C	15	MAK022C	25	MAK032CMS	35	
6	MAK007C	16	MAK024C	26	MAK032CMSD	36	
7	MAK008C	17	MAK025C	27	MAK030CMS	37	
8	MAK009C	18	MAK026C	28	MAK030CMSD	38	
9	MAK010C	19	MAK027C	29		39	
10	MAK014C	20	MAK032C	30		40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 23, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Chlorinated Pesticides
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006557/006558

Sample Identification

MAK001C	MAK029C
MAK002C	MAK030C
MAK004C	MAK031C
MAK005C	MAK028C
MAK006C	MAK032CMS
MAK007C	MAK032CMSD
MAK008C	MAK030CMS
MAK009C	MAK030CMSD
MAK010C	
MAK014C	
MAK015C	
MAK018C	
MAK019C	
MAK020C	
MAK022C	
MAK024C	
MAK025C	
MAK026C	
MAK027C	
MAK032C	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081B for Chlorinated Pesticides.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration

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.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not reviewed in this SDG.

XI. GPC Calibration

GPC cleanup was not reviewed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Chlorinated Pesticides - Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG
006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG
006557/006558**

No Sample Data Qualified in this SDG

LDC #: 31509B3a
 SDG #: 006557/006558
 Laboratory: ARDL, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III

Date: 3/26/14
 Page: 1 of 1
 Reviewer: FJ
 2nd Reviewer: A

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081B)

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.	Technical holding times	Δ	Sampling dates: 9/9 - 9/23/13
II.	GC Instrument Performance Check	Δ	
III.	Initial calibration	Δ	% PSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:
 Tissue

1	MAK001C	11	MAK015C	21	MAK029C	31	B10109
2	MAK002C	12	MAK018C	22	MAK030C	32	B10110
3	MAK004C	13	MAK019C	23	MAK031C	33	
4	MAK005C	14	MAK020C	24	MAK028C	34	
5	MAK006C	15	MAK022C	25	MAK032CMS	35	
6	MAK007C	16	MAK024C	26	MAK032CMSD	36	
7	MAK008C	17	MAK025C	27	MAK030CMS	37	
8	MAK009C	18	MAK026C	28	MAK030CMSD	38	
9	MAK010C	19	MAK027C	29		39	
10	MAK014C	20	MAK032C	30		40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 23, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Explosives
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006557/006558

Sample Identification

MAK001C	MAK029C
MAK002C	MAK030C
MAK004C	MAK031C
MAK005C	MAK028C
MAK006C	MAK032CMS
MAK007C	MAK032CMSD
MAK008C	MAK030CMS
MAK009C	MAK030CMSD
MAK010C	
MAK014C	
MAK015C	
MAK018C	
MAK019C	
MAK020C	
MAK022C	
MAK024C	
MAK025C	
MAK026C	
MAK027C	
MAK032C	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330A for Explosives.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

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 .

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

V. Surrogate Recovery

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

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

IX. Compound Quantitation

Raw data were not reviewed for this SDG.

X. System Performance

Raw data were not reviewed for this SDG.

XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XII. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Explosives - Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Laboratory Blank Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Field Blank Data Qualification Summary - SDG 006557/006558**

No Sample Data Qualified in this SDG

LDC #: 31509B40
 SDG #: 006557/006558
 Laboratory: ARDL, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III

Date: 3/25/14
 Page: 1 of 1
 Reviewer: FJ
 2nd Reviewer: [Signature]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

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

	Validation Area		Comments
I.	Technical holding times	Δ	Sampling dates: 9/9 → 9/23/13
II	Initial calibration	Δ	v ²
III.	Calibration verification/ICV	Δ	1cy/cov = 15
IV.	Blanks	Δ	
V	Surrogate recovery	Δ	
VI.	Matrix spike/Matrix spike duplicates	Δ	
VII.	Laboratory control samples	A	LC3
VIII.	Target compound identification	N	
IX.	Compound quantitation/RL/LOQ/LODs	N	
X.	System Performance	N	
XI.	Overall assessment of data	Δ	
XII.	Field duplicates	N	
XIII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001C	11	MAK015C	21	MAK029C	31	B6641
2	MAK002C	12	MAK018C	22	MAK030C	32	B6642
3	MAK004C	13	MAK019C	23	MAK031C	33	
4	MAK005C	14	MAK020C	24	MAK028C	34	
5	MAK006C	15	MAK022C	25	MAK032CMS	35	
6	MAK007C	16	MAK024C	26	MAK032CMSD	36	
7	MAK008C	17	MAK025C	27	MAK030CMS	37	
8	MAK009C	18	MAK026C	28	MAK030CMSD	38	
9	MAK010C	19	MAK027C	29		39	
10	MAK014C	20	MAK032C	30		40	

Notes: All - reported PDX, nitroglycerine, + 2,4-DNT only

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 16 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Volatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006562/006563

Sample Identification

MAK001L/2L/26L	MAK044L
MAK007L	MAK045L
MAK009L	MAK046L
MAK010L(COMP)	MAK049L
MAK011L	MAK047LMS
MAK013L	MAK047LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK047L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MAK047LMS/MSD (MAK047L)	Styrene	55 (79-127)	29.2 (79-127)	61.3 (≤ 25)	J (all detects) UJ (all non-detects)	A
MAK049LMS/MSD (MAK049L)	Styrene	44.4 (79-127)	38.3 (79-127)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The laboratory indicated sample Trip Blank was received frozen and all vials shattered, therefore no results were provided.

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Volatiles - Data Qualification Summary - SDG 006562/006563**

SDG	Sample	Compound	Flag	A or P	Reason
006562/ 006563	MAK047L	Styrene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD)
006562/ 006563	MAK049L	Styrene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

**Makua Military Reservation
Volatiles - Laboratory Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Volatiles - Field Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

LDC #: 31509C1

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006562/006563

Level III

Laboratory: ARDL, Inc.

Date: 3/25/11

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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.	Technical holding times	Δ	Sampling dates: 9/16 — 10/15/13
II.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	Δ	% RSD ≤ 15
IV.	Continuing calibration/ICV	Δ	1CV / CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LC5
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Δ	Laboratory indicated TB samples arrived frozen and shattered; therefore, no sample results are provided
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: *Tissue*

1	MAK001L/2L/26L	11	MAK025L	21	MAK044L	31	1204JFSA
2	MAK007L	12	MAK047L	22	MAK045L	32	1203JFSZ
3	MAK009L	13	MAK029L	23	MAK046L	33	1204JFSB
4	MAK010L(COMP)	14	MAK030L	24	MAK049L	34	
5	MAK011L	15	MAK033L	25	MAK047LMS	35	
6	MAK013L	16	MAK034L	26	MAK047LMSD	36	
7	MAK016L/21L/27L	17	MAK038L	27	MAK049LMS	37	
8	MAK022L	18	MAK041L	28	MAK049LMSD	38	
9	MAK023L	19	MAK042L	29		39	
10	MAK024L/25L	20	MAK043L	30		40	

All- CC, EB, RRR, FF, SSS & DDD only

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl chloride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 31509C1

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1

Reviewer: FT

2nd Reviewer: [Signature]

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

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?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	<u>26 + 26</u>	<u>FF</u>	<u>55 (79-127)</u>	<u>29.2 (79-127)</u>	<u>61.3 (25)</u>	<u>12</u>	<u>J/uJ/A</u>
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
	<u>27 + 28</u>	<u>FF</u>	<u>44.4 (79-127)</u>	<u>38.3 (79-127)</u>	()	<u>24</u>	<u>J/uJ/A</u>
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		
			()	()	()		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	< 22%	61-145%	< 14%
S.	Trichloroethene	62-137%	< 24%	71-120%	< 14%
V.	Benzene	66-142%	< 21%	76-127%	< 11%
CC.	Toluene	59-139%	< 21%	76-125%	< 13%
DD.	Chlorobenzene	60-133%	< 21%	75-130%	< 13%

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 16 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Semivolatiles
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006562/006563

Sample Identification

MAK001L/2L/26L	MAK044L
MAK007L	MAK045L
MAK009L	MAK046L
MAK010L(COMP)	MAK049L
MAK011L	MAK047LMS
MAK013L	MAK047LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK047L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the validation criteria of less than or equal to 20.0% for all compounds.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MAK049LMS/MSD (MAK049L)	Di-n-butylphthalate	-	50.8 (54-118)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Semivolatiles - Data Qualification Summary - SDG 006562/006563**

SDG	Sample	Compound	Flag	A or P	Reason
006562/ 006563	MAK049L	Di-n-butylphthalate	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

**Makua Military Reservation
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG
006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Semivolatiles - Field Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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.	Technical holding times	Δ	Sampling dates: 9/16 - 9/27/13, 10/15/13
II.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	Δ	% PSD ≤ 15
IV.	Continuing calibration/ICV	A	100/CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	Δ	LC3
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Δ	
XVI.	Field duplicates	N N	
XVII.	Field blanks		

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

Validated Samples:

Tissue

1	MAK001L/2L/26L	11	MAK025L	21	MAK044L	31	B10129
2	MAK007L	12	MAK047L	22	MAK045L	32	B10131
3	MAK009L	13	MAK029L	23	MAK046L	33	
4	MAK010L(COMP)	14	MAK030L	24	MAK049L	34	
5	MAK011L	15	MAK033L	25	MAK047LMS	35	
6	MAK013L	16	MAK034L	26	MAK047LMSD	36	
7	MAK016L/21L/27L	17	MAK038L	27	MAK049LMS	37	
8	MAK022L	18	MAK041L	28	MAK049LMSD	38	
9	MAK023L	19	MAK042L	29		39	
10	MAK024L/25L	20	MAK043L	30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	T. 4-Chloroaniline	MM. 4-Chlorophenyl-phenyl ether	FFF. Di-n-octylphthalate	YYY. 2,3,5-Trimethylnaphthalene
B. Bis (2-chloroethyl) ether	U. Hexachlorobutadiene	NN. Fluorene	GGG. Benzo(b)fluoranthene	ZZZ. Perylene
C. 2-Chlorophenol	V. 4-Chloro-3-methylphenol	OO. 4-Nitroaniline	HHH. Benzo(k)fluoranthene	AAAA. Dibenzothiophene
D. 1,3-Dichlorobenzene	W. 2-Methylnaphthalene	PP. 4,6-Dinitro-2-methylphenol	III. Benzo(a)pyrene	BBBB. Benzo(a)fluoranthene
E. 1,4-Dichlorobenzene	X. Hexachlorocyclopentadiene	QQ. N-Nitrosodiphenylamine	JJJ. Indeno(1,2,3-cd)pyrene	CCCC. Benzo(b)fluorene
F. 1,2-Dichlorobenzene	Y. 2,4,6-Trichlorophenol	RR. 4-Bromophenyl-phenylether	KKK. Dibenz(a,h)anthracene	DDDD. cis/trans-Decalin
G. 2-Methylphenol	Z. 2,4,5-Trichlorophenol	SS. Hexachlorobenzene	LLL. Benzo(g,h,i)perylene	EEEE. Biphenyl
H. 2,2'-Oxybis(1-chloropropane)	AA. 2-Chloronaphthalene	TT. Pentachlorophenol	MMM. Bis(2-Chloroisopropyl)ether	FFFF. Retene
I. 4-Methylphenol	BB. 2-Nitroaniline	UU. Phenanthrene	NNN. Aniline	GGGG. C30-Hopane
J. N-Nitroso-di-n-propylamine	CC. Dimethylphthalate	VV. Anthracene	OOO. N-Nitrosodimethylamine	HHHH. 1-Methylphenanthrene
K. Hexachloroethane	DD. Acenaphthylene	WW. Carbazole	PPP. Benzoic Acid	IIII. 1,4-Dioxane
L. Nitrobenzene	EE. 2,6-Dinitrotoluene	XX. Di-n-butylphthalate	QQQ. Benzyl alcohol	JJJJ. Acetophenone
M. Isophorone	FF. 3-Nitroaniline	YY. Fluoranthene	RRR. Pyridine	KKKK. Atrazine
N. 2-Nitrophenol	GG. Acenaphthene	ZZ. Pyrene	SSS. Benzidine	LLLL. Benzaldehyde
O. 2,4-Dimethylphenol	HH. 2,4-Dinitrophenol	AAA. Butylbenzylphthalate	TTT. 1-Methylnaphthalene	MMMM. Caprolactam
P. Bis(2-chloroethoxy)methane	II. 4-Nitrophenol	BBB. 3,3'-Dichlorobenzidine	UUU. Benzo(b)thiophene	NNNN.
Q. 2,4-Dichlorophenol	JJ. Dibenzofuran	CCC. Benzo(a)anthracene	VVV. Benzonaphthothiophene	OOOO.
R. 1,2,4-Trichlorobenzene	KK. 2,4-Dinitrotoluene	DDD. Chrysene	WWW. Benzo(e)pyrene	PPPP.
S. Naphthalene	LL. Diethylphthalate	EEE. Bis(2-ethylhexyl)phthalate	XXX. 2,6-Dimethylnaphthalene	QQQQ.

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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
		27 & 28	XX	()	90.8 (54-118)	()	24	J/MS/A
				()	()	()		
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 16 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: 2,4-Dinitrotoluene
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006562/006563

Sample Identification

MAK001L/2L/26L	MAK044L
MAK007L	MAK045L
MAK009L	MAK046L
MAK010L(COMP)	MAK049L
MAK011L	
MAK013L	
MAK016L/21L/27L	
MAK022L	
MAK023L	
MAK024L/25L	
MAK025L	
MAK047L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	

Introduction

This data review covers 24 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270SP for 2,4-Dinitrotoluene.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0%.

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the validation criteria of less than or equal to 20.0%.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0%.

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No 2,4-dinitrotoluene was found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
2,4-Dinitrotoluene - Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
2,4-Dinitrotoluene - Laboratory Blank Data Qualification Summary - SDG
006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
2,4-Dinitrotoluene - Field Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

LDC #: 31509C2b

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006562/006563

Level III

Laboratory: ARDL, Inc.

