



# FINAL Follow-Up Investigation Assessment Report



UNIVERSITY  
of HAWAII®  
MĀNOA

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## *Appendices*

- Appendix A: Summary of Military Munitions
- Appendix B: Field Collection Sheets
- Appendix C: Photo Logs
- Appendix D: Chain of Custody Forms
- Appendix E: Laboratory Reports
- Appendix F: Data Summary Tables
- Appendix G: Data QA/QC
- Appendix H: Biota Arsenic Speciation Data
- Appendix I: Hydrocast (Water Column) Data

*Appendix A*  
*Summary of Military Munitions*

**Table A-1: Summary of Military Munitions Documented at Ordnance Reef (HI-06), 2002**

ITEM	APPROXIMATE QUANTITY
.50 caliber cartridges	200
100lb old style frag bomb recon from surface not diver verified	1
90mm mortar	1
105mm cartridge case	1
105mm projectiles*	150
155mm projectiles*	75
20mm cartridges*	1040
25mm cartridges	250
closed ammo boxes (2ftx2ftx2ft)	30
bottom mine	1
depth charge	1
tubes (4ft x 3in dia)**	70
has? (2ft x 3in dia)**	1
high concentration of 6in projectiles	
large pile of munitions - counted by divers before ascent**	45
3 to 6in Naval gun ammunition	35
5in Naval gun ammunition	5
5 to 8in Naval gun ammunition	90
6 to 8in Naval gun ammunition	
8in projectiles*	45
Naval gun ammunition various sizes	65
APPROXIMATE QUANTITY	2106
All quantities are estimated and identifications are considered tentative based on the 2002 report.	
These are used here for initial planning purposes only.	

**Table A-2: Summary of Military Munitions Documented at Ordnance Reef (HI-06), 2010**

	<b>Small Arms Ammunition</b>	<b>Small to Medium Caliber Munitions<sup>a</sup></b>	<b>Large Caliber and Other Munitions<sup>b</sup></b>
Work Area A	14	0	0
Work Area B	229	1,461	0
Work Area C	12,557	6,061	874
Total	12,800	7,525	874

Notes:

Reference: NOAA, 2011

<sup>a</sup> Munitions above .50 caliber to 105 millimeter

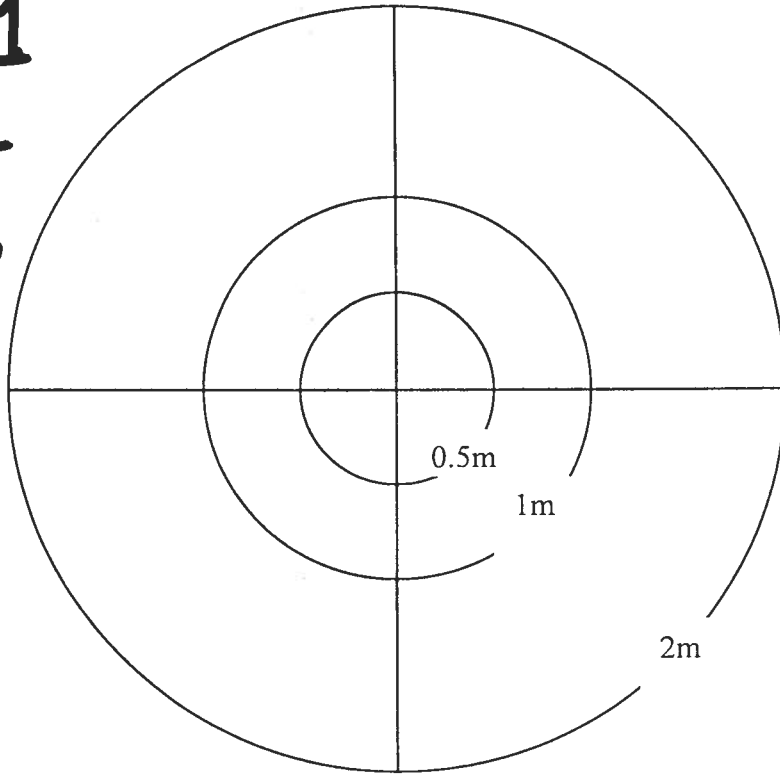
<sup>b</sup> Munitions larger than 105 millimeter, bombs, rockets, etc.

*Appendix B*  
*Field Collection Sheets*

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 31  
DMM 32  
DMM 33



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH.

LATITUDE: ~~21.25110N~~  
21° 25.720N

LONGITUDE: ~~158~~  
158° 12.088 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 31</u>			<u>10:15a</u>	<u>ard item # 81</u>
<u>DMM 32</u>		<u>21.4M</u>		
<u>DMM 33</u>				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

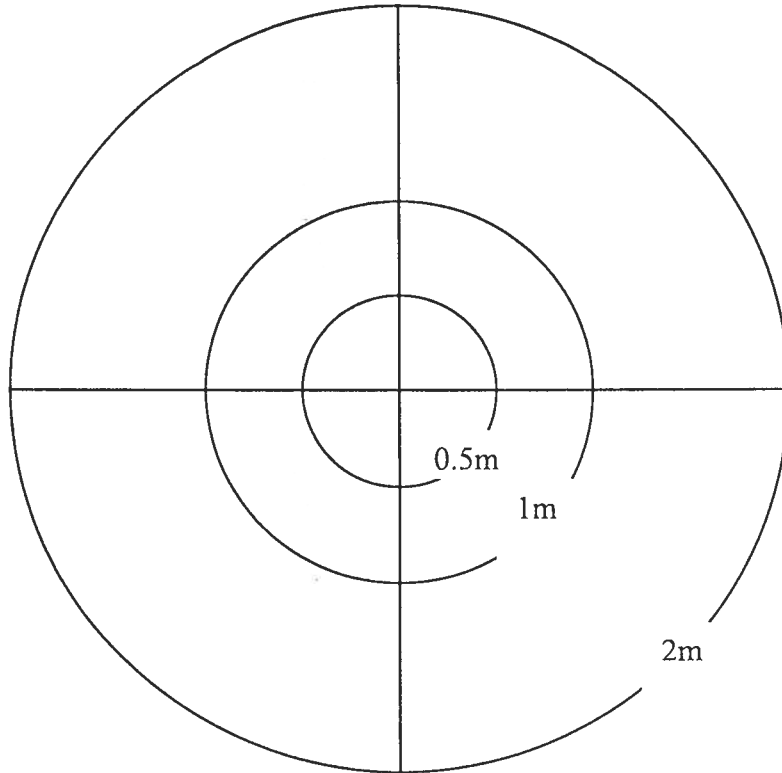
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 34  
DMM 35  
DMM 36



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21° 25.718'N

LONGITUDE: 158° 12.087'W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 34		17.0m	10:35a	ARA Dem # 97
DMM 35				
DMM 36				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

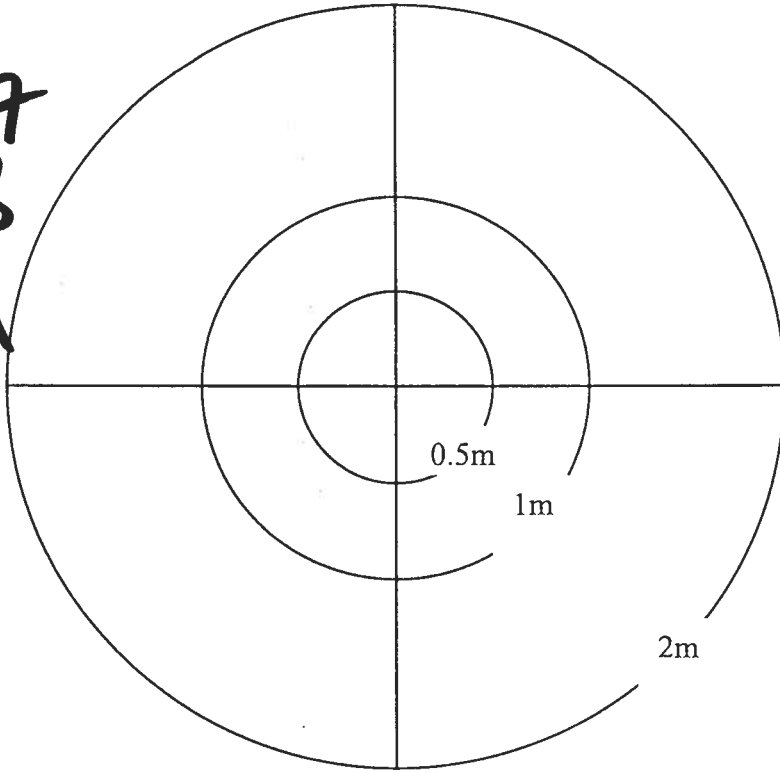
Tag #	Sample #	Sample Location	Date and Time	Comments



ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 37  
DMM 38  
DMM 39



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 28° 25.698 N

LONGITUDE: 158° 12.089 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 37		+	11:20a	ARA Target #193
DMM 38				Projectile 5" x 20"
DMM 39				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

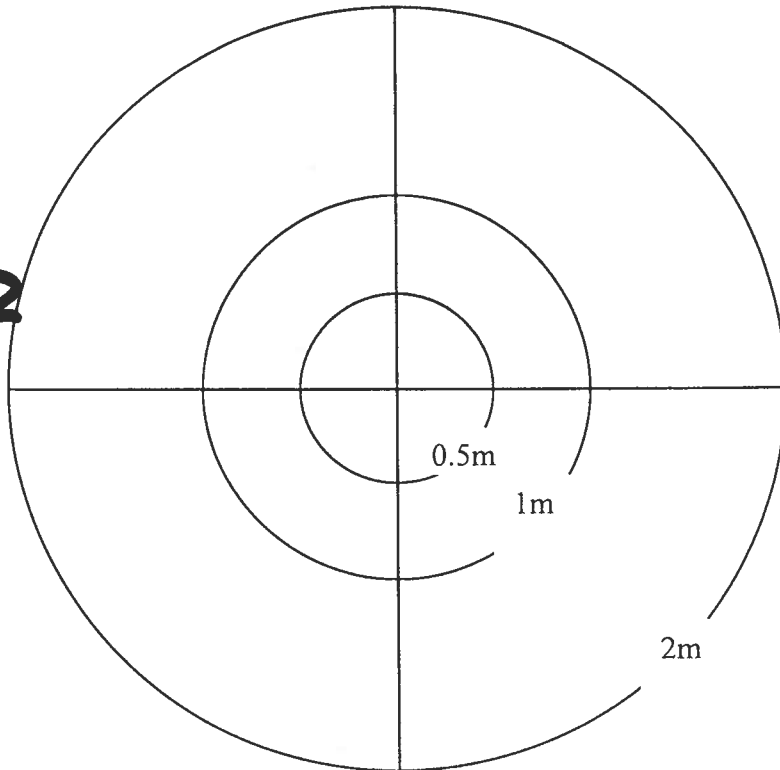
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 40  
DMM 41  
DMM 42



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21°25.614N

LONGITUDE: 158°12.018W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 40		70 ft	11:50a	ARA Item # 126
DMM 41				5" x 6" x 18"
DMM 42				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

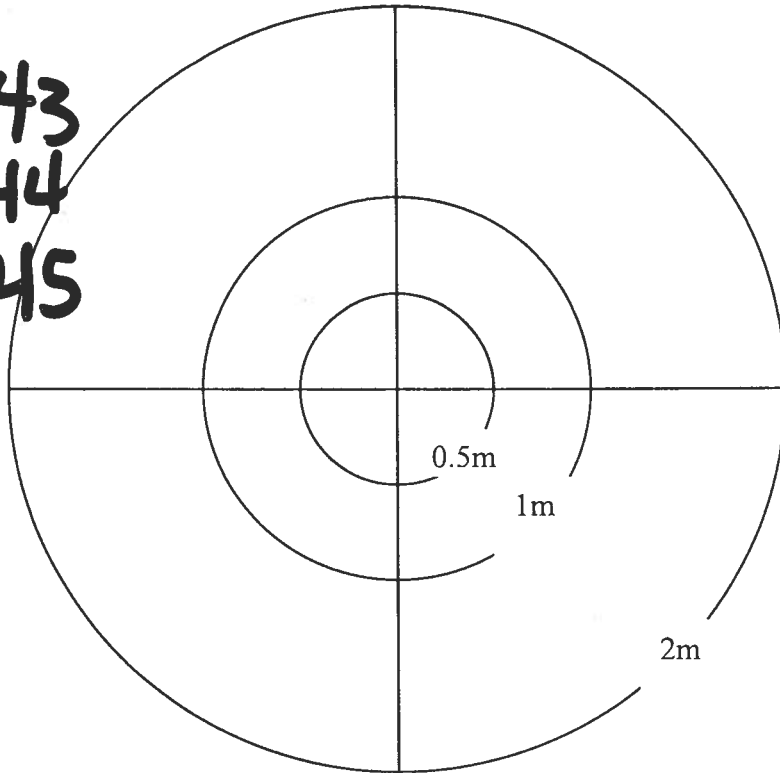
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 43  
DMM 44  
DMM 45



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21°25.823N

LONGITUDE: 158°12.170W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 43		70ft	12:15p	
DMM 44				
DMM 45				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