Date: 3/26/14

Page: 1 of 1

Reviewer: F7

2nd Reviewer: E

METHOD: GC/MS 2, 4 Dinitrotoluene (EPA SW 846 Method 8270^{SP})
e F7
SP

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.	Technical holding times	Δ	Sampling dates: 9/16 - 10/15/13
II.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	A	% PSD ≤ 15
IV.	Continuing calibration/ICV	Δ	ICV/CW ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	NA	
VIII.	Laboratory control samples	A	ICS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Δ	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples:

1	MAK001L/2L/26L	11	MAK025L	21	MAK044L	31	B6664
2	MAK007L	12	MAK047L	22	MAK045L	32	B6665
3	MAK009L	13	MAK029L	23	MAK046L	33	
4	MAK010L(COMP)	14	MAK030L	24	MAK049L	34	
5	MAK011L	15	MAK033L	25		35	
6	MAK013L	16	MAK034L	26		36	
7	MAK016L/21L/27L	17	MAK038L	27		37	
8	MAK022L	18	MAK041L	28		38	
9	MAK023L	19	MAK042L	29		39	
10	MAK024L/25L	20	MAK043L	30		40	

note: Analyte was not spike in the ICS, MS/D.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 16 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Chlorinated Pesticides
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006562/006563

Sample Identification

MAK001L/2L/26L	MAK044L
MAK007L	MAK045L
MAK009L	MAK046L
MAK010L(COMP)	MAK049L
MAK011L	MAK047LMS
MAK013L	MAK047LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK047L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081B for Chlorinated Pesticides.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration

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.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MAK047LMS/MSD (MAK047L)	delta-BHC	140.6 (48-118)	129.9 (48-118)	-	J (all detects)	A
MAK049LMS/MSD (MAK049L)	delta-BHC 4,4'-DDT beta-BHC	172.7 (48-118) - 142.3 (50-111)	142.4 (48-118) - -	- 39.3 (≤25) 37.4 (≤25)	J (all detects) J (all detects) J (all detects)	A
MAK049LMS/MSD (MAK049L)	Heptachlor	-	50.9 (52-114)	32.1 (≤25)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not reviewed in this SDG.

XI. GPC Calibration

GPC cleanup was not reviewed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Chlorinated Pesticides - Data Qualification Summary - SDG 006562/006563**

SDG	Sample	Compound	Flag	A or P	Reason
006562/ 006563	MAK047L MAK049L	delta-BHC	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
006562/ 006563	MAK049L	4,4'-DDT	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD)
006562/ 006563	MAK049L	beta-BHC	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD)
006562/ 006563	MAK049L	Heptachlor	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD)

**Makua Military Reservation
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG
006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG
006562/006563**

No Sample Data Qualified in this SDG

LDC #: 31509C3a

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006562/006563

Level III

Laboratory: ARDL, Inc.

Date: 3/26/14

Page: 1 of 1

Reviewer: *F*2nd Reviewer: *A***METHOD:** GC Chlorinated Pesticides (EPA SW 846 Method 8081B)

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.	Technical holding times	A	Sampling dates: 9/27 9/16 - 10/15/13
II.	GC Instrument Performance Check	Δ	
III.	Initial calibration	Δ	% PSD ≤ 20
IV.	Continuing calibration/ICV	Δ	ICV/CCV ≤ 20
V.	Blanks	Δ	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LC>
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	Δ	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:

1	MAK001L/2L/26L	11	MAK025L	21	MAK044L	31	B10130
2	MAK007L	12	MAK047L	22	MAK045L	32	B10132
3	MAK009L	13	MAK029L	23	MAK046L	33	
4	MAK010L(COMP)	14	MAK030L	24	MAK049L	34	
5	MAK011L	15	MAK033L	25	MAK047LMS	35	
+	6	MAK013L	16	MAK034L	26	MAK047LMSD	36
+	7	MAK016L/21L/27L	17	MAK038L	27	MAK049LMS	37
8	MAK022L	18	MAK041L	28	MAK049LMSD	38	
9	MAK023L	19	MAK042L	29		39	
10	MAK024L/25L	20	MAK043L	30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II. Aroclor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK. Oxychlordane
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL. trans-Nonachlor
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM. cis-Nonachlor
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Explosives
Validation Level: EPA Level III
Laboratory: ARDL, Inc.
Sample Delivery Group (SDG): 006562/006563

Sample Identification

MAK001L/2L/26L	MAK044L
MAK007L	MAK045L
MAK009L	MAK046L
MAK010L(COMP)	MAK049L
MAK011L	MAK047LMS
MAK013L	MAK047LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK047L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330A for Explosives.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

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 .

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

V. Surrogate Recovery

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

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

IX. Compound Quantitation

Raw data were not reviewed for this SDG.

X. System Performance

Raw data were not reviewed for this SDG.

XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XII. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Explosives - Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Laboratory Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Explosives - Field Blank Data Qualification Summary - SDG 006562/006563**

No Sample Data Qualified in this SDG

LDC #: 31509C40

VALIDATION COMPLETENESS WORKSHEET

SDG #: 006562/006563

Level III

Laboratory: ARDL, Inc.

Date: 3/25/14

Page: 1 of 1

Reviewer: F7

2nd Reviewer: [Signature]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/9/13 → 10/15/13
II.	Initial calibration	A	12
III.	Calibration verification/ICV	A	ICV/CCV ≤ 15
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Target compound identification	N	
IX.	Compound quantitation/RL/LOQ/LODs	N	
X.	System Performance	N	
XI.	Overall assessment of data	A	
XII.	Field duplicates	N	
XIII.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001L/2L/26L	11	MAK025L	21	MAK044L	31	B10128
2	MAK007L	12	MAK047L	22	MAK045L	32	B10133
3	MAK009L	13	MAK029L	23	MAK046L	33	
4	MAK010L(COMP)	14	MAK030L	24	MAK049L	34	
5	MAK011L	15	MAK033L	25	MAK047LMS	35	
6	MAK013L	16	MAK034L	26	MAK047LMSD	36	
7	MAK016L/21L/27L	17	MAK038L	27	MAK049LMS	37	
8	MAK022L	18	MAK041L	28	MAK049LMSD	38	
9	MAK023L	19	MAK042L	29		39	
10	MAK024L/25L	20	MAK043L	30		40	

Notes: All reported RDX + Nitroglycerine only

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 11, 2013
LDC Report Date: June 9, 2014
Matrix: Tissue
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Pace Analytical Services, Inc.
Sample Delivery Group (SDG): 10247058

Sample Identification

MAK001C
MAK002C
MAK004C
MAK005C
MAK006C
MAK007C
MAK008C
MAK009C
MAK001CMS
MAK001CMSD

Introduction

This data review covers 10 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
BLANK-38270	10/31/13	2,3,7,8-TCDF Total TCDF Total TCDD Total HpCDD OCDF OCDD	0.092 ng/Kg 0.092 ng/Kg 0.420 ng/Kg 0.220 ng/Kg 0.480 ng/Kg 1.400 ng/Kg	All samples in SDG 10247058

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

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK001C	2,3,7,8-TCDF OCDF OCDD	0.100 ng/Kg 0.52 ng/Kg 3.70 ng/Kg	0.100U ng/Kg 0.52U ng/Kg 3.70U ng/Kg
MAK002C	2,3,7,8-TCDF OCDF OCDD	0.075 ng/Kg 0.270 ng/Kg 1.100 ng/Kg	0.075U ng/Kg 0.270U ng/Kg 1.100U ng/Kg
MAK004C	2,3,7,8-TCDF OCDD	0.069 ng/Kg 1.300 ng/Kg	0.069U ng/Kg 1.300U ng/Kg
MAK005C	OCDF OCDD	0.25 ng/Kg 1.30 ng/Kg	0.25U ng/Kg 1.30U ng/Kg
MAK006C	2,3,7,8-TCDF OCDF OCDD	0.079 ng/Kg 0.230 ng/Kg 1.300 ng/Kg	0.079U ng/Kg 0.230U ng/Kg 1.300U ng/Kg
MAK007C	OCDF OCDD	0.27 ng/Kg 1.40 ng/Kg	0.27U ng/Kg 1.40U ng/Kg
MAK008C	2,3,7,8-TCDF OCDD	0.091 ng/Kg 0.870 ng/Kg	0.091U ng/Kg 0.870U ng/Kg
MAK009C	2,3,7,8-TCDF Total TCDF OCDF OCDD	0.100 ng/Kg 0.100 ng/Kg 0.18 ng/Kg 0.970 ng/Kg	0.100U ng/Kg 0.100J ng/Kg 0.18U ng/Kg 0.970U ng/Kg

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within the QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Associated Compounds	Flag	A or P
MAK001CMS/MSD (MAK001C)	1,2,3,6,7,8-HxCDD OCDF	132 (70-130) 131 (70-130)	-	-	1,2,3,6,7,8-HxCDD Total HxCDD OCDF	J (all detects) J (all detects) J (all detects)	A

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within the QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Dioxins/Dibenzofurans - Data Qualification Summary - SDG 10247058**

SDG	Sample	Compound	Flag	A or P	Reason
10247058	MAK001C	1,2,3,6,7,8-HxCDD Total HxCDD OCDF	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)

**Makua Military Reservation
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 10247058**

SDG	Sample	Compound	Modified Final Concentration	A or P
10247058	MAK001C	2,3,7,8-TCDF OCDF OCDD	0.100U ng/Kg 0.52U ng/Kg 3.70U ng/Kg	A
10247058	MAK002C	2,3,7,8-TCDF OCDF OCDD	0.075U ng/Kg 0.270U ng/Kg 1.100U ng/Kg	A
10247058	MAK004C	2,3,7,8-TCDF OCDD	0.069U ng/Kg 1.300U ng/Kg	A
10247058	MAK005C	OCDF OCDD	0.25U ng/Kg 1.30U ng/Kg	A
10247058	MAK006C	2,3,7,8-TCDF OCDF OCDD	0.079U ng/Kg 0.230U ng/Kg 1.300U ng/Kg	A
10247058	MAK007C	OCDF OCDD	0.27U ng/Kg 1.40U ng/Kg	A
10247058	MAK008C	2,3,7,8-TCDF OCDD	0.091U ng/Kg 0.870U ng/Kg	A
10247058	MAK009C	2,3,7,8-TCDF Total TCDF OCDF OCDD	0.100U ng/Kg 0.100J ng/Kg 0.18U ng/Kg 0.970U ng/Kg	A

**Makua Military Reservation
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 10247058**

No Sample Data Qualified in this SDG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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.	Technical holding times	A	Sampling dates: 9/9/13 → 9/11/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤20/35
IV.	Continuing calibration/ ICV	A	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	SW	
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation/RL/LOQ/LODs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: tissue

1	MAK001C	11		21		31	
2	MAK002C	12		22		32	
3	MAK004C	13		23		33	
4	MAK005C	14		24		34	
5	MAK006C	15		25		35	
6	MAK007C	16		26		36	
7	MAK008C	17		27		37	
8	MAK009C	18		28		38	
9	MAK001CMS	19		29		39	
10	MAK001CMSD	20	BLANK-38270	30		40	

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

N N/A Were all samples associated with a method blank?

N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

N N/A Was the method blank contaminated?

Blank extraction date: 10/31/13 Blank analysis date: 11/05/13 Associated samples: All Qual U/Qual J

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification								
		5x	1	2	3	4	5	6	7	8
	BLANK-38270									
H	0.092	0.460	0.100* U	0.075* U	0.069* U		0.079* U		0.091* U	0.100 U
V	0.092	--								0.100 U J
R	0.420	--								
U	0.220	--								
Q	0.480	2.40	0.52 U	0.270* U		0.25 U	0.230* U	0.27 U		0.18* U
G	1.400	7.00	3.70 U	1.100* U	1.300 U	1.30 U	1.300* U	1.40 U	0.870* U	0.970 U

*EMPC

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 11, 2013
LDC Report Date: June 6, 2014
Matrix: Tissue
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Pace Analytical Services, Inc.
Sample Delivery Group (SDG): 10247062

Sample Identification

MAK001O
MAK002O
MAK003O
MAK004O
MAK005O
MAK006O
MAK007O
MAK008O
MAK006OMS
MAK006OMSD

Introduction

This data review covers 10 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
BLANK-38270	10/31/13	2,3,7,8-TCDF Total TCDF Total TCDD Total HpCDD OCDF OCDD	0.092 ng/Kg 0.092 ng/Kg 0.420 ng/Kg 0.220 ng/Kg 0.480 ng/Kg 1.400 ng/Kg	All samples in SDG 10247062

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

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK001O	2,3,7,8-TCDF Total TCDF OCDD	0.073 ng/Kg 0.064 ng/Kg 1.800 ng/Kg	0.073U ng/Kg 0.064J ng/Kg 1.800U ng/Kg
MAK002O	OCDD	2.0 ng/Kg	2.0U ng/Kg
MAK003O	2,3,7,8-TCDF Total TCDF OCDD	0.097 ng/Kg 0.097 ng/Kg 2.10 ng/Kg	0.097U ng/Kg 0.097J ng/Kg 2.10U ng/Kg
MAK004O	OCDD	2.000 ng/Kg	2.00U ng/Kg
MAK005O	2,3,7,8-TCDF Total TCDF OCDD	0.085 ng/Kg 0.170 ng/Kg 2.900 ng/Kg	0.085U ng/Kg 0.170J ng/Kg 2.900U ng/Kg
MAK006O	OCDD	1.80 ng/Kg	1.80U ng/Kg
MAK007O	2,3,7,8-TCDF Total TCDF OCDD	0.091 ng/Kg 0.160 ng/Kg 1.90 ng/Kg	0.091U ng/Kg 0.160J ng/Kg 1.90U ng/Kg

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within the QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Dioxins/Dibenzofurans - Data Qualification Summary - SDG 10247062**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 10247062**

SDG	Sample	Compound	Modified Final Concentration	A or P
10247062	MAK001O	2,3,7,8-TCDF Total TCDF OCDD	0.073U ng/Kg 0.064J ng/Kg 1.800U ng/Kg	A
10247062	MAK002O	OCDD	2.0U ng/Kg	A
10247062	MAK003O	2,3,7,8-TCDF Total TCDF OCDD	0.097U ng/Kg 0.097J ng/Kg 2.10U ng/Kg	A
10247062	MAK004O	OCDD	2.00U ng/Kg	A
10247062	MAK005O	2,3,7,8-TCDF Total TCDF OCDD	0.085U ng/Kg 0.170J ng/Kg 2.900U ng/Kg	A
10247062	MAK006O	OCDD	1.80U ng/Kg	A
10247062	MAK007O	2,3,7,8-TCDF Total TCDF OCDD	0.091U ng/Kg 0.160J ng/Kg 1.90U ng/Kg	A

**Makua Military Reservation
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 10247062**

No Sample Data Qualified in this SDG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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.	Technical holding times	A	Sampling dates: 9/9/13 → 9/11/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Continuing calibration/±CV-	A	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	N	
XI.	Compound quantitation/RL/LOQ/LODs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: *tissue*

1	MAK001O	11		21		31	
2	MAK002O	12		22		32	
3	MAK003O	13		23		33	
4	MAK004O	14		24		34	
5	MAK005O	15		25		35	
6	MAK006O	16		26		36	
7	MAK007O	17		27		37	
8	MAK008O	18		28		38	
9	MAK006OMS	19		29		39	
10	MAK006OMSD	20	<i>BLANK-38270</i>	30		40	

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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 method blank?

Y **N** **N/A** Was a method blank performed for each matrix and whenever a sample extraction was performed?