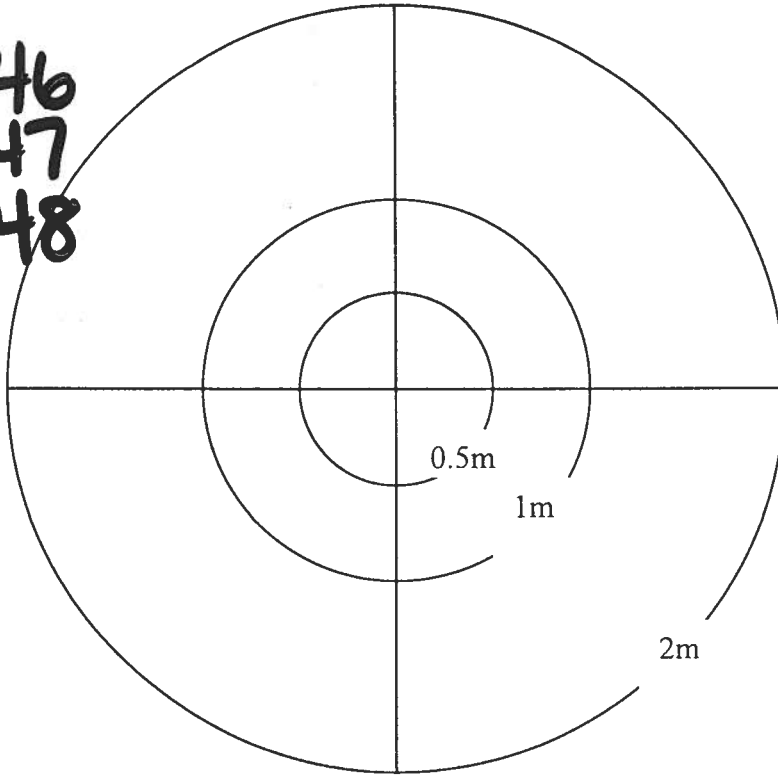
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 46  
DMM 47  
DMM 48



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: VH

LATITUDE: 21° 25.846N

LONGITUDE: 158° 12.369W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 46		120 ft	12:45p	sandy bottom
DMM 47		135 ft		
DMM 48				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

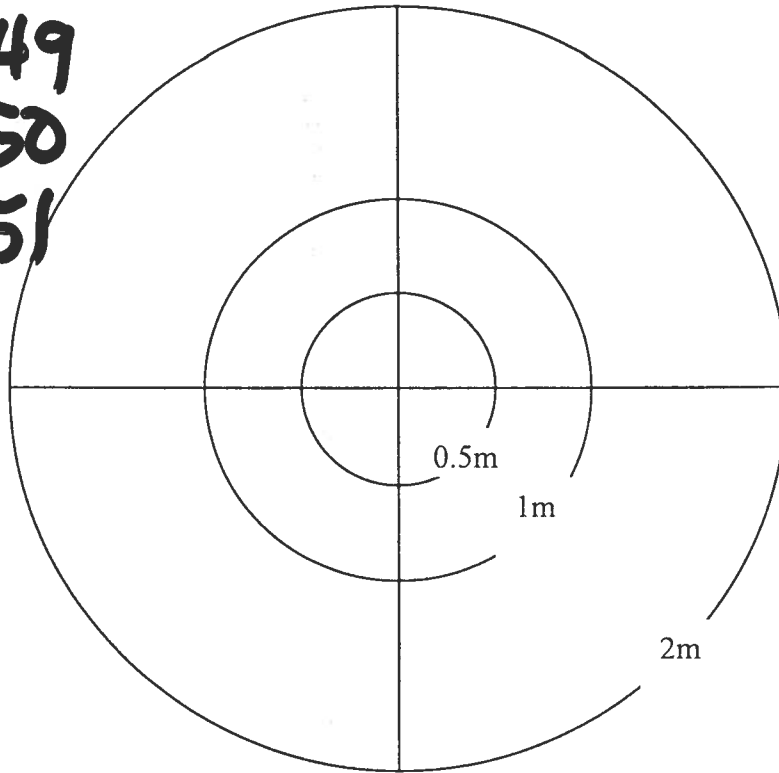
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM 49  
DMM 50  
DMM 51



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: VH

LATITUDE: 21°25.711N

LONGITUDE: 158°12.065W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 49		76ft	1:10P	
DMM 50				
DMM 51				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

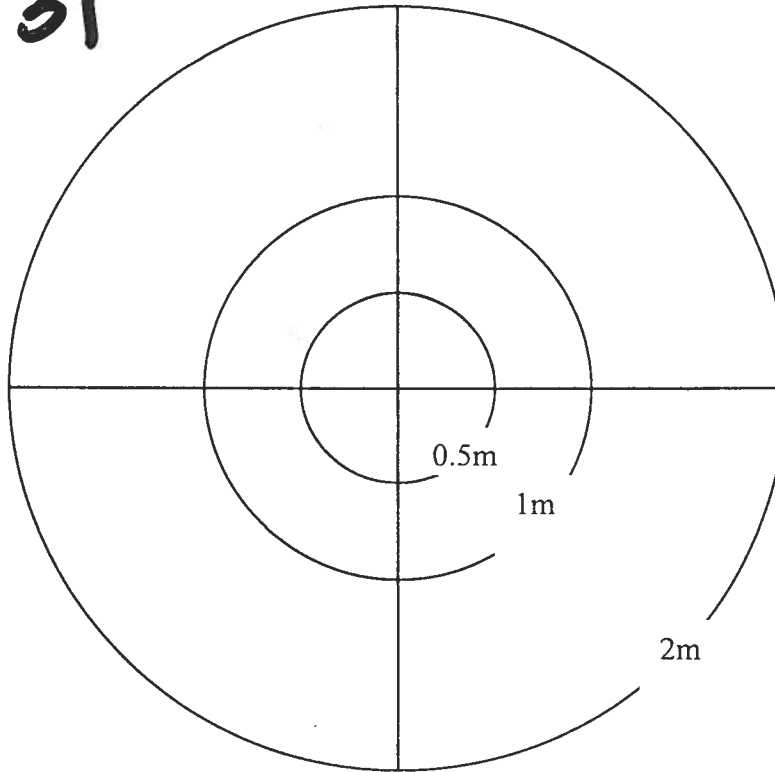
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP 31



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21°25.421N

LONGITUDE: 158°11.821W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
WWTP 31		92ft	1325 6/11/11	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

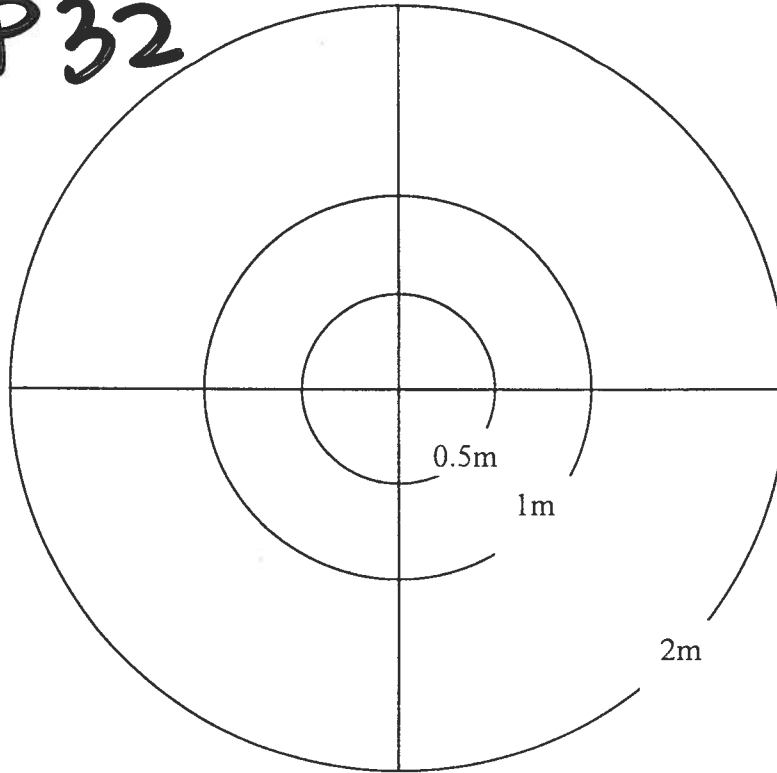
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP 32



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: 4H

LATITUDE: 21° 25.447 N

LONGITUDE: 158° 11.779 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
WWTP 32		26.9m 82ft	1335	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

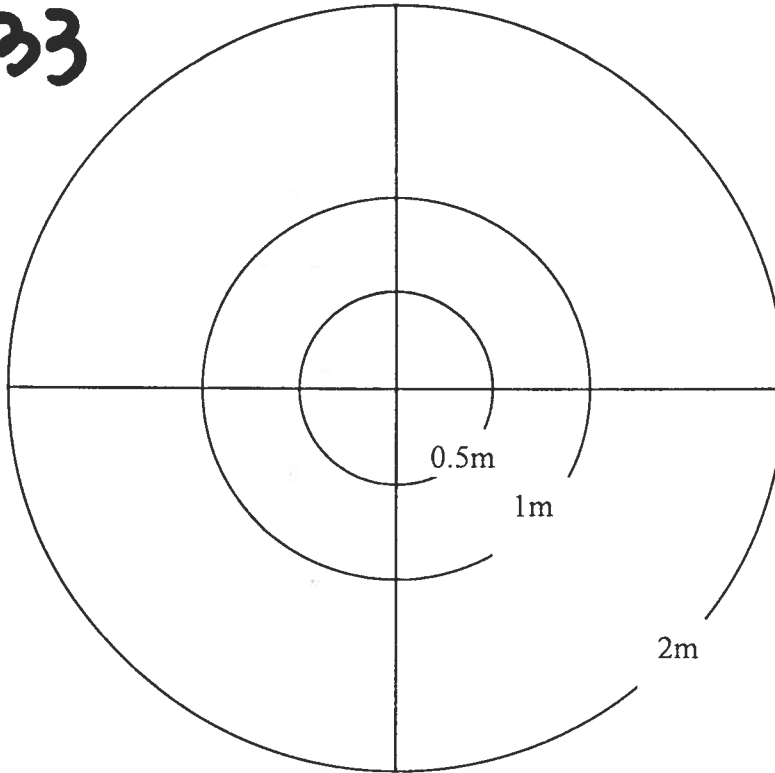
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP 33



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: VH

LATITUDE: 21° 25.486 N

LONGITUDE: 158° 11.745 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
WWTP 33		72.9m	1341	
		75ft	8/6/11	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

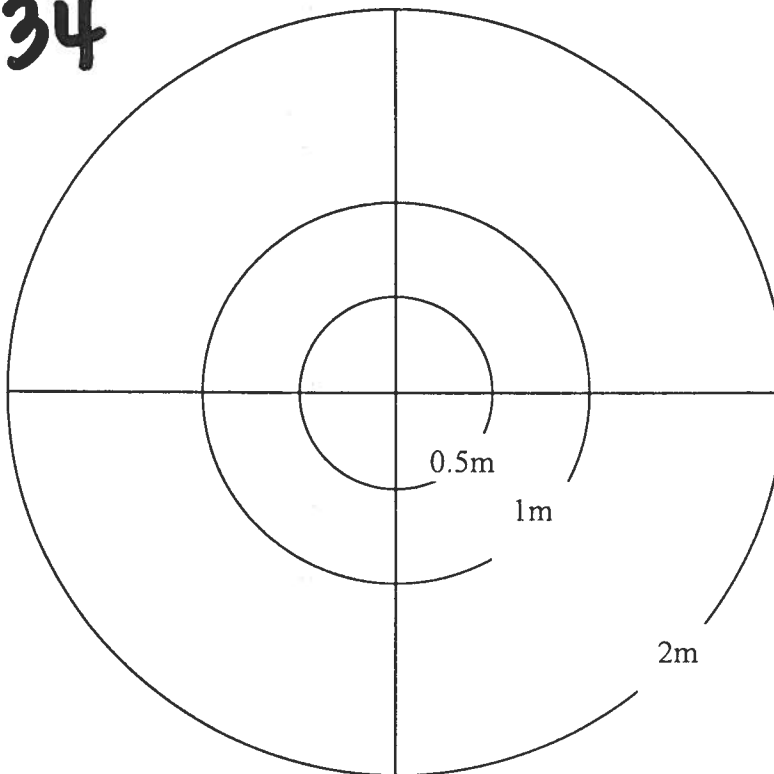
Tag #	Sample #	Sample Location	Date and Time	Comments



ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP 34



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21° 25.510 N

LONGITUDE: 158° 11.711 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>WWTP 34</u>		<u>19.5 m</u>	<u>1346</u>	
		<u>65ft</u>	<u>8/10/11</u>	
		<u>55ft</u>		

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

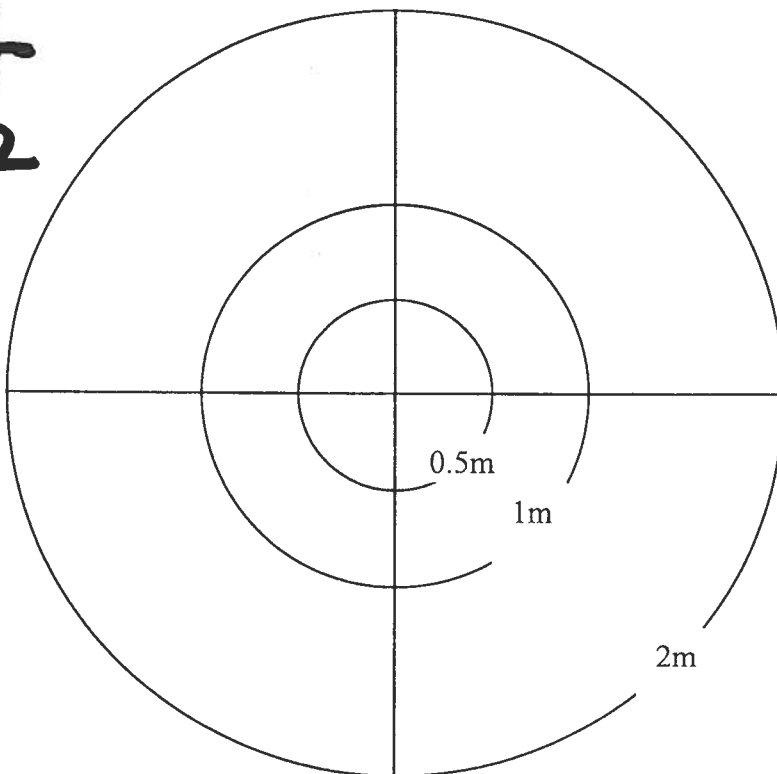
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

~~CON #~~  
con 42



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21°27.187N

LONGITUDE: 158°12.970W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>con 42</u>		<u>27.5m</u>	<u>1420</u>	<u>near old con 1 site</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

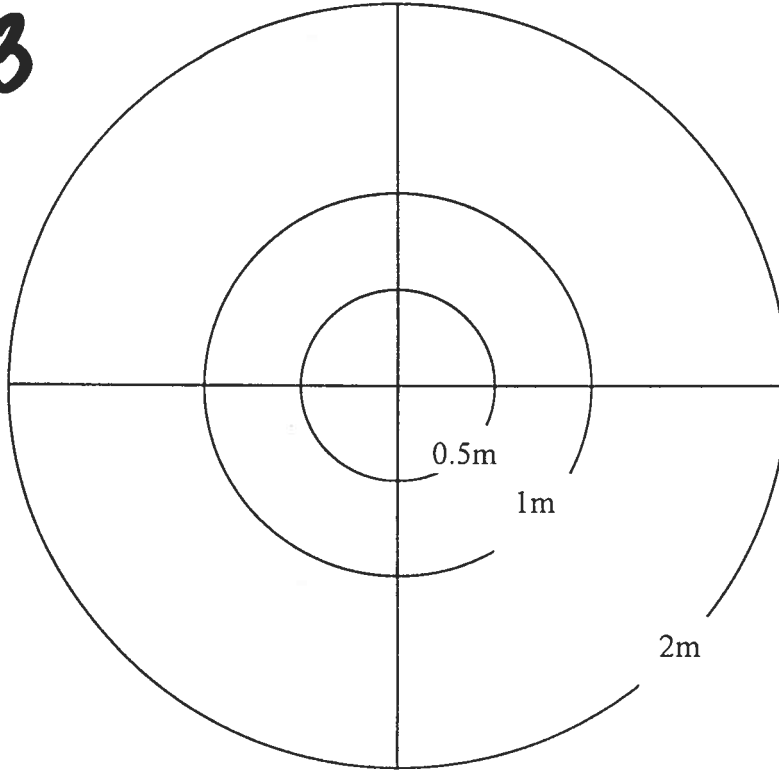
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

con 43



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: Decarlo

SAMPLE COLLECTOR: UH

LATITUDE: 21.45905 note unit change LONGITUDE: 158.21793

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>con 43</u>		<u>5m</u>	<u>1420</u>	
		<u>14m</u>	<u>1435</u>	

\*near old CON 3

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments
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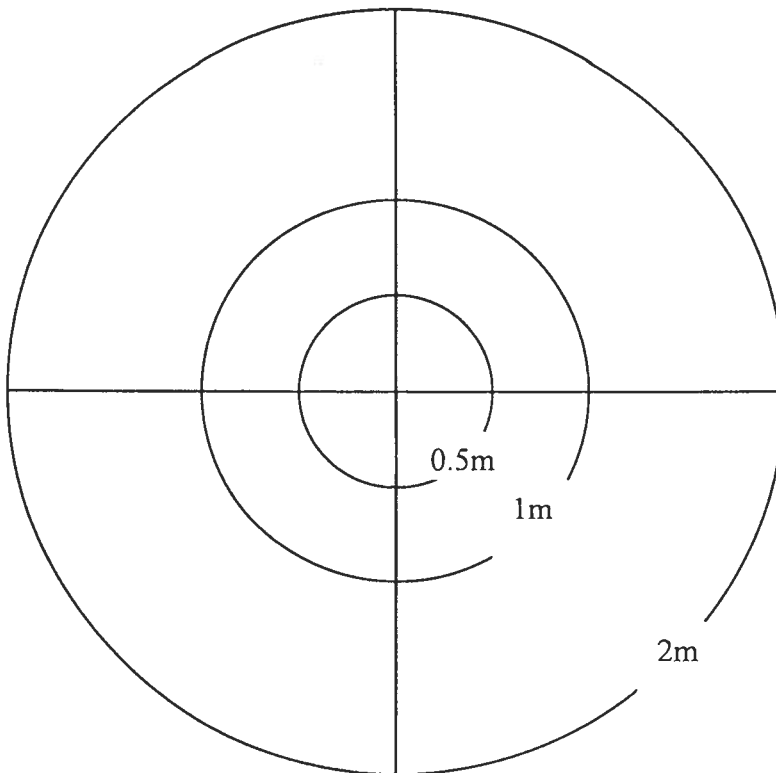
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
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ORDNANCE REEF Sample Collection Sheet

NORTH

CON 44



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: VH

LATITUDE: 21.45978

LONGITUDE: 158.21758

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON 44		8m	1440 8/6/11	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

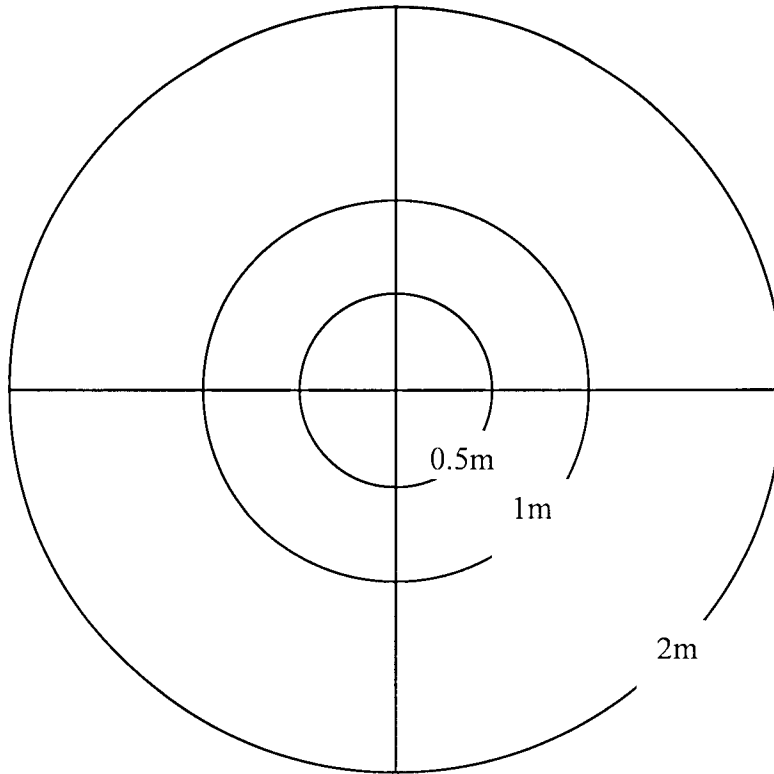
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

CON 45

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: UH

LATITUDE: ~~21.45093~~ 21.45703 LONGITUDE: 158.21487

SEDIMENT ~~21.45073~~ 21.45703

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON 45</u>		<u>SW</u> <u>8.2 m</u>	<u>1445</u> <u>8/16/11</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

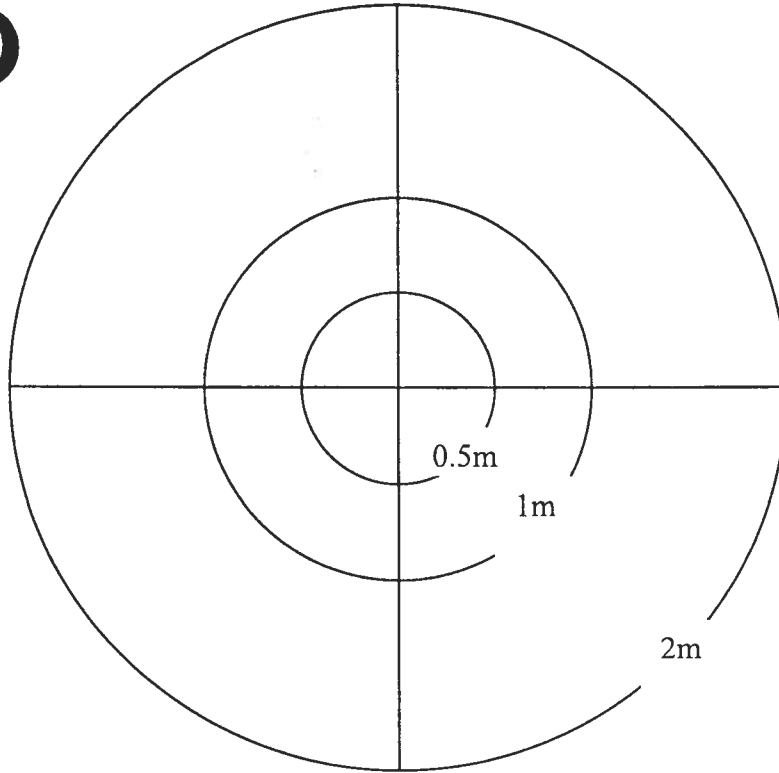
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

NPS 40



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: DeCarlo

SAMPLE COLLECTOR: VH

LATITUDE: 21.42442 N LONGITUDE: 158.18417

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS 40</u>		<u>7.9m</u> <u>1016a</u>	<u>8/7/11</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

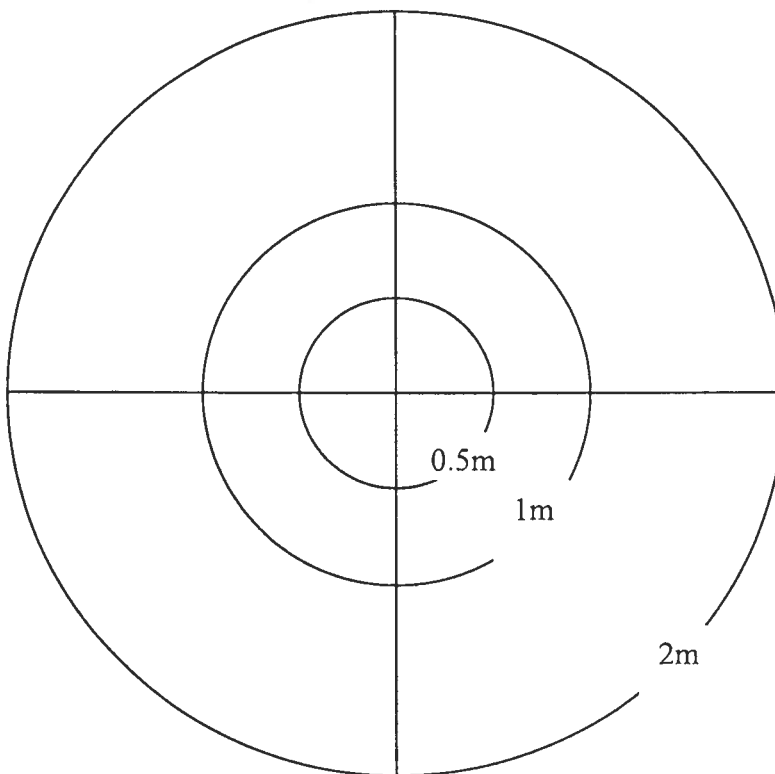
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NPS 41  
8/7/11

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: DeGard

SAMPLE COLLECTOR: UH

LATITUDE: 21.42518 LONGITUDE: 158.18544

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS 41</u>	<u>5.7m</u>	<u>1030a</u>		

SEAWATER

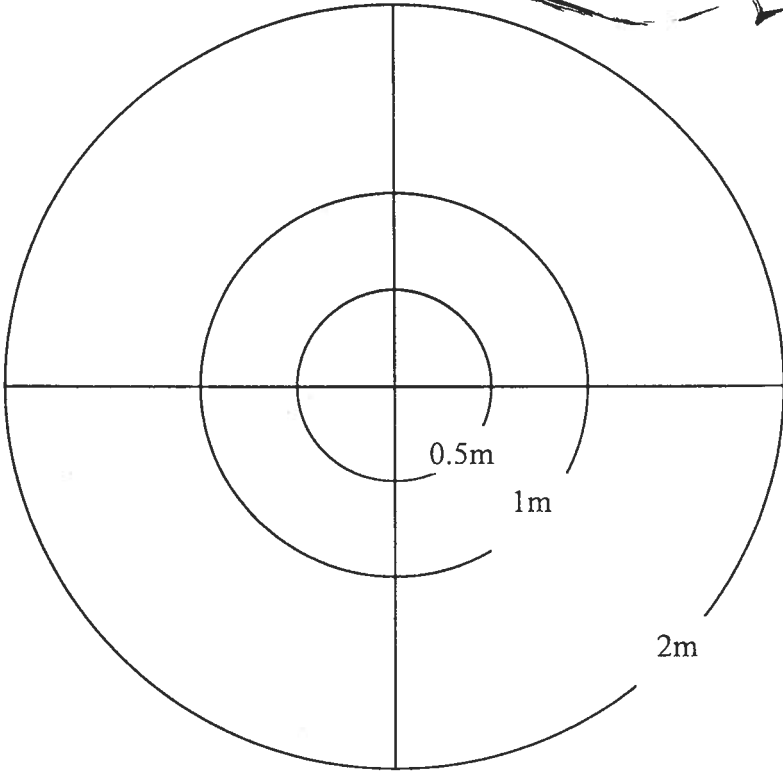
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

**NPS 42**  
**8/7/11**



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: DeCarlo  
 SAMPLE COLLECTOR: UH  
 LATITUDE: 21.42635 N LONGITUDE: 158.18568 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS 42</u>	<u>6.1m</u>	<u>1035a</u>		