Y **N** **N/A** Was the method blank contaminated?

Blank extraction date: 10/31/13 Blank analysis date: 11/05/13 Associated samples: All Qual U/*Qual J*

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification								
		5x	1	2	3	4	5	6	7	
	BLANK-38270									
H	0.092	0.460	0.073*U		0.097U		0.085U		0.091U	
V	0.092	--	0.064J		0.097U <i>J</i>		0.170J		0.160J	
R	0.420	--								
U	0.220	--								
Q	0.480	2.40								
G	1.400	7.00	1.800*U	2.0*U	2.100U	2.00*U	2.900U	1.80U	1.90*U	

*EMPC

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".

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y (N/A) Are all internal standard recoveries were within the QC criteria?

Y N (N/A) Was the S/N ratio all internal standard peaks ≥ 10 ?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit)	Qualifications
		9 ↓	N C D O P	25 (29-147) 28 (32-141) 24 (28-130) 24 (28-143) 24 (26-138)	No qual - MS ↓

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Makua Military Reservation
Collection Date: September 13 through September 27, 2013
LDC Report Date: July 24, 2014
Matrix: Tissue
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Pace Analytical Services, Inc.
Sample Delivery Group (SDG): 10247063

Sample Identification

MAK009O
MAK010O
MAK011O
MAK012O
MAK013O
MAK014O
MAK015O
MAK016O
MAK017O
MAK018O
MAK019O
MAK020O
MAK021O
MAK022O
MAK023O
MAK024O
MAK024OMS
MAK024OMSD

Introduction

This data review covers 18 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
Blank-38307	11/4/13	2,3,7,8-TCDF Total TCDD 1,2,3,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.067 ng/Kg 0.420 ng/Kg 0.049 ng/Kg 0.050 ng/Kg 0.045 ng/Kg 0.064 ng/Kg 0.082 ng/Kg 0.069 ng/Kg 0.050 ng/Kg 0.069 ng/Kg 0.096 ng/Kg 0.072 ng/Kg 0.160 ng/Kg 0.160 ng/Kg 0.270 ng/Kg 0.340 ng/Kg 0.890 ng/Kg	All samples in SDG 10247063

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

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK0090	2,3,7,8-TCDF 2,3,4,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110 ng/Kg 0.048 ng/Kg 0.094 ng/Kg 0.047 ng/Kg 0.170 ng/Kg 0.084 ng/Kg 0.051 ng/Kg 0.140 ng/Kg 0.310 ng/Kg 0.410 ng/Kg 0.230 ng/Kg 1.800 ng/Kg	0.110U ng/Kg 0.048U ng/Kg 0.094U ng/Kg 0.047U ng/Kg 0.170J ng/Kg 0.084U ng/Kg 0.051U ng/Kg 0.140U ng/Kg 0.310U ng/Kg 0.410J ng/Kg 0.230U ng/Kg 1.800U ng/Kg
MAK0100	2,3,7,8-TCDF 1,2,3,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110 ng/Kg 0.067 ng/Kg 0.089 ng/Kg 0.089 ng/Kg 0.089 ng/Kg 0.210 ng/Kg 0.120 ng/Kg 0.290 ng/Kg 1.200 ng/Kg	0.110U ng/Kg 0.067U ng/Kg 0.089U ng/Kg 0.089U ng/Kg 0.089J ng/Kg 0.210U ng/Kg 0.120J ng/Kg 0.290U ng/Kg 1.200U ng/Kg
MAK0110	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.098 ng/Kg 0.180 ng/Kg 0.280 ng/Kg 0.280 ng/Kg 1.200 ng/Kg	0.098U ng/Kg 0.180U ng/Kg 0.280J ng/Kg 0.280U ng/Kg 1.200U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK0120	2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.090 ng/Kg 0.038 ng/Kg 0.050 ng/Kg 0.042 ng/Kg 0.120 ng/Kg 0.120 ng/Kg 0.170 ng/Kg 1.000 ng/Kg	0.090U ng/Kg 0.038U ng/Kg 0.050U ng/Kg 0.042U ng/Kg 0.120U ng/Kg 0.120J ng/Kg 0.170U ng/Kg 1.000U ng/Kg
MAK0130	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD Total HpCDF	0.086 ng/Kg 0.061 ng/Kg 0.240 ng/Kg 0.440 ng/Kg 0.260 ng/Kg 2.500 ng/Kg 0.069 ng/Kg	0.086U ng/Kg 0.061U ng/Kg 0.240U ng/Kg 0.440J ng/Kg 0.260U ng/Kg 2.500U ng/Kg 0.069J ng/Kg
MAK0140	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.063 ng/Kg 0.041 ng/Kg 0.072 ng/Kg 0.130 ng/Kg 0.240 ng/Kg 0.120 ng/Kg 0.950 ng/Kg	0.063U ng/Kg 0.041U ng/Kg 0.072J ng/Kg 0.130U ng/Kg 0.240J ng/Kg 0.120U ng/Kg 0.950U ng/Kg
MAK0150	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.065 ng/Kg 0.040 ng/Kg 0.088 ng/Kg 0.130 ng/Kg 0.130 ng/Kg 0.160 ng/Kg 0.860 ng/Kg	0.065U ng/Kg 0.040U ng/Kg 0.088J ng/Kg 0.130U ng/Kg 0.130J ng/Kg 0.160U ng/Kg 0.860U ng/Kg
MAK0160	2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.079 ng/Kg 0.032 ng/Kg 0.034 ng/Kg 0.049 ng/Kg 0.051 ng/Kg 0.064 ng/Kg 0.110 ng/Kg 0.180 ng/Kg 0.180 ng/Kg 0.200 ng/Kg 1.200 ng/Kg	0.079U ng/Kg 0.032U ng/Kg 0.034U ng/Kg 0.049U ng/Kg 0.051U ng/Kg 0.064U ng/Kg 0.110J ng/Kg 0.180U ng/Kg 0.180J ng/Kg 0.200U ng/Kg 1.200U ng/Kg
MAK0170	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.069 ng/Kg 0.045 ng/Kg 0.093 ng/Kg 0.091 ng/Kg 0.160 ng/Kg 0.880 ng/Kg	0.069U ng/Kg 0.045U ng/Kg 0.093J ng/Kg 0.091U ng/Kg 0.160U ng/Kg 0.880U ng/Kg
MAK0180	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.084 ng/Kg 0.041 ng/Kg 0.110 ng/Kg 0.110 ng/Kg 0.140 ng/Kg 0.880 ng/Kg	0.084U ng/Kg 0.041U ng/Kg 0.110U ng/Kg 0.110J ng/Kg 0.140U ng/Kg 0.880U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK019O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110 ng/Kg 0.043 ng/Kg 0.043 ng/Kg 0.100 ng/Kg 0.190 ng/Kg 0.17 ng/Kg 0.84 ng/Kg	0.110U ng/Kg 0.043U ng/Kg 0.043J ng/Kg 0.100U ng/Kg 0.190J ng/Kg 0.17U ng/Kg 0.84U ng/Kg
MAK020O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.092 ng/Kg 0.056 ng/Kg 0.099 ng/Kg 0.130 ng/Kg 0.220 ng/Kg 0.190 ng/Kg 0.870 ng/Kg	0.092U ng/Kg 0.056U ng/Kg 0.099J ng/Kg 0.130U ng/Kg 0.220J ng/Kg 0.190U ng/Kg 0.870U ng/Kg
MAK021O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.078 ng/Kg 0.049 ng/Kg 0.049 ng/Kg 0.098 ng/Kg 0.200 ng/Kg 0.180 ng/Kg 0.830 ng/Kg	0.078U ng/Kg 0.049U ng/Kg 0.049J ng/Kg 0.098U ng/Kg 0.200J ng/Kg 0.180U ng/Kg 0.830U ng/Kg
MAK022O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.075 ng/Kg 0.047 ng/Kg 0.047 ng/Kg 0.110 ng/Kg 0.220 ng/Kg 0.190 ng/Kg 0.780 ng/Kg	0.075U ng/Kg 0.047U ng/Kg 0.047J ng/Kg 0.110U ng/Kg 0.220J ng/Kg 0.190U ng/Kg 0.780U ng/Kg
MAK023O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.063 ng/Kg 0.100 ng/Kg 0.370 ng/Kg 0.230 ng/Kg 0.460 ng/Kg 1.400 ng/Kg 2.500 ng/Kg	0.063U ng/Kg 0.100U ng/Kg 0.370J ng/Kg 0.230U ng/Kg 0.460J ng/Kg 1.400U ng/Kg 2.500U ng/Kg
MAK024O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF OCDF OCDD	0.19 ng/Kg 0.11 ng/Kg 0.57 ng/Kg 4.10 ng/Kg	0.19U ng/Kg 0.11U ng/Kg 0.57U ng/Kg 4.10U ng/Kg

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within the QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
MAK009O MAK010O MAK012O MAK013O MAK018O MAK020O MAK021O MAK022O	All compounds flagged "P" due to DiPhenylEther interference	J (all detects)	P

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Dioxins/Dibenzofurans - Data Qualification Summary - SDG 10247063**

SDG	Sample	Compound	Flag	A or P	Reason
10247063	MAK009O MAK010O MAK012O MAK013O MAK018O MAK020O MAK021O MAK022O	All compounds flagged "P" due to DiPhenylEther interference	J (all detects)	P	Compound quantitation

**Makua Military Reservation
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG
10247063**

SDG	Sample	Compound	Modified Final Concentration	A or P
10247063	MAK009O	2,3,7,8-TCDF 2,3,4,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110U ng/Kg 0.048U ng/Kg 0.094U ng/Kg 0.047U ng/Kg 0.170J ng/Kg 0.084U ng/Kg 0.051U ng/Kg 0.140J ng/Kg 0.310U ng/Kg 0.410J ng/Kg 0.230U ng/Kg 1.800U ng/Kg	A
10247063	MAK010O	2,3,7,8-TCDF 1,2,3,6,7,8-HxCDF 1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110U ng/Kg 0.067U ng/Kg 0.089U ng/Kg 0.089U ng/Kg 0.089J ng/Kg 0.210U ng/Kg 0.120J ng/Kg 0.290U ng/Kg 1.200U ng/Kg	A
10247063	MAK011O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.098U ng/Kg 0.180U ng/Kg 0.280J ng/Kg 0.280U ng/Kg 1.200U ng/Kg	A
10247063	MAK012O	2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.090U ng/Kg 0.038U ng/Kg 0.050U ng/Kg 0.042U ng/Kg 0.120U ng/Kg 0.120J ng/Kg 0.170U ng/Kg 1.000U ng/Kg	A

SDG	Sample	Compound	Modified Final Concentration	A or P
10247063	MAK013O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD Total HpCDF	0.086U ng/Kg 0.061U ng/Kg 0.240U ng/Kg 0.440J ng/Kg 0.260U ng/Kg 2.500U ng/Kg 0.069J ng/Kg	A
10247063	MAK014O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.063U ng/Kg 0.041U ng/Kg 0.072J ng/Kg 0.130U ng/Kg 0.240J ng/Kg 0.120U ng/Kg 0.950U ng/Kg	A
10247063	MAK015O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.065U ng/Kg 0.040U ng/Kg 0.088J ng/Kg 0.130U ng/Kg 0.130J ng/Kg 0.160U ng/Kg 0.860U ng/Kg	A
10247063	MAK016O	2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.079U ng/Kg 0.032U ng/Kg 0.034U ng/Kg 0.049U ng/Kg 0.051U ng/Kg 0.064U ng/Kg 0.110J ng/Kg 0.180U ng/Kg 0.180J ng/Kg 0.200U ng/Kg 1.200U ng/Kg	A
10247063	MAK017O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.069U ng/Kg 0.045U ng/Kg 0.093J ng/Kg 0.091U ng/Kg 0.160U ng/Kg 0.880U ng/Kg	A
10247063	MAK018O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.084U ng/Kg 0.041U ng/Kg 0.110U ng/Kg 0.110J ng/Kg 0.140U ng/Kg 0.880U ng/Kg	A
10247063	MAK019O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.110U ng/Kg 0.043U ng/Kg 0.043J ng/Kg 0.100U ng/Kg 0.190J ng/Kg 0.17U ng/Kg 0.84U ng/Kg	A

SDG	Sample	Compound	Modified Final Concentration	A or P
10247063	MAK020O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.092U ng/Kg 0.056U ng/Kg 0.099J ng/Kg 0.130U ng/Kg 0.220J ng/Kg 0.190U ng/Kg 0.870U ng/Kg	A
10247063	MAK021O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.078U ng/Kg 0.049U ng/Kg 0.049J ng/Kg 0.098U ng/Kg 0.200J ng/Kg 0.180U ng/Kg 0.830U ng/Kg	A
10247063	MAK022O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.075U ng/Kg 0.047U ng/Kg 0.047J ng/Kg 0.110U ng/Kg 0.220J ng/Kg 0.190U ng/Kg 0.780U ng/Kg	A
10247063	MAK023O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF Total HpCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.063U ng/Kg 0.100U ng/Kg 0.370J ng/Kg 0.230U ng/Kg 0.460J ng/Kg 1.400U ng/Kg 2.500U ng/Kg	A
10247063	MAK024O	2,3,7,8-TCDF 1,2,3,4,6,7,8-HpCDF OCDF OCDD	0.19U ng/Kg 0.11U ng/Kg 0.57U ng/Kg 4.10U ng/Kg	A

Makua Military Reservation

Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 10247063

No Sample Data Qualified in this SDG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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.	Technical holding times	A	Sampling dates: 9/13/13 → 9/27/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	6/20/13
IV.	Continuing calibration/ACV	A	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation/RL/LOQ/LQDs	SW	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: tissue

1	MAK0090	11	MAK0190	21		31	
2	MAK0100	12	MAK0200	22		32	
3	MAK0110	13	MAK0210	23		33	
4	MAK0120	14	MAK0220	24		34	
5	MAK0130	15	MAK0230	25		35	
6	MAK0140	16	MAK0240	26		36	
7	MAK0150	17	MAK024QMS	27		37	
8	MAK0160	18	MAK024OMSD	28		38	
9	MAK0170	19		29		39	
10	MAK0180	20		30	BLANK-38307	40	

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

VALIDATION FINDINGS WORKSHEET

Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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 method blank?
- Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
- Y N N/A Was the method blank contaminated?

Blank extraction date: 11/04/13 Blank analysis date: 11/07/13 Associated samples: All Qual U/Duals

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification								
		5x	1	2	3	4	5	6	7	8
	BLANK-38307									
H	0.067*	0.335	0.110*U	0.110*U	0.098*U	0.090*U	0.086*U	0.063*U	0.065*U	0.079*U
R	0.420	-								
I	0.049*	0.245								
K	0.050*	0.250				0.038*U				0.032*U
L	0.045*	0.225		0.067U						0.034U
M	0.064*	0.320	0.048U							0.049U
N	0.082*	0.410								0.051U
D	0.069	0.345	0.094U	0.089U						0.148U
E	0.050*	0.250	0.047*U							
T	0.069	--	0.170J							
O	0.096	0.480	0.084U	0.089U		0.050*U	0.061*U	0.041*U	0.040U	0.064U
P	0.072*	0.360	0.051U			0.042*U				
Y	0.160	--	0.140J	0.089U <u>JS</u>			0.069J	0.072J	0.088J	0.110J
F	0.160	0.800	0.310U	0.210*U	0.180U	0.120U	0.240U	0.130U	0.130U	0.180U
U	0.270	--	0.410J	0.120J	0.280J	0.120 <u>JS</u>	0.440J	0.240J	0.130 <u>JS</u>	0.180 <u>JS</u>
Q	0.340	1.70	0.230U	0.290*U	0.280U	0.170*U	0.260*U	0.120*U	0.160*U	0.200*U
G	0.890	4.45	1.800U	1.200U	1.200U	1.000U	2.500U	0.950U	0.860U	1.200U

APL
7/24/14

*EMPC

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".

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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 method blank?
- Y ~~N~~ ~~N/A~~ Was a method blank performed for each matrix and whenever a sample extraction was performed?
- Y ~~N~~ ~~N/A~~ Was the method blank contaminated?

Blank extraction date: 11/04/13 Blank analysis date: 11/07/13 Associated samples: All Qual U/Qual J

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification																		
		5x	9	10	11	12	13	14	15	16										
	BLANK-38307																			
H	0.067*	0.335	0.069*U	0.084*U	0.110U	0.092*U	0.078*U	0.075*U	0.063*U	0.19*U										
R	0.420	--																		
I	0.049*	0.245																		
K	0.050*	0.250																		
L	0.045*	0.225																		
M	0.064*	0.320																		
N	0.082*	0.410																		
D	0.069	0.345																		
E	0.050*	0.250																		
T	0.069	--																		
O	0.096	0.480	0.045U	0.041*U	0.043U	0.056U	0.049U	0.047U	0.100*U	0.11*U										
P	0.072*	0.360																		
Y	0.160	--	0.093J		0.043 <u>AS</u>	0.099J	0.049 <u>AS</u>	0.047 <u>AS</u>	0.370J											
F	0.160	0.800	0.091*U	0.110U	0.100U	0.130U	0.098U	0.110U	0.230U											
U	0.270	--		0.110 <u>AS</u>	0.190J	0.220J	0.200J	0.220J	0.460J											
Q	0.340	1.70	0.160*U	0.140*U	0.17*U	0.190U	0.180U	0.190U	1.400U	0.57U										
G	0.890	4.45	0.880U	0.880U	0.84U	0.870U	0.830U	0.780*U	2.500U	4.10U										

*EMPC
CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Makua Military Reservation
Collection Date: September 13 through September 23, 2013
LDC Report Date: June 9, 2014
Matrix: Tissue
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Pace Analytical Services, Inc.
Sample Delivery Group (SDG): 10247065

Sample Identification

MAK010C
MAK014C
MAK015C
MAK018C
MAK019C
MAK020C
MAK022C
MAK024C
MAK025C
MAK026C
MAK027C
MAK028C
MAK029C
MAK030C
MAK031C
MAK032C
MAK030CMS
MAK030CMSD

Introduction

This data review covers 18 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
BLANK-38383	11/11/13	Total TCDD Total HxCDD	0.57 ng/Kg 0.24 ng/Kg	All samples in SDG 10247065

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

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
MAK020C	All compounds flagged "P" due to DiPhenylEther interference	J (all detects)	P

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Dioxins/Dibenzofurans - Data Qualification Summary - SDG 10247065**

SDG	Sample	Compound	Flag	A or P	Reason
10247065	MAK020C	All compounds flagged "P" due to DiPhenylEther interference	J (all detects)	P	Compound quantitation

**Makua Military Reservation
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG
10247065**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 10247065**

No Sample Data Qualified in this SDG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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.	Technical holding times	A	Sampling dates: 9/13/13 → 9/23/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Continuing calibration/CEV	A	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	LCS/LCSD
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation/RL/LOQ/LODs	SW	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: tissue

1	MAK010C	11	MAK027C	21		31	
2	MAK014C	12	MAK028C	22		32	
3	MAK015C	13	MAK029C	23		33	
4	MAK018C	14	MAK030C	24		34	
5	MAK019C	15	MAK031C	25		35	
6	MAK020C	16	MAK032C	26		36	
7	MAK022C	17	MAK030CMS	27		37	
8	MAK024C	18	MAK030CMSD	28		38	
9	MAK025C	19		29		39	
10	MAK026C	20		30	BLANK-38383	40	

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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 method blank?

Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

Y N N/A Was the method blank contaminated?

Blank extraction date: 11/11/13 Blank analysis date: 11/15/13 Associated samples: All

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification							
	BLANK-38383	5x							
R	0.57	--							
T	0.24	--							

Compound	Blank ID	Sample Identification							
	BLANK-38383	5x							
R	0.57	--							
T	0.24	--							

*EMPC
CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through October 15, 2013
LDC Report Date: June 6, 2014
Matrix: Tissue
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Pace Analytical Services, Inc.
Sample Delivery Group (SDG): 10248731

Sample Identification

MAK001L/2L/26L	MAK045L
MAK007L	MAK046L
MAK009L	MAK047L
MAK010L(comp)	MAK049L
MAK011L	MAK047LMS
MAK013L	MAK047LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	
MAK044L	

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III. Initial Calibration

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The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
BLANK-38507	11/21/13	Total TCDD Total PeCDD 1,2,3,4,6,7,8-HpCDD OCDF OCDD	1.300 ng/Kg 0.086 ng/Kg 0.067 ng/Kg 0.260 ng/Kg 0.450 ng/Kg	MAK044L MAK045L MAK046L MAK047L

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
Blank-38505	11/21/13	Total TCDD	1.400 ng/Kg	MAK001L/2L/26L
		2,3,4,7,8-PeCDF	0.070 ng/Kg	MAK007L
		Total PeCDD	0.260 ng/Kg	MAK009L
		1,2,3,4,7,8-HxCDF	0.054 ng/Kg	MAK010L(comp)
		2,3,4,6,7,8-HxCDF	0.049 ng/Kg	MAK011L
		1,2,3,7,8,9-HxCDF	0.066 ng/Kg	MAK013L
		Total HxCDF	0.110 ng/Kg	MAK016L/21L/27L
		1,2,3,4,7,8-HxCDD	0.047 ng/Kg	MAK022L
		1,2,3,6,7,8-HxCDD	0.046 ng/Kg	MAK023L
		1,2,3,7,8,9-HxCDD	0.054 ng/Kg	MAK024L/25L
		Total HxCDD	0.150 ng/Kg	MAK025L
		1,2,3,4,6,7,8-HpCDD	0.120 ng/Kg	MAK029L
		Total HpCDD	0.120 ng/Kg	MAK030L
		OCDF	0.220 ng/Kg	MAK033L
		OCDD	0.460 ng/Kg	MAK034L
				MAK038L
				MAK041L
				MAK042L
				MAK043L
				MAK049L

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

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK001L/2L/26L	1,2,3,4,7,8-HxCDF	0.034 ng/Kg	0.034U ng/Kg
	2,3,4,6,7,8-HxCDF	0.038 ng/Kg	0.038U ng/Kg
	Total HxCDF	0.092 ng/Kg	0.092J ng/Kg
	1,2,3,4,6,7,8-HpCDD	0.099 ng/Kg	0.099U ng/Kg
	Total HpCDD	0.140 ng/Kg	0.140J ng/Kg
	OCDF	0.240 ng/Kg	0.240U ng/Kg
	OCDD	0.590 ng/Kg	0.590U ng/Kg
MAK007L	2,3,4,7,8-PeCDF	0.045 ng/Kg	0.045U ng/Kg
	1,2,3,4,7,8-HxCDF	0.035 ng/Kg	0.035U ng/Kg
	2,3,4,6,7,8-HxCDF	0.039 ng/Kg	0.039U ng/Kg
	Total HxCDF	0.058 ng/Kg	0.058J ng/Kg
	1,2,3,7,8,9-HxCDD	0.090 ng/Kg	0.090U ng/Kg
	Total HxCDD	0.210 ng/Kg	0.210J ng/Kg
	1,2,3,4,6,7,8-HpCDD	0.290 ng/Kg	0.290U ng/Kg
	Total HpCDD	0.660 ng/Kg	0.660J ng/Kg
	OCDF	0.330 ng/Kg	0.330U ng/Kg
	OCDD	1.900 ng/Kg	1.900U ng/Kg
MAK009L	1,2,3,4,7,8-HxCDF	0.050 ng/Kg	0.050U ng/Kg
	1,2,3,7,8,9-HxCDF	0.044 ng/Kg	0.044U ng/Kg
	Total HxCDF	0.050 ng/Kg	0.050J ng/Kg
	1,2,3,7,8,9-HxCDD	0.240 ng/Kg	0.240U ng/Kg
	1,2,3,4,6,7,8-HpCDD	0.180 ng/Kg	0.180U ng/Kg
	Total HpCDD	0.380 ng/Kg	0.380J ng/Kg
	OCDF	0.180 ng/Kg	0.180U ng/Kg
	OCDD	1.100 ng/Kg	1.100U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK010L(comp)	1,2,3,4,7,8-HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.049 ng/Kg 0.23 ng/Kg 0.23 ng/Kg 0.22 ng/Kg 1.10 ng/Kg	0.049U ng/Kg 0.23U ng/Kg 0.23J ng/Kg 0.22U ng/Kg 1.10U ng/Kg
MAK011L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.093 ng/Kg 0.093 ng/Kg 0.160 ng/Kg 0.530 ng/Kg	0.093U ng/Kg 0.093J ng/Kg 0.160U ng/Kg 0.530U ng/Kg
MAK013L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.120 ng/Kg 0.250 ng/Kg 0.160 ng/Kg 0.630 ng/Kg	0.120U ng/Kg 0.250J ng/Kg 0.160U ng/Kg 0.630U ng/Kg
MAK016L/21L/27L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.090 ng/Kg 0.120 ng/Kg 0.470 ng/Kg	0.090U ng/Kg 0.120U ng/Kg 0.470U ng/Kg
MAK022L	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.071 ng/Kg 0.092 ng/Kg 0.170 ng/Kg 0.150 ng/Kg 0.540 ng/Kg	0.071U ng/Kg 0.092U ng/Kg 0.170J ng/Kg 0.150U ng/Kg 0.540U ng/Kg
MAK023L	1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDD	0.096 ng/Kg 0.095 ng/Kg 0.095 ng/Kg 0.450 ng/Kg	0.096U ng/Kg 0.095U ng/Kg 0.095J ng/Kg 0.450U ng/Kg
MAK024L/25L	1,2,3,6,7,8-HxCDD Total HxCDD	0.110 ng/Kg 0.250 ng/Kg	0.110U ng/Kg 0.250J ng/Kg
MAK025L	2,3,4,6,7,8-HxCDF Total HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.043 ng/Kg 0.043 ng/Kg 0.086 ng/Kg 0.140 ng/Kg 0.140 ng/Kg 0.730 ng/Kg	0.043U ng/Kg 0.043J ng/Kg 0.086U ng/Kg 0.140J ng/Kg 0.140U ng/Kg 0.730U ng/Kg
MAK029L	1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF Total HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.036 ng/Kg 0.035 ng/Kg 0.045 ng/Kg 0.095 ng/Kg 0.140 ng/Kg 0.140 ng/Kg 0.160 ng/Kg 0.410 ng/Kg	0.036U ng/Kg 0.035U ng/Kg 0.045U ng/Kg 0.095J ng/Kg 0.140U ng/Kg 0.140J ng/Kg 0.160U ng/Kg 0.410U ng/Kg
MAK030L	1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.053 ng/Kg 0.15 ng/Kg 0.30 ng/Kg 0.18 ng/Kg 1.00 ng/Kg	0.053U ng/Kg 0.15U ng/Kg 0.30J ng/Kg 0.18U ng/Kg 1.00U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
MAK033L	2,3,4,7,8-PeCDF 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.041 ng/Kg 0.16 ng/Kg 0.180 ng/Kg 0.180 ng/Kg 0.250 ng/Kg 1.200 ng/Kg	0.041U ng/Kg 0.16U ng/Kg 0.180U ng/Kg 0.180J ng/Kg 0.250U ng/Kg 1.200U ng/Kg
MAK034L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDD	0.13 ng/Kg 0.190 ng/Kg 1.100 ng/Kg	0.13U ng/Kg 0.190J ng/Kg 1.100U ng/Kg
MAK038L	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD	0.120 ng/Kg 0.150 ng/Kg 0.980 ng/Kg	0.120U ng/Kg 0.150U ng/Kg 0.980U ng/Kg
MAK041L	2,3,4,7,8-PeCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.057 ng/Kg 0.190 ng/Kg 0.190 ng/Kg 0.230 ng/Kg 0.740 ng/Kg	0.057U ng/Kg 0.190U ng/Kg 0.190J ng/Kg 0.230U ng/Kg 0.740U ng/Kg
MAK042L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.130 ng/Kg 0.20 ng/Kg 0.150 ng/Kg 0.72 ng/Kg	0.130U ng/Kg 0.20J ng/Kg 0.150U ng/Kg 0.72U ng/Kg
MAK043L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.230 ng/Kg 0.230 ng/Kg 0.150 ng/Kg 1.600 ng/Kg	0.230U ng/Kg 0.230J ng/Kg 0.150U ng/Kg 1.600U ng/Kg
MAK049L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF	0.34 ng/Kg 0.34 ng/Kg 0.37 ng/Kg	0.34U ng/Kg 0.34J ng/Kg 0.37U ng/Kg
MAK044L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.220 ng/Kg 0.180 ng/Kg 1.80 ng/Kg	0.220U ng/Kg 0.180U ng/Kg 1.80U ng/Kg
MAK045L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.180 ng/Kg 0.26 ng/Kg 1.300 ng/Kg	0.180U ng/Kg 0.26U ng/Kg 1.300U ng/Kg
MAK046L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.20 ng/Kg 0.23 ng/Kg 1.400 ng/Kg	0.20U ng/Kg 0.23U ng/Kg 1.400U ng/Kg
MAK047L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.320 ng/Kg 0.240 ng/Kg 2.200 ng/Kg	0.320U ng/Kg 0.240U ng/Kg 2.200U ng/Kg

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within the QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Dioxins/Dibenzofurans - Data Qualification Summary - SDG 10248731**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 10248731**