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

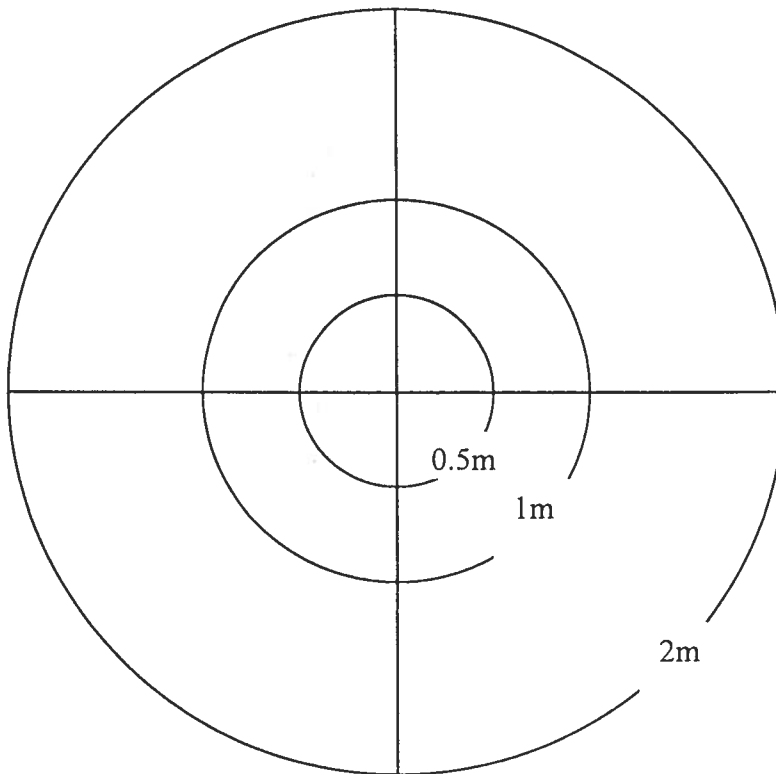
Tag #	Sample #	Sample Location	Date and Time	Comments



ORDNANCE REEF Sample Collection Sheet

NORTH

NPS 43  
 NPS 44  
 (field dup)  
 8/7/11



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR UH SCIENTIST: De Carlo  
 SAMPLE COLLECTOR: Ulf  
 LATITUDE: 21.42839 N LONGITUDE: 158.18341 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS 43</u>		<u>5.6m</u>	<u>1044a</u>	
<u>NPS 44</u>				

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

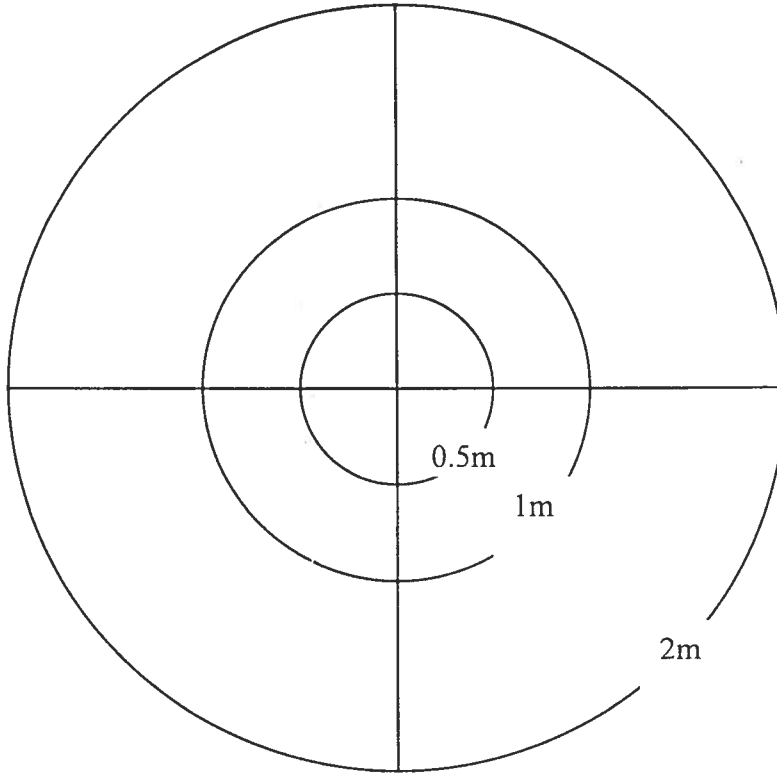
Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NPS 45

8/7/11

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: OR

UH SCIENTIST: DeLorio

SAMPLE COLLECTOR: UH

LATITUDE: 21.42990 N

LONGITUDE: 156.18304 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
NPS 45		50m	10/4/11	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments
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BIOTA

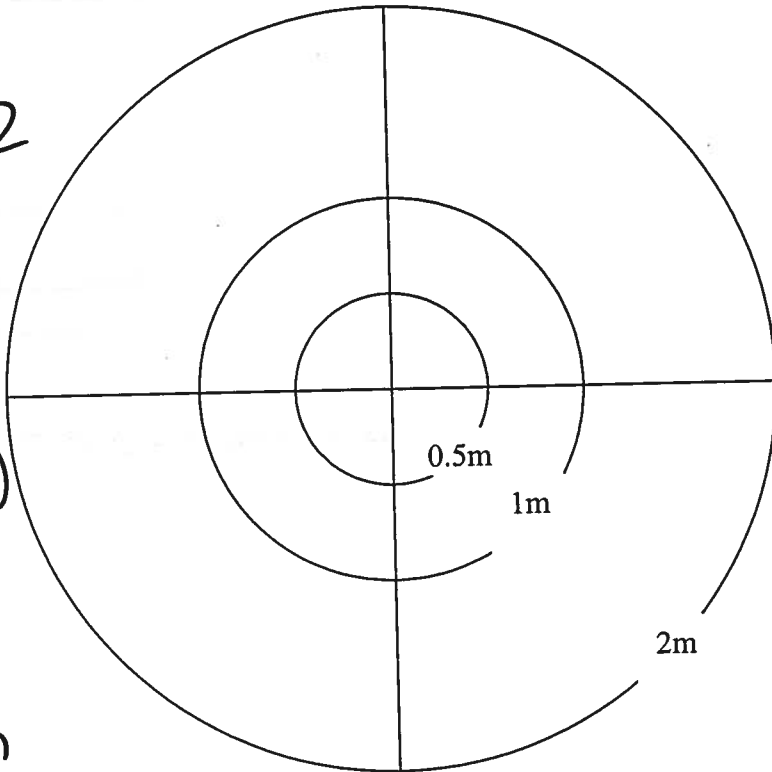
Tag #	Sample #	Sample Location	Date and Time	Comments
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NORTH

7-18-12  
Hydrocast  
#8

(DMM  
Stratum)

Time  
lowered: 1333  
Retrieved: 1336  
57m



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Hydrocast #8  
SAMPLE COLLECTOR: WTT

UH SCIENTIST: E. DeCarlo  
Lat: 21° 25.386  
Long: 158° 12.168

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

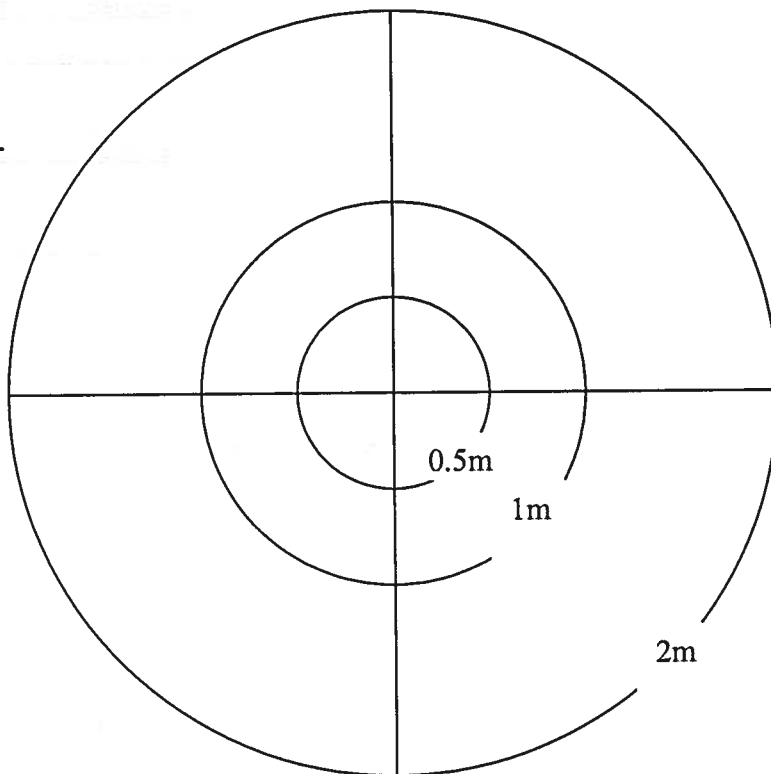
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

NPS  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS51

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.625

Long: 158° 11.082

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS51</u>	<u>6.3m</u>		<u>7-18-12 1234</u>	<u>Collected by PONAR</u>

SEAWATER

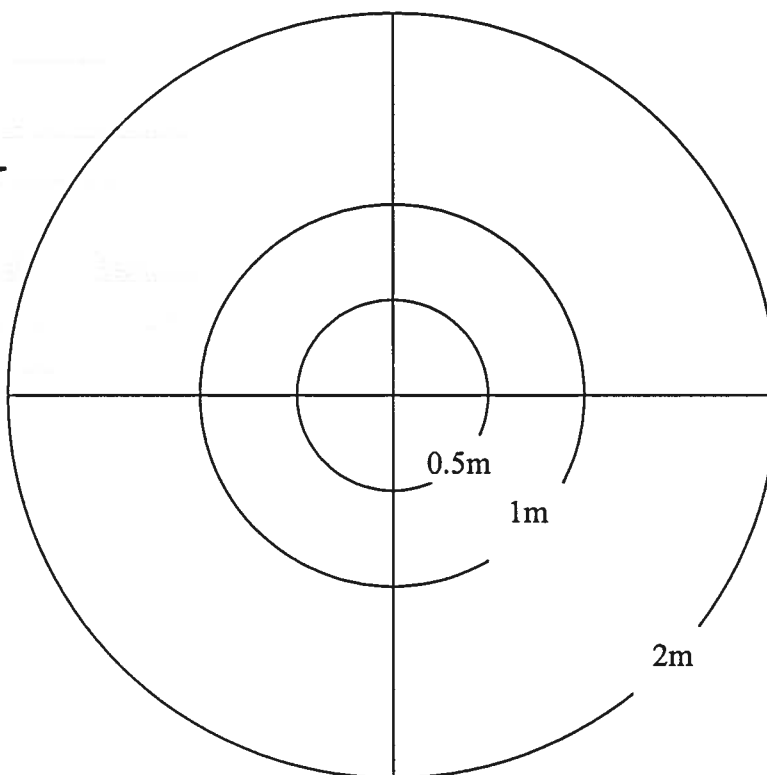
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

NPS  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS49

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat! 21° 25.694

Long! 158° 11.095

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<del>NPS49</del>	NPS49	7.7m	7-18-12 1214	
	NPS50		7-18-12 1214	duplicate of NPS49

Samples collected by PONAR

SEAWATER

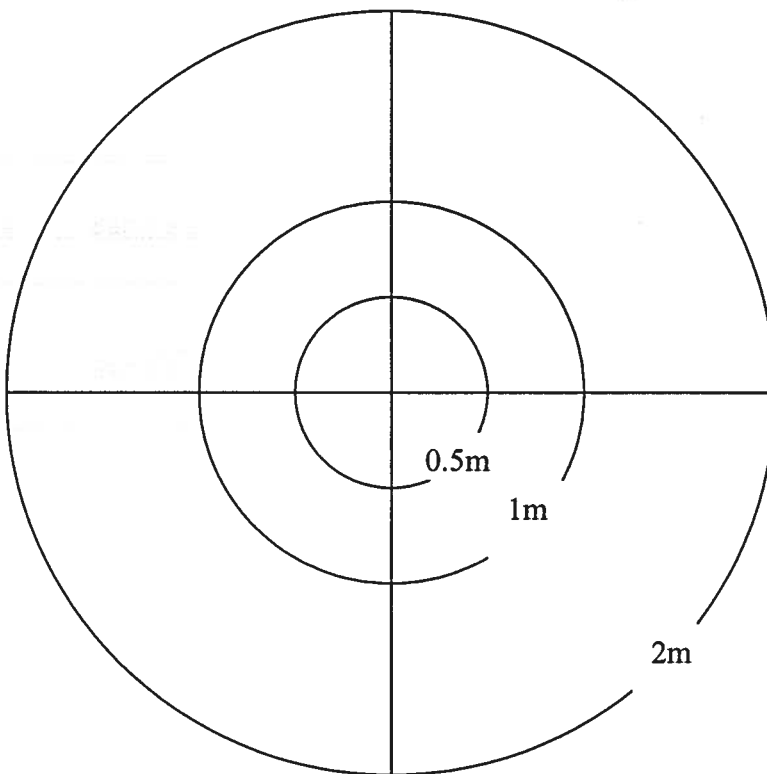
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

NPS  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS48

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.709

Long: 158° 11.082

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS48</u>		<u>7.6m</u>	<u>7-18-12 1209</u>	<u>collected by PONAR</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