SDG	Sample	Compound	Modified Final Concentration	A or P
10248731	MAK001L/2L/26L	1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF Total HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.034U ng/Kg 0.038U ng/Kg 0.092J ng/Kg 0.099U ng/Kg 0.140J ng/Kg 0.240U ng/Kg 0.590U ng/Kg	A
10248731	MAK007L	2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF Total HxCDF 1,2,3,7,8,9-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.045U ng/Kg 0.035U ng/Kg 0.039U ng/Kg 0.058J ng/Kg 0.090U ng/Kg 0.210J ng/Kg 0.290U ng/Kg 0.660J ng/Kg 0.330U ng/Kg 1.900U ng/Kg	A
10248731	MAK009L	1,2,3,4,7,8-HxCDF 1,2,3,7,8,9-HxCDF Total HxCDF 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.050U ng/Kg 0.044U ng/Kg 0.050J ng/Kg 0.240U ng/Kg 0.180U ng/Kg 0.380J ng/Kg 0.180U ng/Kg 1.100U ng/Kg	A
10248731	MAK010L(comp)	1,2,3,4,7,8-HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.049U ng/Kg 0.23U ng/Kg 0.23J ng/Kg 0.22U ng/Kg 1.10U ng/Kg	A
10248731	MAK011L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.093U ng/Kg 0.093J ng/Kg 0.160U ng/Kg 0.530U ng/Kg	A
10248731	MAK013L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.120U ng/Kg 0.250J ng/Kg 0.160U ng/Kg 0.630U ng/Kg	A
10248731	MAK016L/21L/27L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.090U ng/Kg 0.120U ng/Kg 0.470U ng/Kg	A

SDG	Sample	Compound	Modified Final Concentration	A or P
10248731	MAK022L	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.071U ng/Kg 0.092U ng/Kg 0.170J ng/Kg 0.150U ng/Kg 0.540U ng/Kg	A
10248731	MAK023L	1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDD	0.096U ng/Kg 0.095U ng/Kg 0.095J ng/Kg 0.450U ng/Kg	A
10248731	MAK024L/25L	1,2,3,6,7,8-HxCDD Total HxCDD	0.110U ng/Kg 0.250J ng/Kg	A
10248731	MAK025L	2,3,4,6,7,8-HxCDF Total HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.043U ng/Kg 0.043J ng/Kg 0.086U ng/Kg 0.140J ng/Kg 0.140U ng/Kg 0.730U ng/Kg	A
10248731	MAK029L	1,2,3,4,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF Total HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.036U ng/Kg 0.035U ng/Kg 0.045U ng/Kg 0.095J ng/Kg 0.140U ng/Kg 0.140J ng/Kg 0.160U ng/Kg 0.410U ng/Kg	A
10248731	MAK030L	1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.053U ng/Kg 0.15U ng/Kg 0.30J ng/Kg 0.18U ng/Kg 1.00U ng/Kg	A
10248731	MAK033L	2,3,4,7,8-PeCDF 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.041U ng/Kg 0.16U ng/Kg 0.180U ng/Kg 0.180J ng/Kg 0.250U ng/Kg 1.200U ng/Kg	A
10248731	MAK034L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDD	0.13U ng/Kg 0.190J ng/Kg 1.100U ng/Kg	A
10248731	MAK038L	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD	0.120U ng/Kg 0.150U ng/Kg 0.980U ng/Kg	A
10248731	MAK041L	2,3,4,7,8-PeCDF 1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.057U ng/Kg 0.190U ng/Kg 0.190J ng/Kg 0.230U ng/Kg 0.740U ng/Kg	A

SDG	Sample	Compound	Modified Final Concentration	A or P
10248731	MAK042L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.130U ng/Kg 0.20J ng/Kg 0.150U ng/Kg 0.72U ng/Kg	A
10248731	MAK043L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF OCDD	0.230U ng/Kg 0.230J ng/Kg 0.150U ng/Kg 1.600U ng/Kg	A
10248731	MAK049L	1,2,3,4,6,7,8-HpCDD Total HpCDD OCDF	0.34U ng/Kg 0.34J ng/Kg 0.37U ng/Kg	A
10248731	MAK044L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.220U ng/Kg 0.180U ng/Kg 1.80U ng/Kg	A
10248731	MAK045L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.180U ng/Kg 0.26U ng/Kg 1.300U ng/Kg	A
10248731	MAK046L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.20U ng/Kg 0.23U ng/Kg 1.400U ng/Kg	A
10248731	MAK047L	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.320U ng/Kg 0.240U ng/Kg 2.200U ng/Kg	A

**Makua Military Reservation
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 10248731**

No Sample Data Qualified in this SDG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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.	Technical holding times	A	Sampling dates: 9/9/13 → 10/15/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	5/20/13
IV.	Continuing calibration/ICV	A	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation/RL/LOQ/LODs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: *Plant tissue*

1	MAK001L/2L/26L	11	MAK025L	21	MAK045L	31	
2	MAK007L	12	MAK029L	22	MAK046L	32	
3	MAK009L	13	MAK030L	23	MAK047L	33	
4	MAK010L(comp)	14	MAK033L	24	MAK049L	34	
5	MAK011L	15	MAK034L	25	MAK047LMS	35	
6	MAK013L	16	MAK038L	26	MAK047LMSD	36	
7	MAK016L/21L/27L	17	MAK041L	27	MAK049LMS	37	
8	MAK022L	18	MAK042L	28	MAK049LMSD	38	
9	MAK023L	19	MAK043L	29		39	BLANK-38505
10	MAK024L/25L	20	MAK044L	30		40	BLANK-38507

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

VALIDATION FINDINGS WORKSHEET

Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

- N N/A Were all samples associated with a method blank?
- N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
- N N/A Was the method blank contaminated?

Blank extraction date: 11/21/13 **Blank analysis date:** 11/27/13 **Associated samples:** All except 20-23 Qual U/Qual J

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification								
		5x	1	2	3	4	5	6	7	8
	BLANK-38505									
R	1.400	--								
J	0.070*	0.350		0.045*U						
S	0.260	--								
K	0.054*	0.270	0.034U	0.035*U	0.050U	0.049U				
M	0.049	0.245	0.038*U	0.039*U						
N	0.066	0.330			0.044*U					
X	0.110	--	0.092J	0.058J	0.050J					
C	0.047*	0.235								
D	0.046*	0.230								
E	0.054*	0.270		0.090U	0.240*U					0.071*U
T	0.150	--		0.210J						
F	0.120	0.600	0.099*U	0.290U	0.180U	0.23U	0.093U	0.120U	0.090*U	0.092U
U	0.120	--	0.140J	0.660J	0.380J	0.23 <u>J</u>	0.093 <u>J</u>	0.250J		0.170J
Q	0.220*	1.10	0.240*U	0.330U	0.180*U	0.22U	0.160*U	0.160*U	0.120*U	0.150U
G	0.460	2.30	0.590U	1.900U	1.100U	1.10U	0.530U	0.630U	0.470*U	0.540*U

*EMPC

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".

VALIDATION FINDINGS WORKSHEET

Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

N N/A Were all samples associated with a method blank?

N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

N N/A Was the method blank contaminated?

Blank extraction date: 11/21/13 **Blank analysis date:** 11/27/13 **Associated samples:** All except 20-23 Qual U/Qual J

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification								
		5x	9	10	11	12	13	14	15	16
	BLANK-38505									
R	1.400	--								
J	0.070*	0.350						0.041U		
S	0.260	--								
K	0.054*	0.270				0.036*U				
M	0.049	0.245			0.043U	0.035*U				
N	0.066	0.330				0.045U	0.053*U			
X	0.110	--			0.043*UJ	0.095J				
C	0.047*	0.235								
D	0.046*	0.230	0.096*U	0.110U						
E	0.054*	0.270						0.16U		0.120*U
T	0.150	--		0.250J						
F	0.120	0.600	0.095U		0.086*U	0.140U	0.15U	0.180U	0.13*U	0.150*U
U	0.120	--	0.095*UJ		0.140J	0.140*UJ	0.30J	0.180*UJ	0.190J	
Q	0.220*	1.10			0.140*U	0.160U	0.18U	0.250U		
G	0.460	2.30	0.450U		0.730U	0.410*U	1.00U	1.200U	1.100U	0.980U

*EMPC

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".

VALIDATION FINDINGS WORKSHEET

Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

N N/A Were all samples associated with a method blank?

N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

N N/A Was the method blank contaminated?

Blank extraction date: 11/21/13 Blank analysis date: 11/27/13 Associated samples: All except 20-23 Qual U/Qual J

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification							
		5x	17	18	19	24			
	BLANK-38505								
R	1.400	--							
J	0.070*	0.350	0.057*U						
S	0.260	--							
K	0.054*	0.270							
M	0.049	0.245							
N	0.066	0.330							
X	0.110	--							
C	0.047*	0.235							
D	0.046*	0.230							
E	0.054*	0.270							
T	0.150	--							
F	0.120	0.600	0.190U	0.130*U	0.230U	0.34U			
U	0.120	--	0.190U J	0.20J	0.230U J	0.34U J			
Q	0.220*	1.10	0.230U	0.150*U	0.150*U	0.37U			
G	0.460	2.30	0.740U	0.72U	1.600U				

*EMPC

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".

VALIDATION FINDINGS WORKSHEET

Blanks

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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 method blank?
- Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
- Y N N/A Was the method blank contaminated?

Blank extraction date: 11/21/13 **Blank analysis date:** 11/27/13 **Associated samples:** 20-23 Qual U

Conc. units: ng/Kg

Compound	Blank ID	Sample Identification							
		5x	20	21	22	23			
	BLANK-38507								
R	1.300	--							
S	0.086	--							
F	0.067*	0.335	0.220*U	0.180U	0.20*U	0.320U			
Q	0.260	1.30	0.180*U	0.26*U	0.23*U	0.240U			
G	0.450*	2.25	1.80U	1.300U	1.400U	2.200U			

*EMPC

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
 All contaminants within five times the method blank concentration were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 23, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Perchlorate
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): 320-4661-1

Sample Identification

MAK010C	MAK006C
MAK014C	MAK007C
MAK015C	MAK008C
MAK018C	MAK009C
MAK019C	MAK030CMS
MAK020C	MAK030CMSD
MAK022C	MAK032CMS
MAK024C	MAK032CMSD
MAK025C	
MAK026C	
MAK027C	
MAK028C	
MAK029C	
MAK030C	
MAK031C	
MAK032C	
MAK001C	
MAK002C	
MAK004C	
MAK005C	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6850 for Perchlorate.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. LC/MS Instrument Performance Check

Instrument performance check is not required by the method.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were not required by the method.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. System Performance

Raw data were not reviewed for this SDG.

XIV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Perchlorate - Data Qualification Summary - SDG 320-4661-1**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-4661-1**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Perchlorate - Field Blank Data Qualification Summary - SDG 320-4661-1**

No Sample Data Qualified in this SDG

LDC #: 31509187

VALIDATION COMPLETENESS WORKSHEET

Date: 3/26/14

SDG #: 320-4661-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: *[Signature]*2nd Reviewer: *[Signature]***METHOD:** LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Technical holding times	Δ	Sampling dates: 9/9 → 9/23/13
II.	GC/MS Instrument performance check	N	NOT required
III.	Initial calibration	Δ	% RSD ≤ 15
IV.	Continuing calibration/ICV	Δ	ICV/CCV ≤ 15 LODV ≤ 30
V.	Blanks	A	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	A	LC5
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK010C	11	MAK027C	21	MAK006C	31	MB 320-31658
2	MAK014C	12	MAK028C	22	MAK007C	32	MB 320-31661
3	MAK015C	13	MAK029C	23	MAK008C	33	
4	MAK018C	14	MAK030C	24	MAK009C	34	
5	MAK019C	15	MAK031C	25	MAK030CMS	35	
6	MAK020C	16	MAK032C	26	MAK030CMSD	36	
7	MAK022C	17	MAK001C	27	MAK032CMS	37	
8	MAK024C	18	MAK002C	28	MAK032CMSD	38	
9	MAK025C	19	MAK004C	29		39	
10	MAK026C	20	MAK005C	30		40	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through September 27, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Perchlorate
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): 320-4662-1

Sample Identification

MAK001O	MAK021O
MAK002O	MAK022O
MAK003O	MAK023O
MAK004O	MAK024O
MAK005O	MAK006OMS
MAK006O	MAK006OMSD
MAK007O	MAK007OMS
MAK008O	MAK007OMSD
MAK009O	
MAK010O	
MAK011O	
MAK012O	
MAK013O	
MAK014O	
MAK015O	
MAK016O	
MAK017O	
MAK018O	
MAK019O	
MAK020O	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6850 for Perchlorate.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. LC/MS Instrument Performance Check

Instrument performance check is not required by the method.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/17/13	Perchlorate	15.6	MAK001O MAK003O MAK004O MAK005O MAK006O MAK007O MAK009O MAK010O MAK011O MAK012O MAK013O MAK014O MAK015O MAK016O MAK017O MAK018O MAK019O MAK020O MAK021O MAK022O MAK023O MAK024O MAK006OMS MAK006OMSD MAK007OMS MAK007OMSD MB 320-31774	J (all detects) UJ (all non-detects)	A

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were not required by the method.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MAK001O	18-O Perchlorate	138585727 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK003O	18-O Perchlorate	129349335 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK004O	18-O Perchlorate	102872680 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK005O	18-O Perchlorate	119821300 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK006O	18-O Perchlorate	80752391 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	A
MAK009O	18-O Perchlorate	79120850 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK010O	18-O Perchlorate	84212574 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK011O	18-O Perchlorate	85159164 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK012O	18-O Perchlorate	82657928 (296853459-890560376)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK007O	18-O Perchlorate	82664151 (241409347-724228041)	Perchlorate	J (all detects) UJ (all non-detects)	A
MAK013O	18-O Perchlorate	83153426 (241409347-724228041)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK014O	18-O Perchlorate	75143782 (241409347-724228041)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK015O	18-O Perchlorate	83464671 (241409347-724228041)	Perchlorate	J (all detects) UJ (all non-detects)	P

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MAK016O	18-O Perchlorate	96432715 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK017O	18-O Perchlorate	86168693 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK018O	18-O Perchlorate	87632973 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK019O	18-O Perchlorate	110587449 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK020O	18-O Perchlorate	88952968 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK021O	18-O Perchlorate	84223350 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK022O	18-O Perchlorate	82614212 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK023O	18-O Perchlorate	85753876 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK024O	18-O Perchlorate	91327670 (225682812-677048435)	Perchlorate	J (all detects) UJ (all non-detects)	P

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. System Performance

Raw data were not reviewed for this SDG.

XIV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Perchlorate - Data Qualification Summary - SDG 320-4662-1**

SDG	Sample	Compound	Flag	A or P	Reason
320-4662-1	MAK001O MAK003O MAK004O MAK005O MAK006O MAK007O MAK009O MAK010O MAK011O MAK012O MAK013O MAK014O MAK015O MAK016O MAK017O MAK018O MAK019O MAK020O MAK021O MAK022O MAK023O MAK024O	Perchlorate	J (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)
320-4662-1	MAK001O MAK003O MAK004O MAK005O MAK009O MAK010O MAK011O MAK012O MAK013O MAK014O MAK015O MAK016O MAK017O MAK018O MAK019O MAK020O MAK021O MAK022O MAK023O MAK024O	Perchlorate	J (all detects) UJ (all non-detects)	P	Internal standards (area)
320-4662-1	MAK006O MAK007O	Perchlorate	J (all detects) UJ (all non-detects)	A	Internal standards (area)

**Makua Military Reservation
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-4662-1**

No Sample Data Qualified in this SDG

Makua Military Reservation
Perchlorate - Field Blank Data Qualification Summary - SDG 320-4662-1

No Sample Data Qualified in this SDG

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/9 - 9/27/13
II.	GC/MS Instrument performance check	N	not Required
III.	Initial calibration	A	% PSD ≤ 15
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 15 LODV ≤ 30%
V.	Blanks	A	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LED
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:

Trial

1	MAK001O	11	MAK011O	21	MAK021O	31	MB 320-31768
2	MAK002O ✓	12	MAK012O	22	MAK022O	32	MB 320-31774
3	MAK003O	13	MAK013O	23	MAK023O	33	
4	MAK004O	14	MAK014O	24	MAK024O	34	
5	MAK005O	15	MAK015O	25	MAK006OMS	35	
6	MAK006O	16	MAK016O	26	MAK006OMSD	36	
7	MAK007O	17	MAK017O	27	MAK007OMS	37	
8	MAK008O ✓	18	MAK018O	28	MAK007OMSD	38	
9	MAK009O	19	MAK019O	29		39	
10	MAK010O	20	MAK020O	30		40	

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

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 of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1	18-O Perchlorate	138 585 727 (296 853 459 - 890 560 376)		J/W/P
		3		129 349 335		
		4		102 872 680		
		5		119 821 300		↓
		6		807 523 91		J/W/A
		25		836 030 09		no qual MS
		26		807 440 74		no qual MS
		9		79 120 850		J/W/P
		10		84 212 574		
		11		851 591 64		
		12	↓	826 579 28	↓	↓

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

VALIDATION FINDINGS WORKSHEET

Internal Standards

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

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 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	18-0 Perchlorate	82664151 (241409347 - 724228041)		J W/A
		27		77305454		no qual MS
		28		72831196		no qual MS
		13		83153426		J W P
		14		75143782		↓
		15		83464671	↓	↓
		16		96432715 (225682812 - 677048435)		J W P
		17		86168693		
		18		87632973		
		19		110587449		
		20		88952968		
		21		84223350		
		22		82614212	↓	↓

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through October 15, 2013
LDC Report Date: April 2, 2014
Matrix: Tissue
Parameters: Perchlorate
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): 320-4883-1

Sample Identification

MAK001L/2L/26L	MAK045L
MAK007L	MAK046L
MAK009L	MAK047L
MAK010L(COMP)	MAK049L
MAK011L	MAK001L/2L/26LMS
MAK013L	MAK001L/2L/26LMSD
MAK016L/21L/27L	MAK049LMS
MAK022L	MAK049LMSD
MAK023L	
MAK024L/25L	
MAK025L	
MAK029L	
MAK030L	
MAK033L	
MAK034L	
MAK038L	
MAK041L	
MAK042L	
MAK043L	
MAK044L	

Introduction

This data review covers 28 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6850 for Perchlorate.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. LC/MS Instrument Performance Check

Instrument performance check is not required by the method.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were not required by the method.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MAK001L/2L/26L	18-O Perchlorate	80934450 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	A
MAK009L	18-O Perchlorate	88703350 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK010L(COMP)	18-O Perchlorate	100657415 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK011L	18-O Perchlorate	57402030 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK013L	18-O Perchlorate	57211900 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK016L/21L/27L	18-O Perchlorate	62505843 (149169602-447508805)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK022L	18-O Perchlorate	58600244 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK023L	18-O Perchlorate	59165439 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK024L/25L	18-O Perchlorate	59349411 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK025L	18-O Perchlorate	56425548 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK029L	18-O Perchlorate	57993525 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MAK030L	18-O Perchlorate	75730645 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK033L	18-O Perchlorate	88516188 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK034L	18-O Perchlorate	84582775 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK038L	18-O Perchlorate	97051372 (110008743-330026229)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK041L	18-O Perchlorate	95426106 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK042L	18-O Perchlorate	75973748 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK043L	18-O Perchlorate	84172474 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK044L	18-O Perchlorate	92234619 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK045L	18-O Perchlorate	58478514 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK047L	18-O Perchlorate	79461638 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK049L	18-O Perchlorate	70888707 (104362539-313087616)	Perchlorate	J (all detects) UJ (all non-detects)	A
MAK007L	18-O Perchlorate	69734102 (71568927-214706781)	Perchlorate	J (all detects) UJ (all non-detects)	P
MAK046L	18-O Perchlorate	67026301 (71568927-214706781)	Perchlorate	J (all detects) UJ (all non-detects)	P

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation

Raw data were not reviewed for this SDG.

XIII. System Performance

Raw data were not reviewed for this SDG.

XIV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Perchlorate - Data Qualification Summary - SDG 320-4883-1**

SDG	Sample	Compound	Flag	A or P	Reason
320-4883-1	MAK001L/2L/26L MAK049L	Perchlorate	J (all detects) UJ (all non-detects)	A	Internal standards (area)
320-4883-1	MAK009L MAK010L(COMP) MAK011L MAK013L MAK016L/21L/27L MAK022L MAK023L MAK024L/25L MAK025L MAK029L MAK030L MAK033L MAK034L MAK038L MAK041L MAK042L MAK043L MAK044L MAK045L MAK047L MAK007L MAK046L	Perchlorate	J (all detects) UJ (all non-detects)	P	Internal standards (area)

**Makua Military Reservation
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 320-4883-1**

No Sample Data Qualified in this SDG

**Makua Military Reservation
Perchlorate - Field Blank Data Qualification Summary - SDG 320-4883-1**

No Sample Data Qualified in this SDG

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Technical holding times	Δ	Sampling dates: 9/9 - 10/15/13
II.	GC/MS Instrument performance check	A	Not Required
III.	Initial calibration	Δ	% PSD ≤ 15
IV.	Continuing calibration/ICV	A	ICV/CON ≤ 15 LODL ≤ 30%
V.	Blanks	A	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

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

Validated Samples:

Tissue

1	MAK001L/2L/26L	11	MAK025L	21	MAK045L	31	MB 320 - 31906
2	MAK007L	12	MAK029L	22	MAK046L	32	MB 320 - 31924
3	MAK009L	13	MAK030L	23	MAK047L	33	
4	MAK010L(COMP)	14	MAK033L	24	MAK049L	34	
5	MAK011L	15	MAK034L	25	MAK001L/2L/26LMS	35	
6	MAK013L	16	MAK038L	26	MAK001L/2L/26LMSD	36	
7	MAK016L/21L/27L	17	MAK041L	27	MAK049LMS	37	
8	MAK022L	18	MAK042L	28	MAK049LMSD	38	
9	MAK023L	19	MAK043L	29		39	
10	MAK024L/25L	20	MAK044L	30		40	

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

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

Y N/A Were all internal standard area counts within (- +) 50 of the associated calibration standard?

Y N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1			18-O Perchlorate	809 34450 (149 169 602 - 447 508 805)		J/U/A
25				66440509		no qual MS
26				69023463		no qual MSD
3				88703350		J/U/J/P
4				100657415		
5				57402030		
6				57211900		
7				62505843		
8				58600244 (110 008 743 - 330 026 229)		
9				59165439		
10				59349411		
11				56425548		
12				57993525		

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

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

N/A Were all internal standard area counts within (- +) 50 of the associated calibration standard?

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
		13	18-0 Perchlorate	757 30649 (110 008 743 - 330 026 229)		J/W/P
		14		88516188		
		15		845 82 775		
		16	↓	97051372	↓	↓
		17		954 26106 (104 362 539 - 313 087 616)		
		18		759 73748		
		19		841 72474		
		20		922 34619		
		21		584 78514		
		23		794 61638		↓
		24		70888707		J/W/A
		27		74048757		no qual MS
		28	↓	683 96299	↓	no qual MS

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation

Collection Date: September 9 through September 27, 2013

LDC Report Date: April 2, 2014

Matrix: Tissue

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Brooks Rand Labs

Sample Delivery Group (SDG): 1343025

Sample Identification

MAK010C	MAK013O	MAK002O	MAK008OMS
MAK014C	MAK014O	MAK003O	MAK008OMSD
MAK015C	MAK015O	MAK004O	MAK008ODUP
MAK018C	MAK016O	MAK005O	
MAK019C	MAK017O	MAK006O	
MAK020C	MAK018O	MAK007O	
MAK022C	MAK019O	MAK008O	
MAK024C	MAK020O	MAK001O	
MAK025C	MAK021O	MAK030CMS	
MAK026C	MAK022O	MAK030CMSD	
MAK027C	MAK023O	MAK030CDUP	
MAK028C	MAK024O	MAK032CMS	
MAK029C	MAK001C	MAK032CMSD	
MAK030C	MAK002C	MAK032CDUP	
MAK031C	MAK004C	MAK006OMS	
MAK032C	MAK005C	MAK006OMSD	
MAK009O	MAK006C	MAK006ODUP	
MAK010O	MAK007C	MAK007OMS	
MAK011O	MAK008C	MAK007OMSD	
MAK012O	MAK009C	MAK007ODUP	

Introduction

This data review covers 63 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 200.8 for Metals, EPA Method 1631 Appendix for Mercury, EPA Method 1630 for Methyl Mercury, and EPA Method 1632 Modified for Arsenic Speciation. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Selenium, Silver, Thallium, Vanadium, and Zinc.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

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. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
11/27/13	1300820-SCV1	Silver	89 (90-110)	All samples in SDG 1343025	J (all detects) UJ (all non-detects)	P
12/3/13	1300831-CCV5	Arsenic	111 (90-110)	MAK0100	J (all detects)	P

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Zinc Iron	0.20 mg/Kg 0.164 mg/Kg	All samples in SDG 1343025
ICB/CCB	Iron Chromium	0.822 ug/L 0.038 ug/L	All samples in SDG 1343025
ICB/CCB	Zinc	0.10 ug/L	MAK0150 MAK0160 MAK0170 MAK0180 MAK0190 MAK0200 MAK0210 MAK0220 MAK0070 MAK0080 MAK0010

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Zinc	0.11 ug/L	MAK023O MAK024O MAK001C MAK002C MAK004C MAK005C MAK006C MAK007C MAK008C MAK009C MAK002O MAK003O MAK004O MAK005O MAK006O
ICB/CCB	Manganese	0.03 ug/L	MAK015O MAK016O MAK017O MAK018O MAK019O MAK020O MAK021O MAK022O MAK023O
ICB/CCB	Manganese	0.04 ug/L	MAK024O MAK001C MAK002C MAK004C MAK005C MAK006C MAK007C MAK008C MAK009C MAK002O
ICB/CCB	Arsenic	0.037 ug/L	MAK011O MAK012O MAK013O MAK014O MAK015O MAK016O MAK017O MAK018O MAK019O
ICB/CCB	Arsenic	0.069 ug/L	MAK005C MAK006C MAK007C MAK008C MAK009C MAK002O MAK003O MAK004O MAK005O MAK006O MAK007O