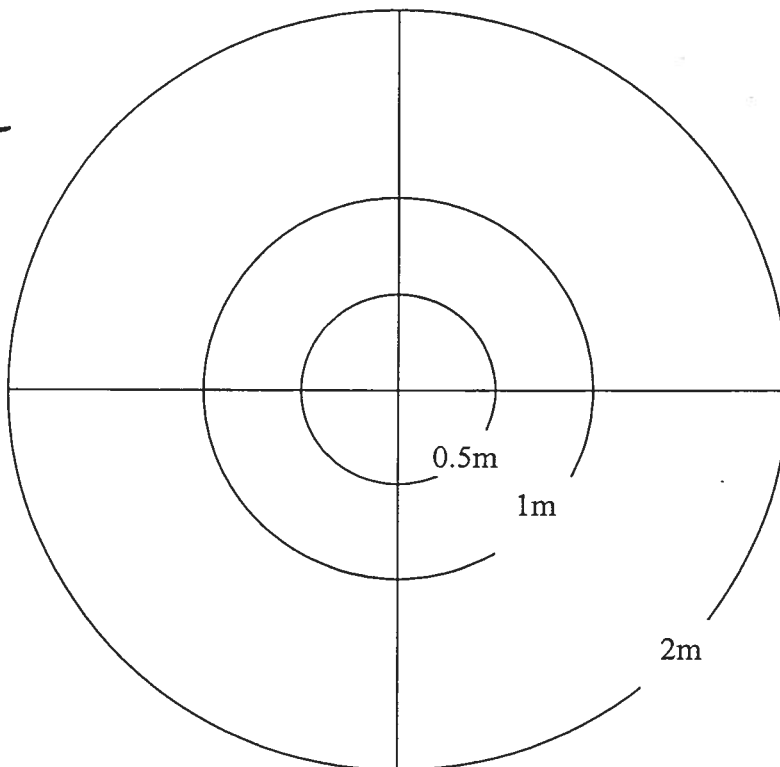
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

NPS  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS47

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.712 158° 10.983W

Long: ~~158° 11.954~~ 158° 11.983  
983

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS47</u>	<u>4.8m</u>		<u>7-18-12 1157</u>	<u>Collected by PONAR</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

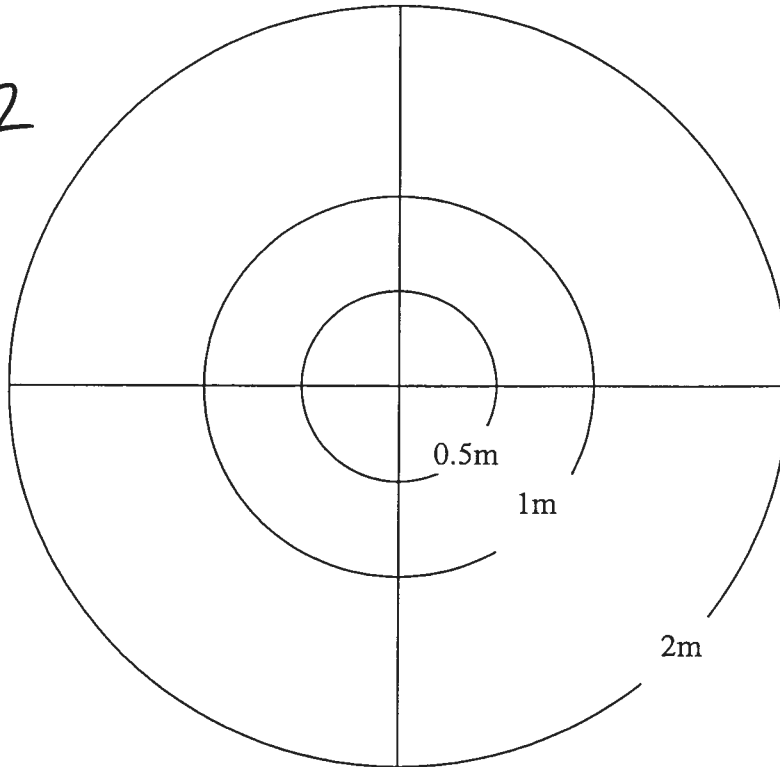
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

NPS  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS46

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.700

Long: ~~158° 11.959~~ 158° 10.959 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS46</u>	<u>3.4 m</u>		<u>7-18-12 1150</u>	<u>Collected by PONAR</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

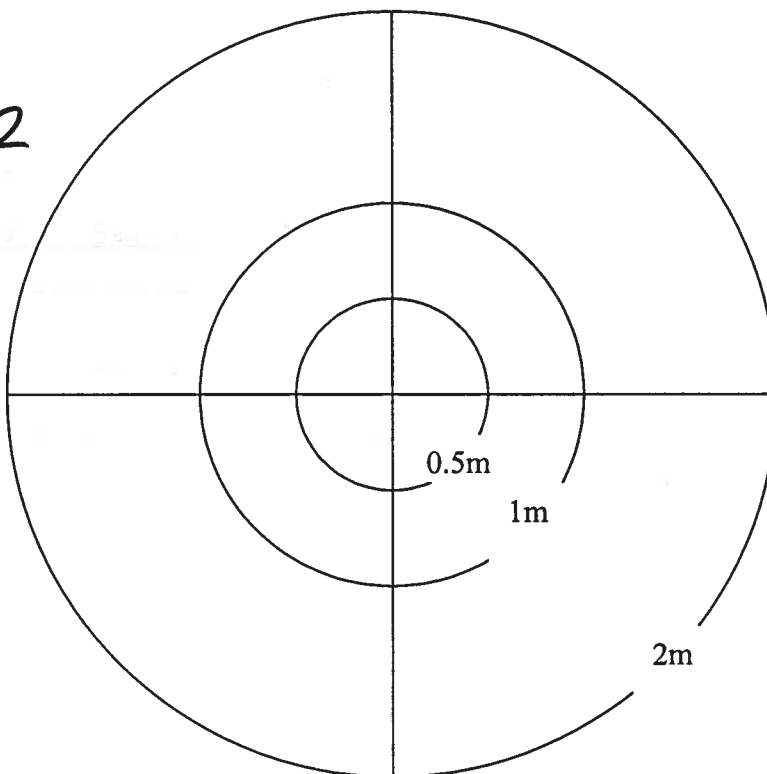
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments



NORTH

7-18-12  
 NPS  
 Hydrocast  
 # 7  
 7.0 m  
 Time: 1123



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Hydrocast # 7

UH SCIENTIST: E. de Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.598  
 Long: 158° 11.205

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

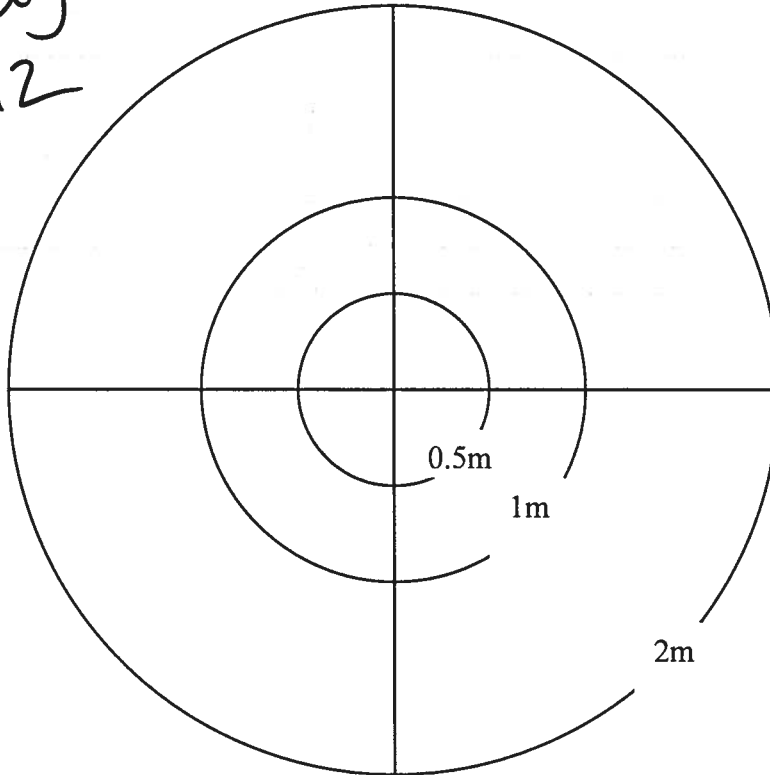
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

Pokai Bay  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: PB10

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

LATITUDE: 21° 26.799

LONGITUDE: 158° 11.674

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
PB10	3.2m		7-18-12 11:17	-UH diver grab

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

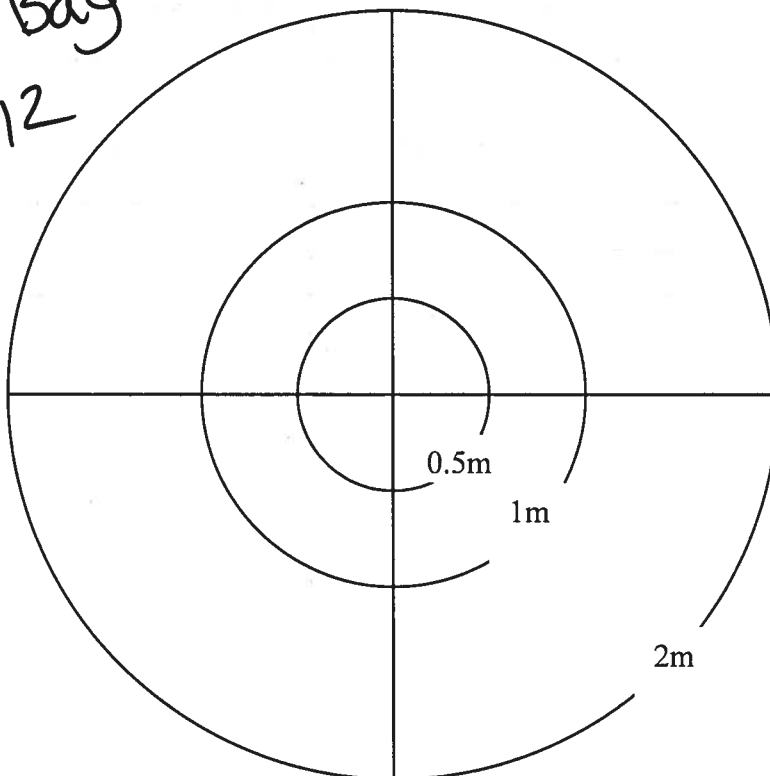
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

Pokai Bay  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: PB09

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

LATITUDE: 21° 26.742

LONGITUDE: 158° 11.636

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>PB09</u>	<u>2.9 m</u>		<u>7-18-12 1115</u>	<u>-UH diver grab</u>

SEAWATER

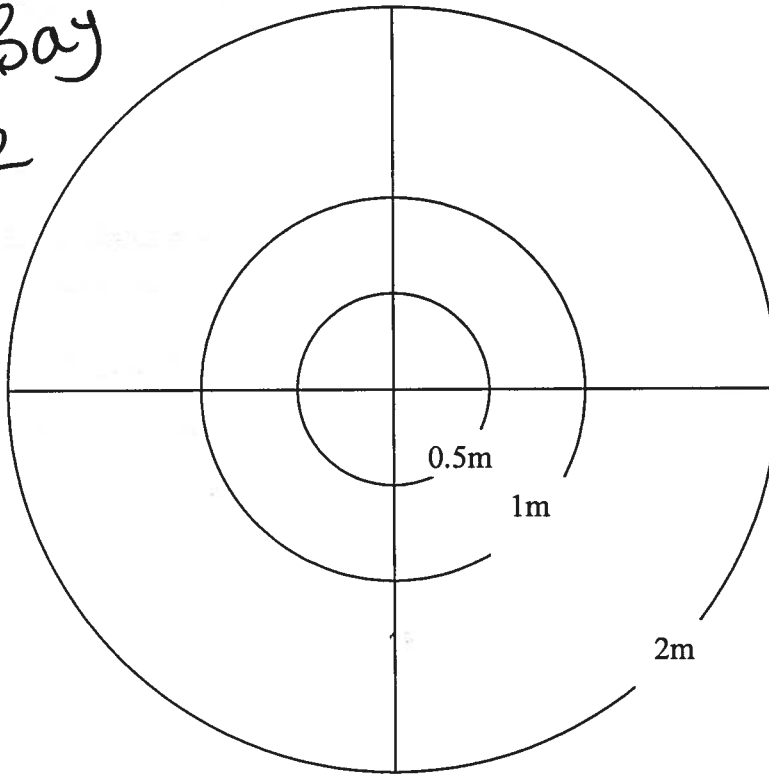
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

Pokai Bay  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: PB08

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 26.685

Long: 158° 11.593

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
PB08	<del>2.3</del> 3.3m		7/18/12 1110	UH diver grab

SEAWATER

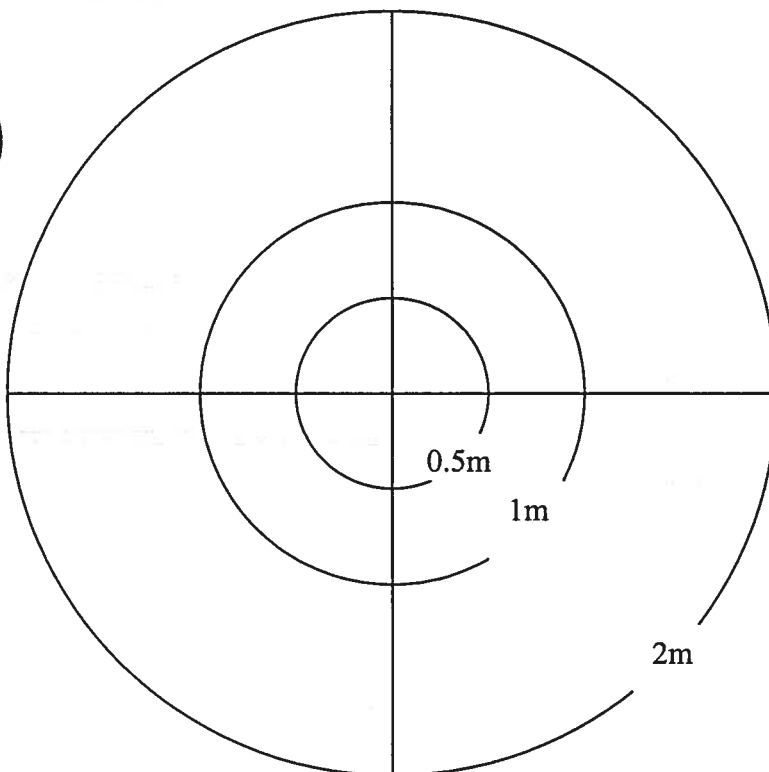
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