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs 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 method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
MAK010C	Zinc Iron Chromium	0.63 mg/Kg 2.37 mg/Kg 0.062 mg/Kg	0.63U mg/Kg 2.37U mg/Kg 0.062U mg/Kg
MAK014C	Iron Chromium	1.96 mg/Kg 0.065 mg/Kg	1.96U mg/Kg 0.065U mg/Kg
MAK015C	Iron Chromium	3.24 mg/Kg 0.089 mg/Kg	3.24U mg/Kg 0.089U mg/Kg
MAK018C	Iron Chromium	1.93 mg/Kg 0.034 mg/Kg	1.93U mg/Kg 0.034U mg/Kg
MAK019C	Iron Chromium	1.40 mg/Kg 0.038 mg/Kg	1.40U mg/Kg 0.038U mg/Kg
MAK020C	Chromium	0.050 mg/Kg	0.050U mg/Kg
MAK022C	Iron Chromium	2.32 mg/Kg 0.069 mg/Kg	2.32U mg/Kg 0.069U mg/Kg
MAK024C	Chromium	0.105 mg/Kg	0.105U mg/Kg
MAK025C	Iron Chromium	2.97 mg/Kg 0.040 mg/Kg	2.97U mg/Kg 0.040U mg/Kg
MAK026C	Iron Chromium	2.11 mg/Kg 0.065 mg/Kg	2.11U mg/Kg 0.065U mg/Kg
MAK027C	Zinc Chromium	0.76 mg/Kg 0.062 mg/Kg	0.76U mg/Kg 0.062U mg/Kg
MAK028C	Iron Chromium	2.34 mg/Kg 0.084 mg/Kg	2.34U mg/Kg 0.084U mg/Kg
MAK029C	Chromium	0.069 mg/Kg	0.069U mg/Kg
MAK030C	Zinc Iron Chromium	0.85 mg/Kg 1.27 mg/Kg 0.036 mg/Kg	0.85U mg/Kg 1.27U mg/Kg 0.036U mg/Kg
MAK031C	Zinc Chromium	0.76 mg/Kg 0.107 mg/Kg	0.76U mg/Kg 0.107U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
MAK032C	Zinc Iron Chromium	0.90 mg/Kg 2.53 mg/Kg 0.121 mg/Kg	0.90U mg/Kg 2.53U mg/Kg 0.121U mg/Kg
MAK009O	Iron Chromium	1.51 mg/Kg 0.106 mg/Kg	1.51U mg/Kg 0.106U mg/Kg
MAK010O	Iron Chromium	1.38 mg/Kg 0.030 mg/Kg	1.38U mg/Kg 0.030U mg/Kg
MAK011O	Iron	0.873 mg/Kg	0.873U mg/Kg
MAK012O	Iron	2.46 mg/Kg	2.46U mg/Kg
MAK013O	Iron Chromium	1.76 mg/Kg 0.116 mg/Kg	1.76U mg/Kg 0.116U mg/Kg
MAK014O	Iron Chromium	0.826 mg/Kg 0.019 mg/Kg	0.826U mg/Kg 0.019U mg/Kg
MAK015O	Iron	1.41 mg/Kg	1.41U mg/Kg
MAK016O	Iron Chromium	1.51 mg/Kg 0.094 mg/Kg	1.51U mg/Kg 0.094U mg/Kg
MAK017O	Iron	1.02 mg/Kg	1.02U mg/Kg
MAK018O	Iron Chromium	1.06 mg/Kg 0.024 mg/Kg	1.06U mg/Kg 0.024U mg/Kg
MAK019O	Iron Chromium	2.36 mg/Kg 0.142 mg/Kg	2.36U mg/Kg 0.142U mg/Kg
MAK020O	Iron Chromium	0.849 mg/Kg 0.018 mg/Kg	0.849U mg/Kg 0.018U mg/Kg
MAK021O	Iron Chromium	0.813 mg/Kg 0.033 mg/Kg	0.813U mg/Kg 0.033U mg/Kg
MAK022O	Iron Chromium	0.901 mg/Kg 0.040 mg/Kg	0.901U mg/Kg 0.040U mg/Kg
MAK023O	Iron	0.892 mg/Kg	0.892U mg/Kg
MAK024O	Iron Chromium	1.42 mg/Kg 0.027 mg/Kg	1.42U mg/Kg 0.027U mg/Kg
MAK001C	Zinc	0.92 mg/Kg	0.92U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
MAK002C	Zinc Chromium Manganese	0.47 mg/Kg 0.073 mg/Kg 0.12 mg/Kg	0.47U mg/Kg 0.073U mg/Kg 0.12U mg/Kg
MAK004C	Iron Chromium Manganese	2.66 mg/Kg 0.128 mg/Kg 0.16 mg/Kg	2.66U mg/Kg 0.128U mg/Kg 0.16U mg/Kg
MAK005C	Zinc Iron Chromium Manganese	0.37 mg/Kg 1.30 mg/Kg 0.051 mg/Kg 0.07 mg/Kg	0.37U mg/Kg 1.30U mg/Kg 0.051U mg/Kg 0.07U mg/Kg
MAK006C	Zinc Chromium	0.58 mg/Kg 0.106 mg/Kg	0.58U mg/Kg 0.106U mg/Kg
MAK007C	Chromium	0.088 mg/Kg	0.088U mg/Kg
MAK008C	Zinc Chromium	0.59 mg/Kg 0.068 mg/Kg	0.59U mg/Kg 0.068U mg/Kg
MAK009C	Zinc Iron Chromium Manganese	0.34 mg/Kg 2.85 mg/Kg 0.042 mg/Kg 0.13 mg/Kg	0.34U mg/Kg 2.85U mg/Kg 0.042U mg/Kg 0.13U mg/Kg
MAK002O	Iron Chromium	0.761 mg/Kg 0.021 mg/Kg	0.761U mg/Kg 0.021U mg/Kg
MAK003O	Iron Chromium	1.73 mg/Kg 0.077 mg/Kg	1.73U mg/Kg 0.077U mg/Kg
MAK004O	Iron Chromium	0.950 mg/Kg 0.019 mg/Kg	0.950U mg/Kg 0.019U mg/Kg
MAK005O	Iron	1.62 mg/Kg	1.62U mg/Kg
MAK006O	Iron Chromium	1.31 mg/Kg 0.057 mg/Kg	1.31U mg/Kg 0.057U mg/Kg
MAK007O	Iron	2.58 mg/Kg	2.58U mg/Kg
MAK008O	Iron Chromium	2.31 mg/Kg 0.020 mg/Kg	2.31U mg/Kg 0.020U mg/Kg
MAK001O	Iron	2.73 mg/Kg	2.73U mg/Kg

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP Interference check sample analysis was not required by the methods.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
MAK030CMS/MSD (MAK030C)	Copper	61 (70-130)	61 (70-130)	-	Copper	J (all detects) UJ (all non-detects)	A
MAK006OMS/MSD (MAK006O)	Copper Monomethyl arsenic	65 (70-130) 53 (60-140)	44 (70-130) 56 (60-140)	- -	Copper Monomethyl arsenic	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
MAK007OMS/MSD (MAK007O)	Copper	23 (70-130)	25 (70-130)	-	Copper	J (all detects) R (all non-detects)	A
MAK007OMS/MSD (MAK007O)	Iron	362 (70-130)	-	116 (≤30)	Iron	J (all detects) UJ (all non-detects)	A
MAK008OMS/MSD (MAK008O)	Monomethyl arsenic	58 (60-140)	58 (60-140)	-	Monomethyl arsenic	J (all detects) UJ (all non-detects)	A

For MAK006OMS/MSD, MAK007OMS/MSD, and MAK008OMS/MSD, no data were qualified for Arsenic percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
MAK030CDUP (MAK030C)	Copper	98 (≤35)	-	J (all detects) UJ (all non-detects)	A
MAK007ODUP (MAK007O)	Iron	-	1.673 mg/Kg (≤1.604)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)/Standard Reference Material (SRM)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Percent recoveries (%R) of the standard reference material (SRM) were within QC limits with the following exceptions:

SRM ID	Compound	%R (Limits)	Associated Samples
SRM2 (TORT-3)	Chromium	149 (75-125)	All samples in SDG 1343025
SRM1 (DORM-4)	Lead	52 (75-122)	All samples in SDG 1343025

Although Chromium and Lead were outside control limits of 75-125%, these are new SRMs to BRL and do not have historical data to compare recoveries. The recoveries of the blank spike, other SRMs and all matrix spikes met acceptance criteria and no qualifications were necessary.

IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Metals - Data Qualification Summary - SDG 1343025**

SDG	Sample	Analyte	Flag	A or P	Reason
1343025	MAK010C MAK014C MAK015C MAK018C MAK019C MAK020C MAK022C MAK024C MAK025C MAK026C MAK027C MAK028C MAK029C MAK030C MAK031C MAK032C MAK009O MAK010O MAK011O MAK012O MAK013O MAK014O MAK015O MAK016O MAK017O MAK018O MAK019O MAK020O MAK021O MAK022O MAK023O MAK024O MAK001C MAK002C MAK004C MAK005C MAK006C MAK007C MAK008C MAK009C MAK002O MAK003O MAK004O MAK005O MAK006O MAK007O MAK008O MAK001O	Silver	J (all detects) UJ (all non-detects)	P	Calibration (CCV %R)
1343025	MAK010O	Arsenic	J (all detects)	P	Calibration (CCV %R)
1343025	MAK030C	Copper	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
1343025	MAK006O	Copper Monomethyl arsenic	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

SDG	Sample	Analyte	Flag	A or P	Reason
1343025	MAK007O	Copper	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
1343025	MAK007O	Iron	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD)
1343025	MAK008O	Monomethyl arsenic	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
1343025	MAK030C	Copper	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD)
1343025	MAK007O	Iron	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (difference)

**Makua Military Reservation
Metals - Laboratory Blank Data Qualification Summary - SDG 1343025**

SDG	Sample	Analyte	Modified Final Concentration	A or P
1343025	MAK010C	Zinc Iron Chromium	0.63U mg/Kg 2.37U mg/Kg 0.062U mg/Kg	A
1343025	MAK014C	Iron Chromium	1.96U mg/Kg 0.065U mg/Kg	A
1343025	MAK015C	Iron Chromium	3.24U mg/Kg 0.089U mg/Kg	A
1343025	MAK018C	Iron Chromium	1.93U mg/Kg 0.034U mg/Kg	A
1343025	MAK019C	Iron Chromium	1.40U mg/Kg 0.038U mg/Kg	A
1343025	MAK020C	Chromium	0.050U mg/Kg	A
1343025	MAK022C	Iron Chromium	2.32U mg/Kg 0.069U mg/Kg	A
1343025	MAK024C	Chromium	0.105U mg/Kg	A
1343025	MAK025C	Iron Chromium	2.97U mg/Kg 0.040U mg/Kg	A
1343025	MAK026C	Iron Chromium	2.11U mg/Kg 0.065U mg/Kg	A

SDG	Sample	Analyte	Modified Final Concentration	A or P
1343025	MAK027C	Zinc Chromium	0.76U mg/Kg 0.062U mg/Kg	A
1343025	MAK028C	Iron Chromium	2.34U mg/Kg 0.084U mg/Kg	A
1343025	MAK029C	Chromium	0.069U mg/Kg	A
1343025	MAK030C	Zinc Iron Chromium	0.85U mg/Kg 1.27U mg/Kg 0.036U mg/Kg	A
1343025	MAK031C	Zinc Chromium	0.76U mg/Kg 0.107U mg/Kg	A
1343025	MAK032C	Zinc Iron Chromium	0.90U mg/Kg 2.53U mg/Kg 0.121U mg/Kg	A
1343025	MAK009O	Iron Chromium	1.51U mg/Kg 0.106U mg/Kg	A
1343025	MAK010O	Iron Chromium	1.38U mg/Kg 0.030U mg/Kg	A
1343025	MAK011O	Iron	0.873U mg/Kg	A
1343025	MAK012O	Iron	2.46U mg/Kg	A
1343025	MAK013O	Iron Chromium	1.76U mg/Kg 0.116U mg/Kg	A
1343025	MAK014O	Iron Chromium	0.826U mg/Kg 0.019U mg/Kg	A
1343025	MAK015O	Iron	1.41U mg/Kg	A
1343025	MAK016O	Iron Chromium	1.51U mg/Kg 0.094U mg/Kg	A
1343025	MAK017O	Iron	1.02U mg/Kg	A
1343025	MAK018O	Iron Chromium	1.06U mg/Kg 0.024U mg/Kg	A
1343025	MAK019O	Iron Chromium	2.36U mg/Kg 0.142U mg/Kg	A

SDG	Sample	Analyte	Modified Final Concentration	A or P
1343025	MAK020O	Iron Chromium	0.849U mg/Kg 0.018U mg/Kg	A
1343025	MAK021O	Iron Chromium	0.813U mg/Kg 0.033U mg/Kg	A
1343025	MAK022O	Iron Chromium	0.901U mg/Kg 0.040U mg/Kg	A
1343025	MAK023O	Iron	0.892U mg/Kg	A
1343025	MAK024O	Iron Chromium	1.42U mg/Kg 0.027U mg/Kg	A
1343025	MAK001C	Zinc	0.92U mg/Kg	A
1343025	MAK002C	Zinc Chromium Manganese	0.47U mg/Kg 0.073U mg/Kg 0.12U mg/Kg	A
1343025	MAK004C	Iron Chromium Manganese	2.66U mg/Kg 0.128U mg/Kg 0.16U mg/Kg	A
1343025	MAK005C	Zinc Iron Chromium Manganese	0.37U mg/Kg 1.30U mg/Kg 0.051U mg/Kg 0.07U mg/Kg	A
1343025	MAK006C	Zinc Chromium	0.58U mg/Kg 0.106U mg/Kg	A
1343025	MAK007C	Chromium	0.088U mg/Kg	A
1343025	MAK008C	Zinc Chromium	0.59U mg/Kg 0.068U mg/Kg	A
1343025	MAK009C	Zinc Iron Chromium Manganese	0.34U mg/Kg 2.85U mg/Kg 0.042U mg/Kg 0.13U mg/Kg	A
1343025	MAK002O	Iron Chromium	0.761U mg/Kg 0.021U mg/Kg	A
1343025	MAK003O	Iron Chromium	1.73U mg/Kg 0.077U mg/Kg	A
1343025	MAK004O	Iron Chromium	0.950U mg/Kg 0.019U mg/Kg	A

SDG	Sample	Analyte	Modified Final Concentration	A or P
1343025	MAK005O	Iron	1.62U mg/Kg	A
1343025	MAK006O	Iron Chromium	1.31U mg/Kg 0.057U mg/Kg	A
1343025	MAK007O	Iron	2.58U mg/Kg	A
1343025	MAK008O	Iron Chromium	2.31U mg/Kg 0.020U mg/Kg	A
1343025	MAK001O	Iron	2.73U mg/Kg	A

**Makua Military Reservation
Metals - Field Blank Data Qualification Summary - SDG 1343025**

No Sample Data Qualified in this SDG

LDC #: 31509L4

VALIDATION COMPLETENESS WORKSHEET

Date: 3/27/13

SDG #: 1343025

Level III

Page: 1 of 2

Laboratory: Brooks Rand Labs

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: Metals (EPA Method ~~200.8~~ ^{200.8}), Mercury (EPA Method 1631 ~~A~~ ^A), Methyl Mercury (EPA Method 1631 ~~A~~ ^A), Arsenic Speciation (EPA Method 1632 ~~M~~ ^M)

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.	Technical holding times	A	Sampling dates: 9/9/13 - 9/29/13
II.	ICP/MS Tune	A	
III.	Calibration	SW	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	N	MT required
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	SW	
VIII.	Laboratory Control Samples (LCS)	SW	LCS, SRM
IX.	Internal Standard (ICP-MS)	N	kit reviewed
X.	ICP Serial Dilution	N	kit performed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

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

Validated Samples:

Tissue

1	MAK010C	11	MAK027C	21	MAK0130	31	MAK0230
2	MAK014C	12	MAK028C	22	MAK0140	32	MAK0240
3	MAK015C	13	MAK029C	23	MAK0150	33	MAK001C
4	MAK018C	14	MAK030C	24	MAK0160	34	MAK002C
5	MAK019C	15	MAK031C	25	MAK0170	35	MAK004C
6	MAK020C	16	MAK032C	26	MAK0180	36	MAK005C
7	MAK022C	17	MAK0090	27	MAK0190	37	MAK006C
8	MAK024C	18	MAK0100	28	MAK0200	38	MAK007C
9	MAK025C	19	MAK0110	29	MAK0210	39	MAK008C
10	MAK026C	20	MAK0120	30	MAK0220	40	MAK009C

Notes:

LDC #: 31509L4

VALIDATION COMPLETENESS WORKSHEET

Date: 3/24/14

SDG #: 1343025

Level III

Page: 2 of 2

Laboratory: Brooks Rand Labs

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: Metals (EPA Method 200.9), Mercury (EPA Method 1631E), Methyl Mercury (EPA Method 1631M), Arsenic Speciation (EPA Method 1632M)

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.	Technical holding times		Sampling dates:
II.	ICP/MS Tune		
III.	Calibration		
IV.	Blanks		
V.	ICP Interference Check Sample (ICS) Analysis		
VI.	Matrix Spike Analysis		
VII.	Duplicate Sample Analysis		See page 1
VIII.	Laboratory Control Samples (LCS)		
IX.	Internal Standard (ICP-MS)		
X.	ICP Serial Dilution		
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data		
XIII.	Field Duplicates		
XIV.	Field Blanks		

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

Validated Samples:

41	MAK002O	51	MAK030CDUP	61	MAK008OMS	71	MB
42	MAK003O	52	MAK032CMS	62	MAK008OMSD	72	
43	MAK004O	53	MAK032CMSD	63	MAK008ODUP	73	
44	MAK005O	54	MAK032CDUP	64		74	
45	MAK006O	55	MAK006OMS	65		75	
46	MAK007O	56	MAK006OMSD	66		76	
47	MAK008O	57	MAK006ODUP	67		77	
48	MAK001O	58	MAK007OMS	68		78	
49	MAK030CMS	59	MAK007OMSD	69		79	
50	MAK030CMSD	60	MAK007ODUP	70		80	

Notes: _____

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace Metals (EPA 200.8/1631E/1630/1632M) Soil preparation factor applied: 800X, 0.5g to 40ml, 10X
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All

					Sample Identification																
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Zn	0.20			1	0.63										0.76			0.85	0.76	0.90	
Fe	0.164		0.822	3.288	2.37	1.96	3.24	1.93	1.40		2.32		2.97	2.11		2.34		1.27		2.53	1.51
Cr			0.038	0.152	0.062	0.065	0.089	0.034	0.038	0.050	0.069	0.105	0.040	0.065	0.062	0.084	0.069	0.036	0.107	0.121	0.106

					Sample Identification																
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Zn	0.20			1																0.92	0.47
Fe	0.164		0.822	3.288	1.38	0.873	2.46	1.76	0.826	1.41	1.51	1.02	1.06	2.36	0.849	0.813	0.901	0.892	1.42		
Cr			0.038	0.152	0.030			0.116	0.019		0.094		0.024	0.142	0.018	0.033	0.040		0.027		0.073

					Sample Identification																
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	35	36	37	38	39	40	41	42	43	44	45	46	47	48			
Zn	0.20			1		0.37	0.58		0.59	0.34											
Fe	0.164		0.822	3.288	2.66	1.30				2.85	0.761	1.73	0.950	1.62	1.31	2.58	2.31	2.73			
Cr			0.038	0.152	0.128	0.051	0.106	0.088	0.068	0.042	0.021	0.077	0.019		0.057		0.020				

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 23-30,46-48 (>5X)

					Sample Identification																
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit																	
Zn			0.10	0.4																	

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.

**VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES**

METHOD: Trace Metals (EPA 200.8/1631E/1630/1632M) Soil preparation factor applied: 800X, 0.5g to 40ml, 10X
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 31-45

					Sample Identification													
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit														
Zn			0.11	0.44	See MB													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 23-31

					Sample Identification													
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit														
Mn			0.03	0.12														

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 32-41

					Sample Identification													
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	34	35	36	40										
Mn			0.04	0.16	0.12	0.16	0.07	0.13										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 19-27 (>5X)

					Sample Identification													
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit														
As			0.037	0.148														

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 36-46 (>5X)

					Sample Identification													
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit														
As			0.069	0.276														

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Makua Military Reservation
Collection Date: September 9 through October 15, 2013
LDC Report Date: June 18, 2014
Matrix: Tissue
Parameters: Metals
Validation Level: EPA Level III
Laboratory: Brooks Rand Labs

Sample Delivery Group (SDG): 1345019

Sample Identification

MAK001L/2L/26L	MAK045L	MAK046LMSD
MAK007L	MAK046L	MAK046LDUP
MAK009L	MAK047L	
MAK010L(COMP)	MAK049L	
MAK011L	MAK001L/2L/26LMS	
MAK013L	MAK001L/2L/26LMSD	
MAK016L/21L/27L	MAK001L/2L/26LDUP	
MAK022L	MAK007LMS	
MAK023L	MAK007LMSD	
MAK024L/25L	MAK007LDUP	
MAK025L	MAK025LMS	
MAK029L	MAK025LMSD	
MAK030L	MAK025LDUP	
MAK033L	MAK029LMS	
MAK034L	MAK029LMSD	
MAK038L	MAK029LDUP	
MAK041L	MAK045LMS	
MAK042L	MAK045LMSD	
MAK043L	MAK045LDUP	
MAK044L	MAK046LMS	

Introduction

This data review covers 42 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 200.8 for Metals, EPA Method 1631 Appendix for Mercury, EPA Method 1630 for Methyl Mercury, and EPA Method 1632 Modified for Arsenic Speciation. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Selenium, Silver, Thallium, Vanadium, and Zinc.

This review follows the Final Supplemental Marine Resources Study Sampling and Analysis Plan at Makua Military Reservation, Oahu, Hawaii (August 2013), the Final Draft Version of the U.S. Department of Defense (DoD) and Department of Energy (DoE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (March 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

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. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
11/27/13	1300820-SCV1	Silver	89 (90-110)	All samples in SDG 1345019	J (all detects) UJ (all non-detects)	P

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Iron	0.147 mg/Kg	All samples in SDG 1345019
ICB/CCB	Chromium	0.038 ug/L	All samples in SDG 1345019
ICB/CCB	Iron	0.822 ug/L	MAK001L/2L/26L MAK007L MAK009L MAK010L(COMP) MAK011L MAK013L MAK016L/21L/27L MAK022L MAK023L MAK024L/25L MAK025L MAK029L MAK030L MAK033L

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Iron	1.45 ug/L	MAK034L MAK038L MAK041L MAK042L MAK043L MAK044L MAK045L MAK046L MAK047L MAK049L
ICB/CCB	Aluminum Barium Copper Manganese Thallium Zinc	3.14 ug/L 0.11 ug/L 0.05 ug/L 0.12 ug/L 0.003 ug/L 0.40 ug/L	MAK047L MAK049L

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs 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 method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
MAK047L	Thallium	0.005 mg/Kg	0.005U mg/Kg
MAK049L	Thallium	0.004 mg/Kg	0.004U mg/Kg

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP Interference check sample analysis was not required by the methods.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
MAK001L/2L/26LMS/MSD (All samples in SDG 1345019)	Dimethyl arsenic	21 (60-140)	24 (60-140)	-	Dimethyl arsenic	J (all detects) R (all non-detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
MAK025LMS/MSD (All samples in SDG 1345019)	Dimethyl arsenic	15 (60-140)	38 (60-140)	-	Dimethyl arsenic	J (all detects) R (all non-detects)	A
MAK025LMS/MSD (MAK025L)	Methyl mercury	-	138 (65-135)	-	Methyl mercury	J (all detects)	A
MAK045LMS/MSD (All samples in SDG 1345019)	Dimethyl arsenic	41 (60-140)	28 (60-140)	-	Dimethyl arsenic	J (all detects) R (all non-detects)	A
MAK007LMS/MSD (MAK007L)	Antimony Chromium Vanadium	53 (70-130) 45 (70-130) 65 (70-130)	52 (70-130) - -	- - -	Antimony Chromium Vanadium	J (all detects) UJ (all non-detects)	A
MAK029LMS/MSD (MAK029L)	Aluminum Manganese Iron	136 (70-130) 168 (70-130) 205 (70-130)	- 144 (70-130) 177 (70-130)	- - -	Aluminum Manganese Iron	J (all detects) J (all detects) J (all detects)	A
MAK046LMS/MSD (MAK046L)	Antimony	66 (70-130)	68 (70-130)	-	Antimony	J (all detects) UJ (all non-detects)	A
MAK001L/2L/26LMS (MAK001L/2L/26L)	Inorganic arsenic	142 (65-135)	NA	NA	Inorganic arsenic Arsenic (V)	J (all detects) J (all detects)	A

For MAK007LMS/MSD, no data were qualified for Aluminum, Manganese, Iron, and Arsenic percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For MAK046LMS/MSD, no data were qualified for Aluminum, Manganese, and Iron percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
MAK007LDUP (MAK007L)	Aluminum Manganese Chromium Iron Lead	41 (≤35) 38 (≤35) 45 (≤35) 46 (≤35) 41 (≤35)	- - - - -	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)/Standard Reference Material (SRM)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Percent recoveries (%R) of the standard reference material (SRM) were within QC limits with the following exceptions:

SRM ID	Compound	%R (Limits)	Associated Samples
SRM2 (TORT-3)	Chromium	59 (75-125)	All samples in SDG 1345019
SRM1 (DORM-4)	Lead	53 (75-122)	All samples in SDG 1345019

Although Chromium and Lead were outside control limits of 75-125%, these are new SRMs to BRL and do not have historical data to compare recoveries. The recoveries of the blank spike, other SRMs and all matrix spikes met acceptance criteria and no qualifications were necessary.

IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

No field duplicates were identified in this SDG.

**Makua Military Reservation
Metals - Data Qualification Summary - SDG 1345019**

SDG	Sample	Analyte	Flag	A or P	Reason
1345019	MAK001L/2L/26L MAK007L MAK009L MAK010L(COMP) MAK011L MAK013L MAK016L/21L/27L MAK022L MAK023L MAK024L/25L MAK025L MAK029L MAK030L MAK033L MAK034L MAK038L MAK041L MAK042L MAK043L MAK044L MAK045L MAK046L MAK047L MAK049L	Silver	J (all detects) UJ (all non-detects)	P	Calibration (CCV %R)
1345019	MAK001L/2L/26L MAK007L MAK009L MAK010L(COMP) MAK011L MAK013L MAK016L/21L/27L MAK022L MAK023L MAK024L/25L MAK025L MAK029L MAK030L MAK033L MAK034L MAK038L MAK041L MAK042L MAK043L MAK044L MAK045L MAK046L MAK047L MAK049L	Dimethyl arsenic	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
1345019	MAK025L	Methyl mercury	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
1345019	MAK007L	Antimony Chromium Vanadium	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

SDG	Sample	Analyte	Flag	A or P	Reason
1345019	MAK029L	Aluminum Manganese Iron	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
1345019	MAK046L	Antimony	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
1345019	MAK001L/2L/26L	Inorganic arsenic Arsenic (V)	J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
1345019	MAK007L	Aluminum Manganese Chromium Iron Lead	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD)

**Makua Military Reservation
Metals - Laboratory Blank Data Qualification Summary - SDG 1345019**

SDG	Sample	Analyte	Modified Final Concentration	A or P
1345019	MAK047L	Thallium	0.005U mg/Kg	A
1345019	MAK049L	Thallium	0.004U mg/Kg	A

**Makua Military Reservation
Metals - Field Blank Data Qualification Summary - SDG 1345019**

No Sample Data Qualified in this SDG

LDC #: 31509M4 **VALIDATION COMPLETENESS WORKSHEET**

SDG #: 1345019

Level III

Laboratory: Brooks Rand Labs

Date: 3/25/14

Page: 1 of 2

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: Metals (EPA Method 200.8), Mercury (EPA Method 1631), Methyl Mercury (EPA Method 1631M), Arsenic Speciation (EPA Method 1632M)

Appendix

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.	Technical holding times	A	Sampling dates: 9/9/13-10/15/13
II.	ICP/MS Tune	A	
III.	Calibration	SW	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	N	k.t. required
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	SW	
VIII.	Laboratory Control Samples (LCS)	SW	LCS, SRM
IX.	Internal Standard (ICP-MS)	N	k.t. reviewed
X.	ICP Serial Dilution	N	k.t. performed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

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

Validated Samples: Tissue

1	MAK001L/2L/26L	11	MAK025L	21	MAK045L	31	MAK025LMS
2	MAK007L	12	MAK029L	22	MAK046L	32	MAK025LMSD
3	MAK009L	13	MAK030L	23	MAK047L	33	MAK025LDUP
4	MAK010L(COMP)	14	MAK033L	24	MAK049L	34	MAK029LMS
5	MAK011L	15	MAK034L	25	MAK001L/2L/26LMS	35	MAK029LMSD
6	MAK013L	16	MAK038L	26	MAK001L/2L/26LMSD	36	MAK029LDUP
7	MAK016L/21L/27L	17	MAK041L	27	MAK001L/2L/26LDUP	37	MAK045LMS
8	MAK022L	18	MAK042L	28	MAK007LMS	38	MAK045LMSD
9	MAK023L	19	MAK043L	29	MAK007LMSD	39	MAK045LDUP
10	MAK024L/25L	20	MAK044L	30	MAK007LDUP	40	MAK046LMS

Notes: _____

METHOD: Metals (EPA Method 200.8), Mercury (EPA Method 1631E), Methyl Mercury (EPA Method 1630M), Arsenic Speciation (EPA Method 1632)

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.	Technical holding times		Sampling dates:
II.	ICP/MS Tune		
III.	Calibration		
IV.	Blanks		
V.	ICP Interference Check Sample (ICS) Analysis		
VI.	Matrix Spike Analysis		
VII.	Duplicate Sample Analysis		<i>See page 1</i>
VIII.	Laboratory Control Samples (LCS)		
IX.	Internal Standard (ICP-MS)		
X.	ICP Serial Dilution		
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data		
XIII.	Field Duplicates		
XIV.	Field Blanks		

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

Validated Samples:

41	MAK046LMSD	51	<i>ME</i>	61	71
42	MAK046LDUP	52		62	72
43		53		63	73
44		54		64	74
45		55		65	75
46		56		66	76
47		57		67	77
48		58		68	78
49		59		69	79
50		60		70	80

Notes: _____

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace Metals (EPA 200.8/1631E/1630/1632M) Soil preparation factor applied: 800X, 0.5g to 40ml, 10X
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: PB: All, ICB/CCB: Cr: All, Fe: 1-14 (>5X)

Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	Sample Identification												
Cr			0.038	0.152													
Fe	0.147		0.822	3.288													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: PB: All, ICB/CCB: Cr: All, Fe: 15-24 (>5X)

Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	15	16	17	18	19	20	21	22	23	24
Cr			0.038	0.152										
Fe	0.147		1.45	5.8										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 23,24

Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	Sample Identification											
					23	24										
Al			3.14	12.56												
Ba			0.11	0.44												
Cu			0.05	0.2												
Mn			0.12	0.48												
Tl			0.003	0.012	0.005	0.004										
Zn			0.40	1.6												

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.

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

METHOD: Trace metals (EPA Method 1638/1631E/1630/1632M)

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 lab?
- Y N N/A Were all duplicate sample relative percent differences (RPD) within the control limits of lab?

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	25/26	Limu	DMAs	21 (60-140)	24 (60-140)		All	J/R/A
2	31/32	Limu	DMAs	15 (60-140)	38 (60-140)		All	J/R/A
			MeHg		138 (65-135)		11*	J det/A
3	37/38	Limu	DMAs	41 (60-140)	28 (60-140)		All	J/R/A
4	28/29	Limu	Sb	53 (70-130)	52 (70-130)		2*	J/U/J/A
			Cr	45 (70-130)				
			V	65 (70-130)				
5	34/35	Limu	Al	136 (70-130)			12*	J det/A
			Mn	168 (70-130)	144 (70-130)			J det/A
			Fe	205 (70-130)	177 (70-130)			J det/A
6	40/41	Limu	Sb	66 (70-130)	68 (70-130)		22*	J det/A J/U/J/A

Comments: * 2nd MS/MSD %Rs were within QC Limits, 28/29: Al, Mn, Fe, As 40/41: Al, Mn, Fe >4X, no qual for %R