Pokai Bay  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: PB07

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: UH

Lat: 21° 26.657

Long: 158° 11.526

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>PB07</u>	<u>4.2m</u>		<u>7-18-12 1105</u>	<u>-diver grab by UH</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

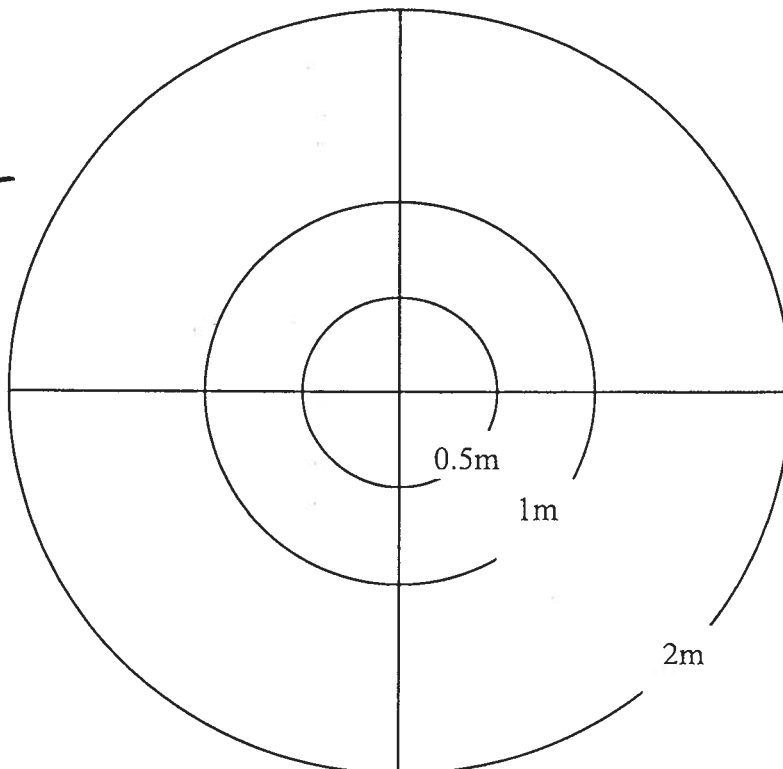
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON51

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

158° 12.799W

LATITUDE: 21° 27.450

LONGITUDE: 158° 13.799 ~~W~~

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON51</u>		<u>5.5m</u>	<u>7/18/12 1040</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments
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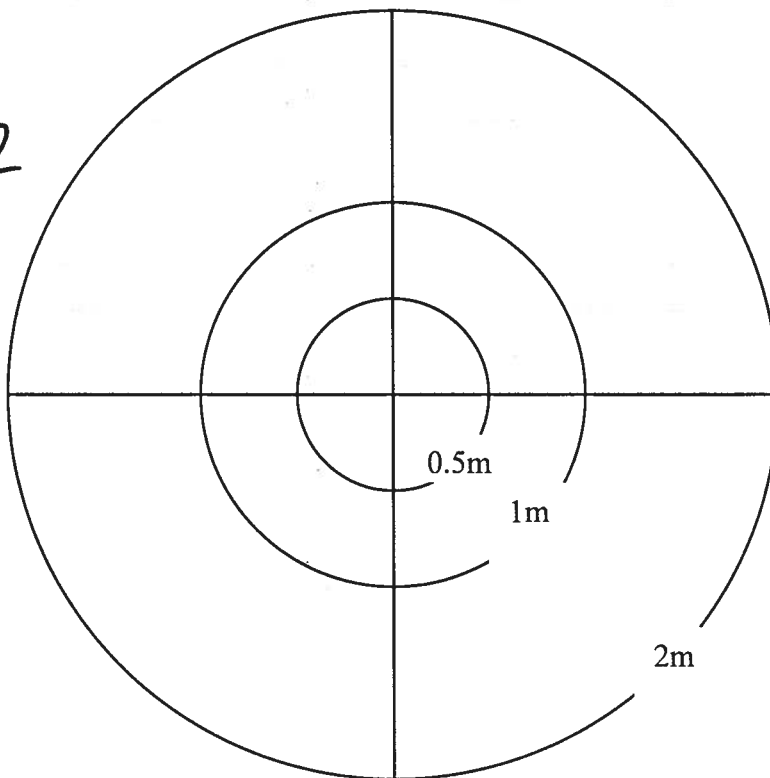
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON51-0017</u>		<u>5.5m</u>	<u>7/18/12</u>	<u>1050</u>
<u>CON51-LO11</u>			<u>7/18/12</u>	<u>1050</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON49

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

LATITUDE: 21° 27.530

LONGITUDE: 158° 13.076

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON49		14.0m	7/18/12 1005	
CON50			7/18/12 1005	CON50 Dup of CON49

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

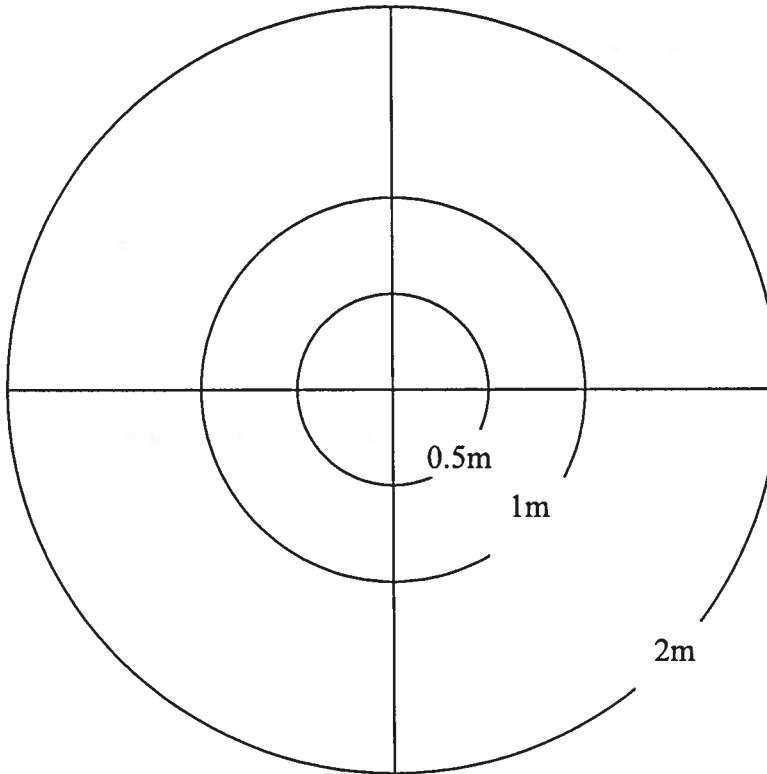
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON49-0016		14.0m	7/18/12 1030	
CON49-L010			7/18/12 1030	

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7-18-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON48

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/uh

LATITUDE: 21° 27.203

LONGITUDE: 158° 12.986

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON48		26.2m	7-18-12 0925	

~~CON50~~

~~SEAWATER~~ Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
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BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON48-0015		26.2m	7/18/12 0955	
CON48-L009			7/18/12 0955	

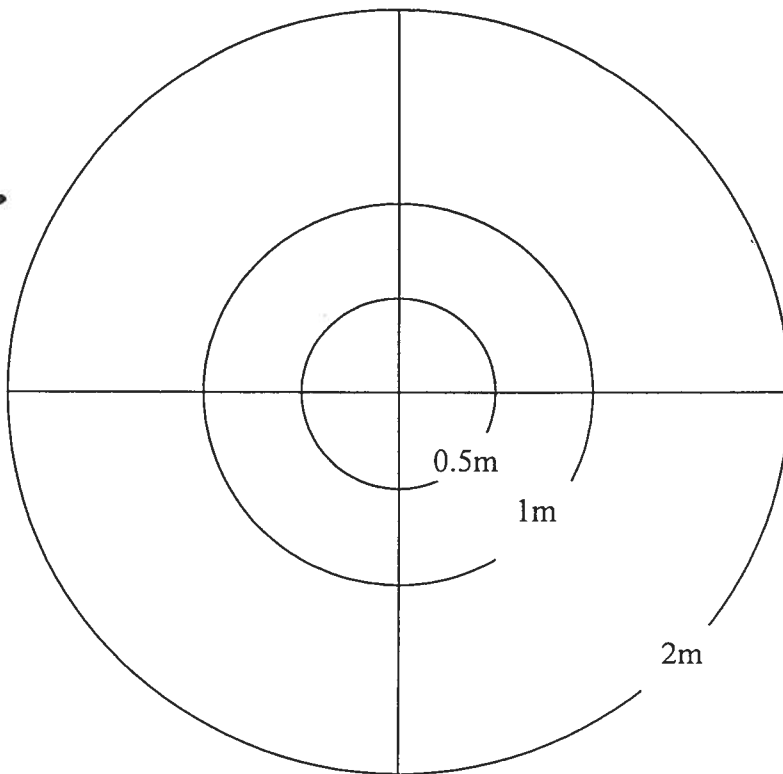
\* Hydrocast #6 at this location



ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON47  
 SAMPLE COLLECTOR: CS/ut  
 LATITUDE: 21° 27.437

UH SCIENTIST: E. DeCarlo  
158° 12.955 W  
 LONGITUDE: 158° 13.955 OKP

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON47</u>	<u>8.5m</u>		<u>7/17/12 1305</u>	

~~SEAWATER~~

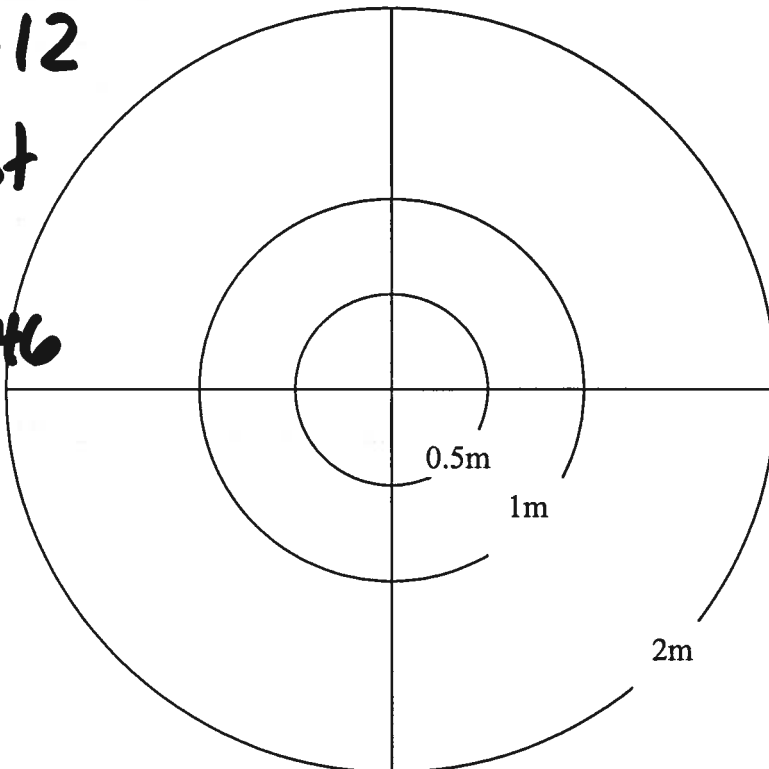
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON47-0014</u>			<u>7/17/12 1325</u>	
<u>CON47-0008</u>			<u>7/17/12 1325</u>	

NORTH

7-17-12  
 Hydrocast  
 # 5  
 near CV46  
 14.2 m  
 13:40



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Hydrocast #5  
 SAMPLE COLLECTOR: UH

UH SCIENTIST: E. DeCarlo  
 Lat: 21° 27.555  
 Long: 158° 13.078

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

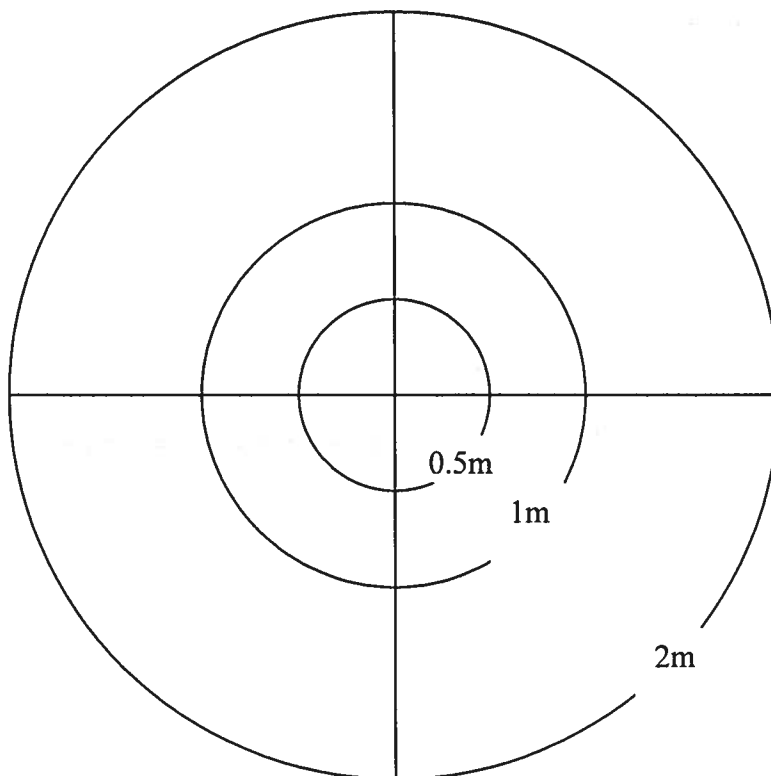
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH

CON  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON46 UH SCIENTIST: E. DeCarlo  
 SAMPLE COLLECTOR: CJ/UH  
 LATITUDE: 21° 27.535 LONGITUDE: 158° 13.081

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON46		14.4m	7/17/12 12:30	

~~SEAWATER~~

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

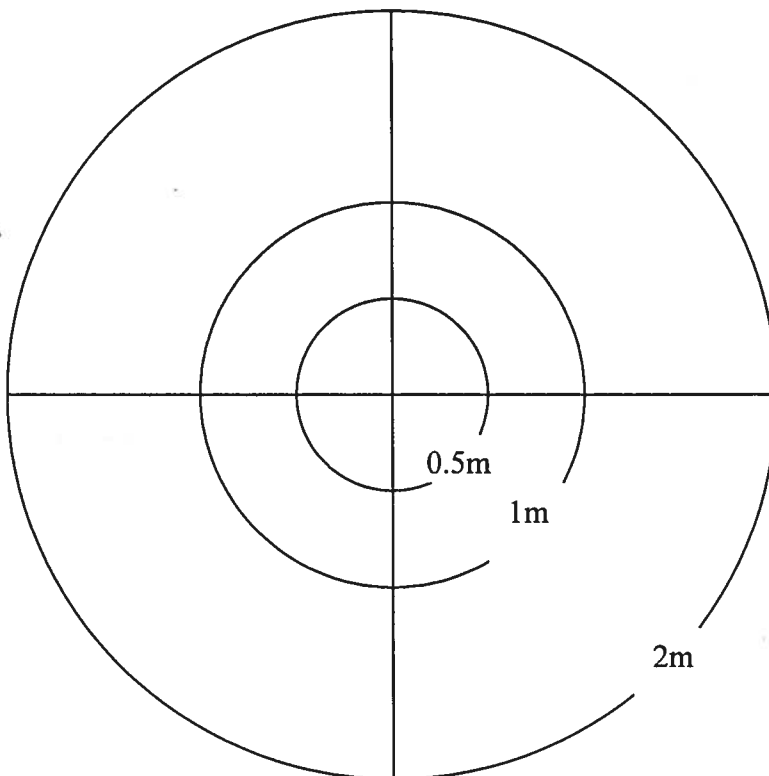
Tag #	Sample #	Sample Location	Date and Time	Comments
CON46	-0013		7/17/12 1250	14.4m
CON46	-L007		7/17/12 1250	14.4m

\* Hydrocast #5 near this site (note: #4 aborted)

ORDNANCE REEF Sample Collection Sheet

NORTH

NPS  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CS/UH

LATITUDE: 21° 25.472 LONGITUDE: 158° 11.573

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

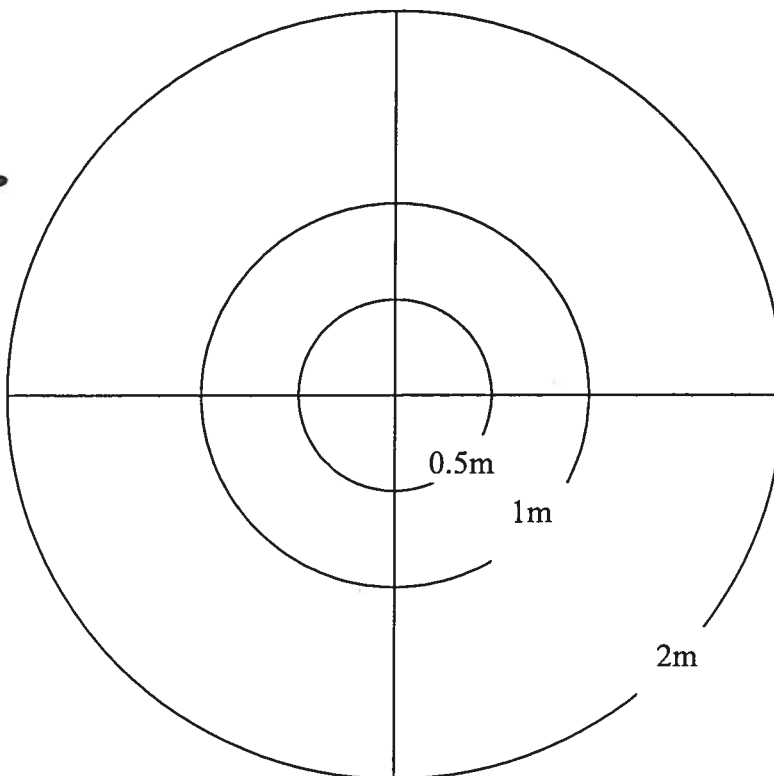
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS-0012</u>			<u>7/17/12 1215</u>	<u>21.1 m</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

NPS  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: NPS

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: C.J./UH

LATITUDE: 21° 25.523

LONGITUDE: 158° 11.573

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

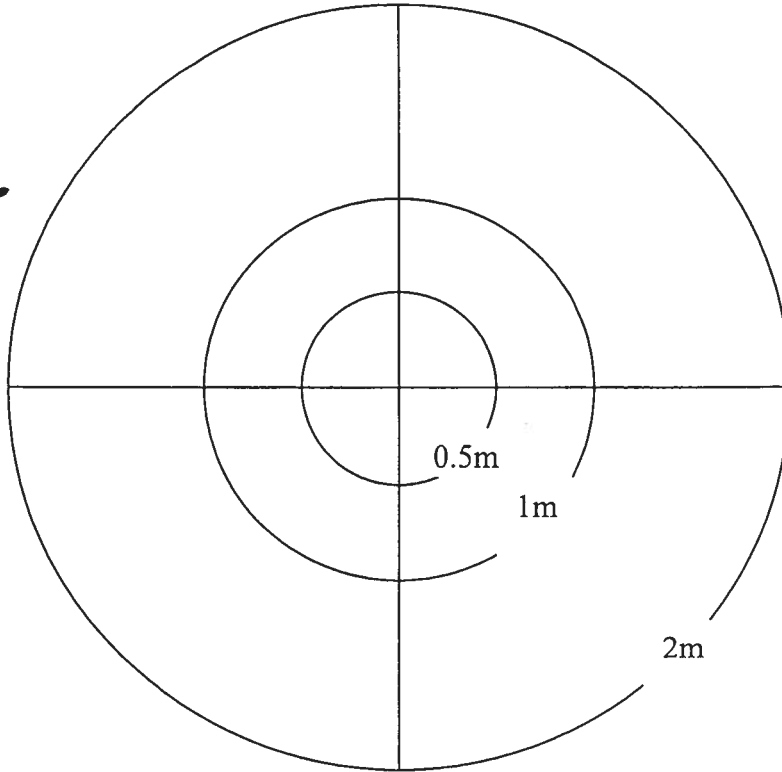
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NPS-0010</u>		<u>12.6 m</u>	<u>7/17/12 1205</u>	
<u>NPS-0011</u>			<u>7/17/12 1205</u>	

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: C.J. / uH

158° 11.936 W

LATITUDE: 21° 25.431

LONGITUDE: 158° 12.936 atp

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

~~SEAWATER~~

Tag #	Sample #	Sample Location	Date and Time	Comments

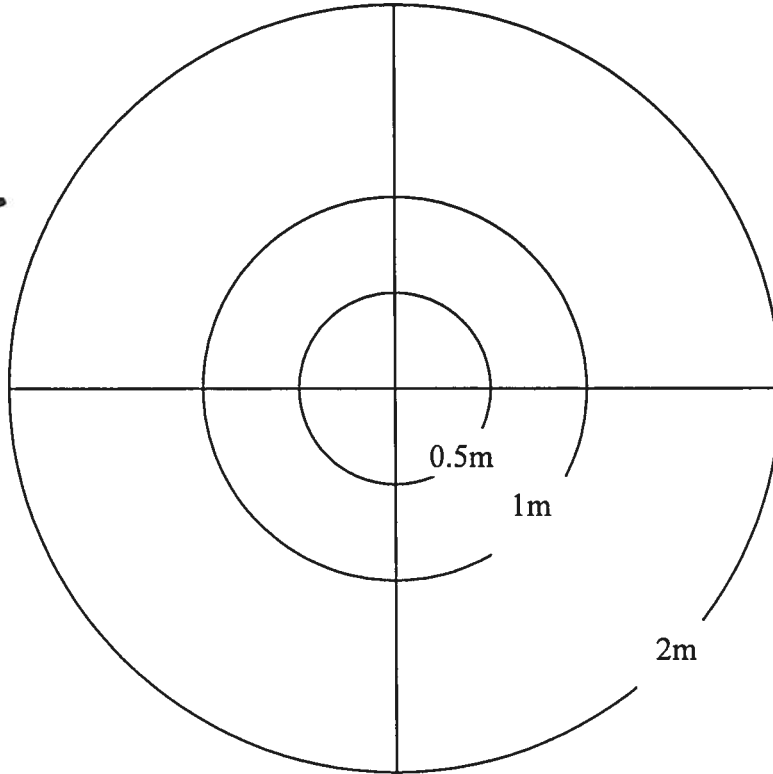
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>WWTP-0009</u>			<u>7/17/12 1145</u>	<u>330m</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

CWTP  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CWTP 38 UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

LATITUDE: 21° 25.485 LONGITUDE: 158° 11.753

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CWTP 38</u>		<u>21.9 m</u>	<u>7/17/12 11:00</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

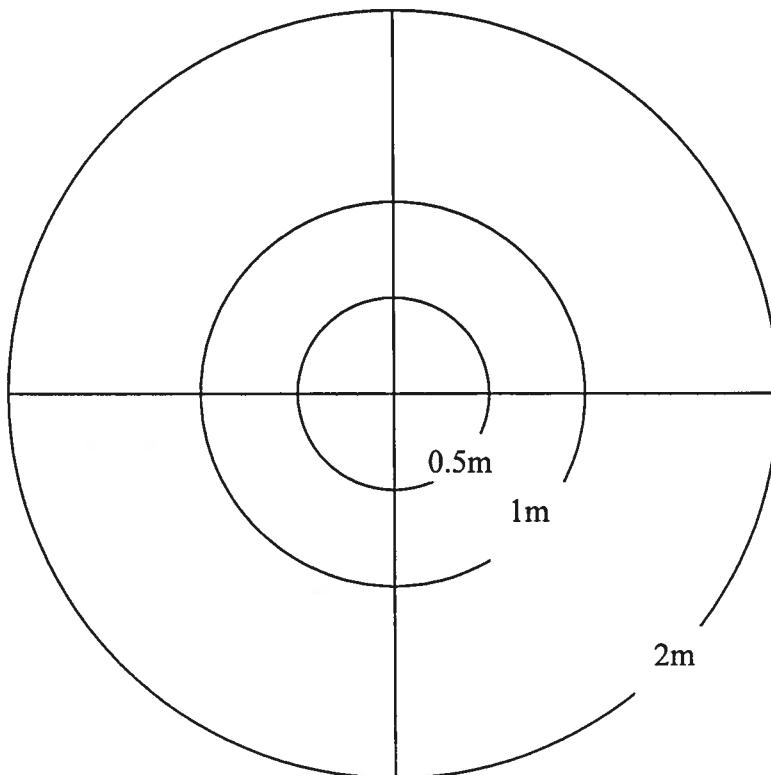
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT P  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT 37

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

LATITUDE: 21° 25.452

LONGITUDE: 158° 11.770

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>WWT 37</u>		<u>25.7 m</u>	<u>7/17/12 10:55</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

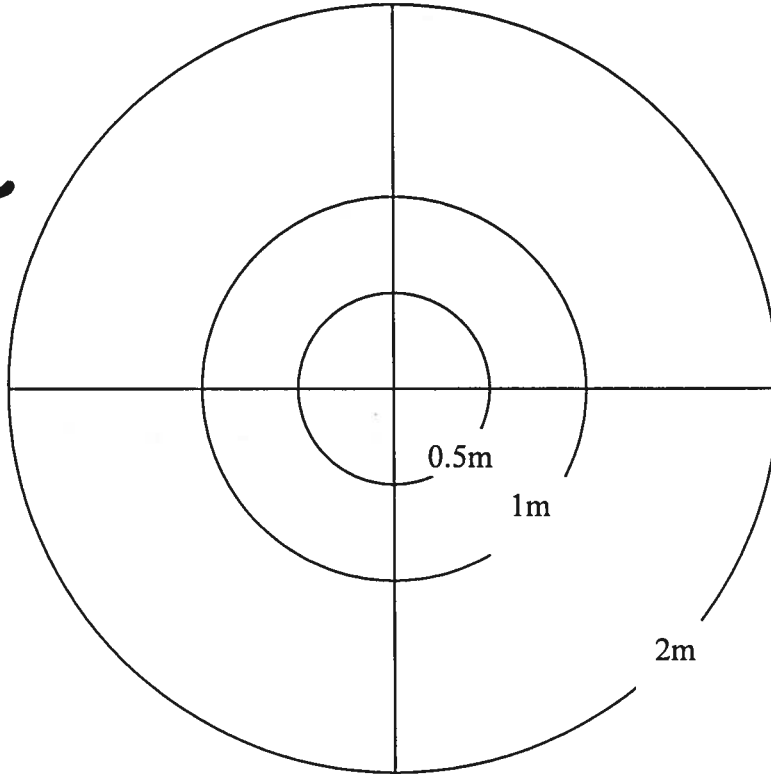
Tag #	Sample #	Sample Location	Date and Time	Comments



ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP36 UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/uh

LATITUDE: 21° 25.436 LONGITUDE: 158° 11.783

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>WWTP36</u>	<u>26.9 m</u>		<u>7/17/12 10:50</u>	

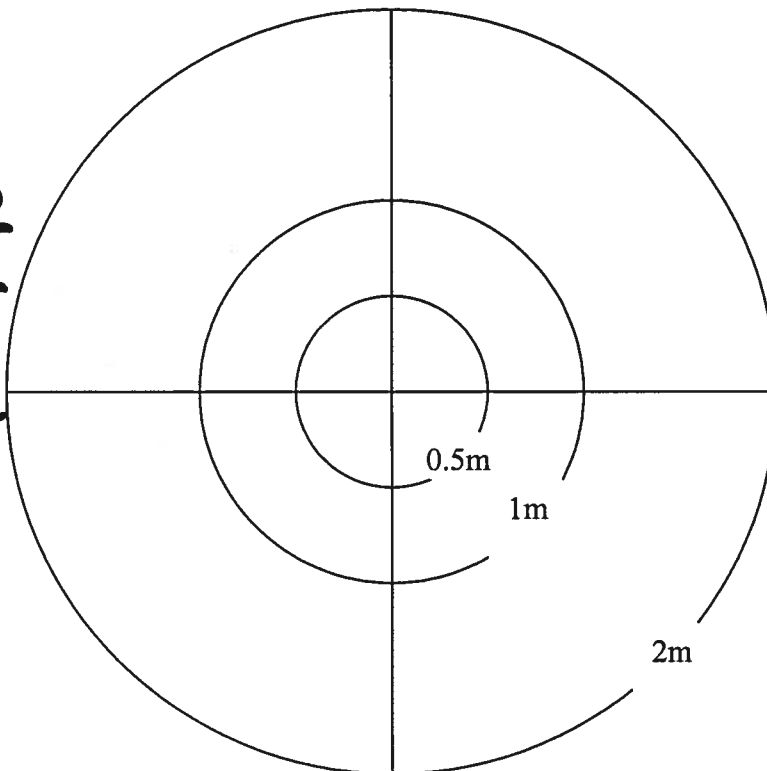
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

NORTH



7-17-12  
 Hydrocast  
 #3  
 near WWT35  
 29.6 m  
 lowered: 1043  
 retrieved: 1049

Cast started  
 at "L"  
 of WWT P  
 Pipe

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Hydrocast #3  
 SAMPLE COLLECTOR: UH

UH SCIENTIST: E. De Carlo  
 Lat: 21° 25.403  
 Long: 158° 11.807

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

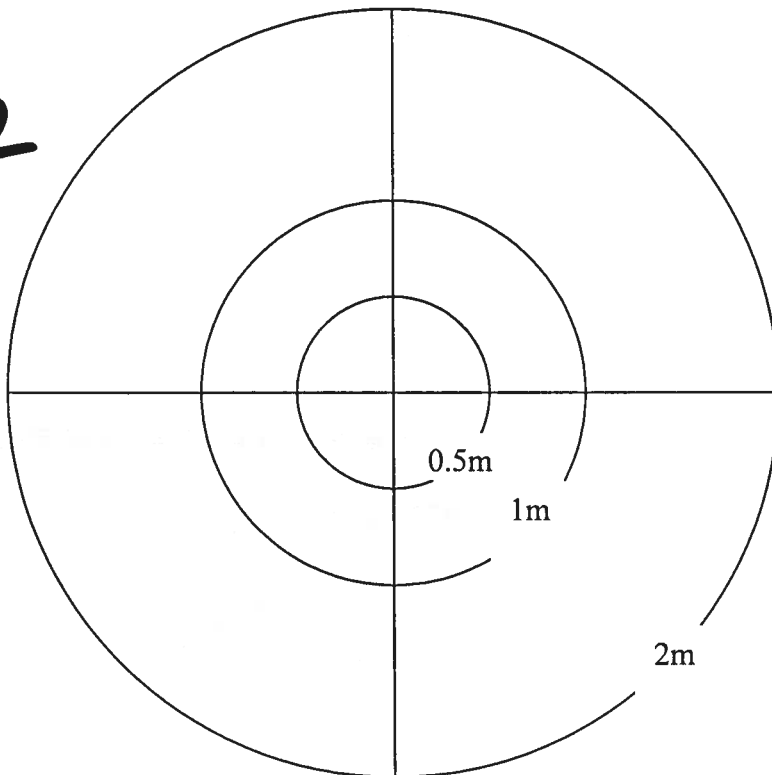
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CS/UH

LATITUDE: 21° 25.414

LONGITUDE: 158° 11.807

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>WWTP35</u>	<u>36m</u>		<u>7/17/12 10:40</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

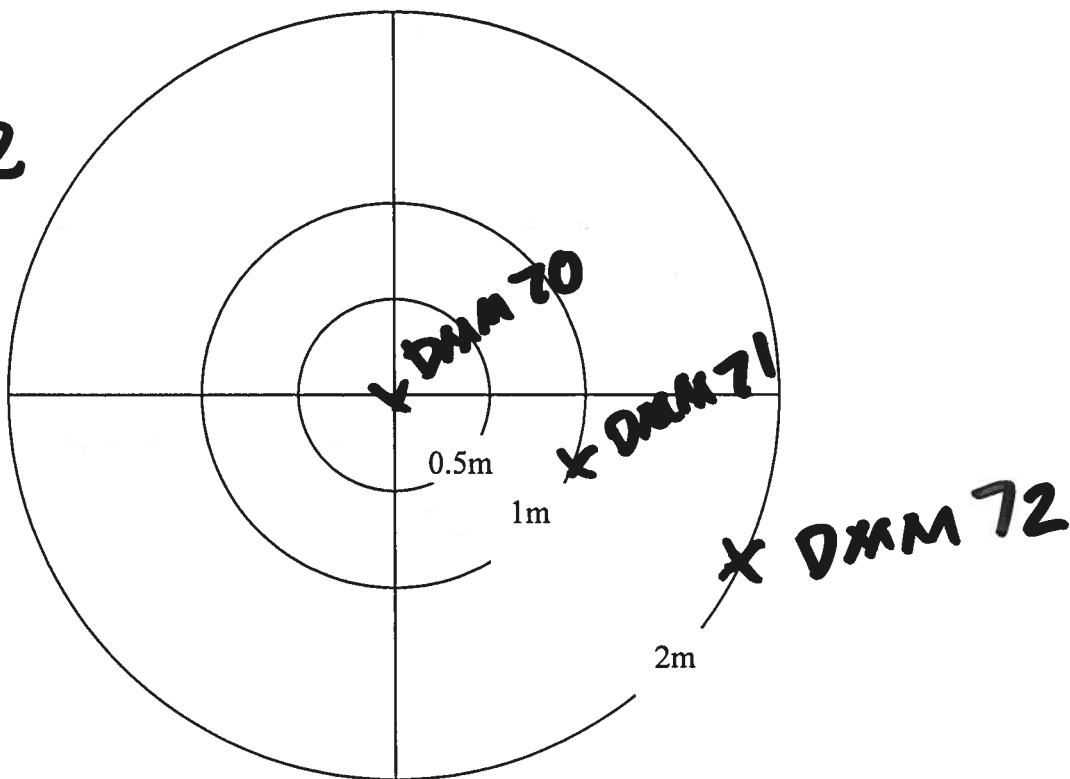
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

\* Hydrocast #3 near this location

NORTH

DMM  
7-17-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 70

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: C.S./UH

LATITUDE: 21° 25.896N

LONGITUDE: 158° 12.369W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 70	43m		7/17/12 0930	0ft
DMM 71			7/17/12 0930	3ft
DMM 72			7/17/12 0930	6ft

SEAWATER Biota

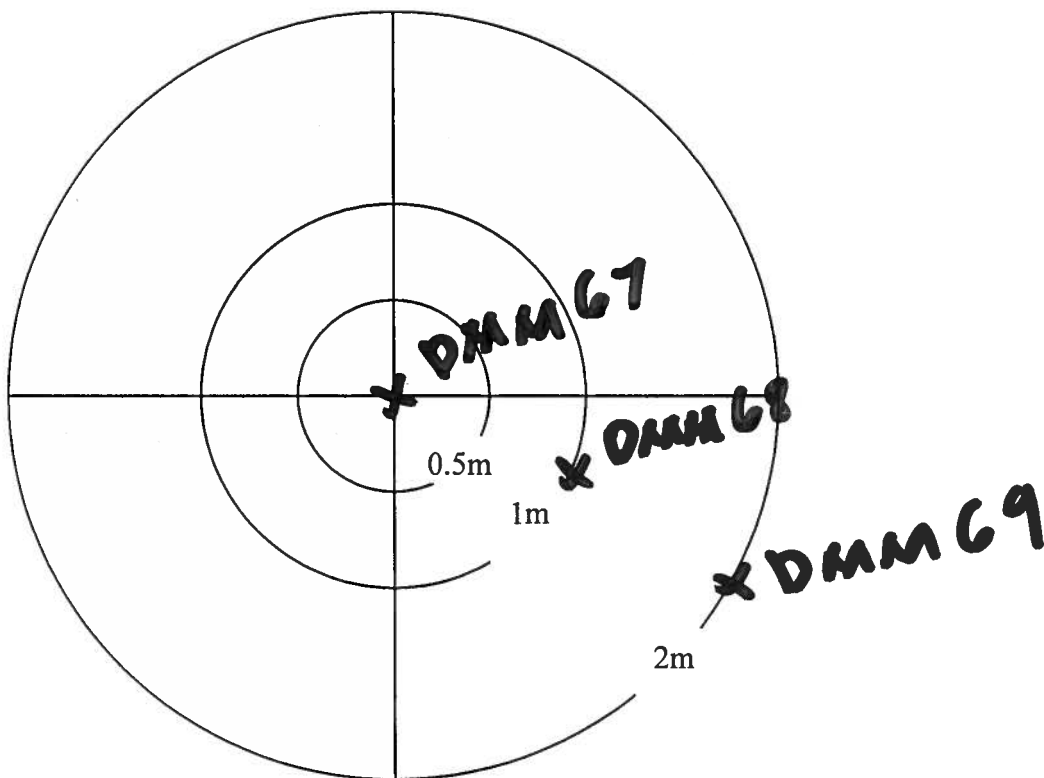
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 70-1006			7/17/12 1020	

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>NO Octopus at this site</u>				

NORTH

DMM  
7-16-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 67

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

LATITUDE: 21° 25.711N

LONGITUDE: 158° 12.065W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 67	22.1m		7/16/12 1335	off
DMM 68			7/16/12 1335	A 384
DMM 69			7/16/12 1335	64

~~SEAWATER~~ Biota

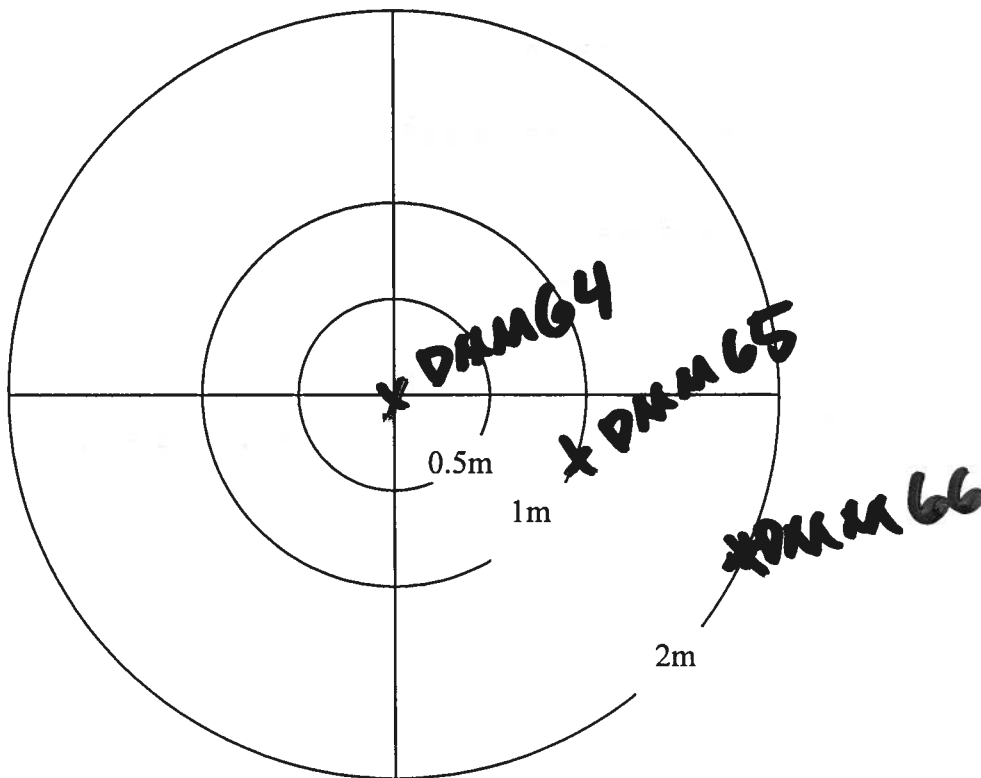
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 67-0008			7/16/12 1412	

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 67-6005			7/16/12 1412	

NORTH

**DMM  
7-16-12**



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 64 UH SCIENTIST: E. DeCarlo  
 SAMPLE COLLECTOR: C.J./UH  
 LATITUDE: 21° 25.823 N LONGITUDE: 158° 12.170 W

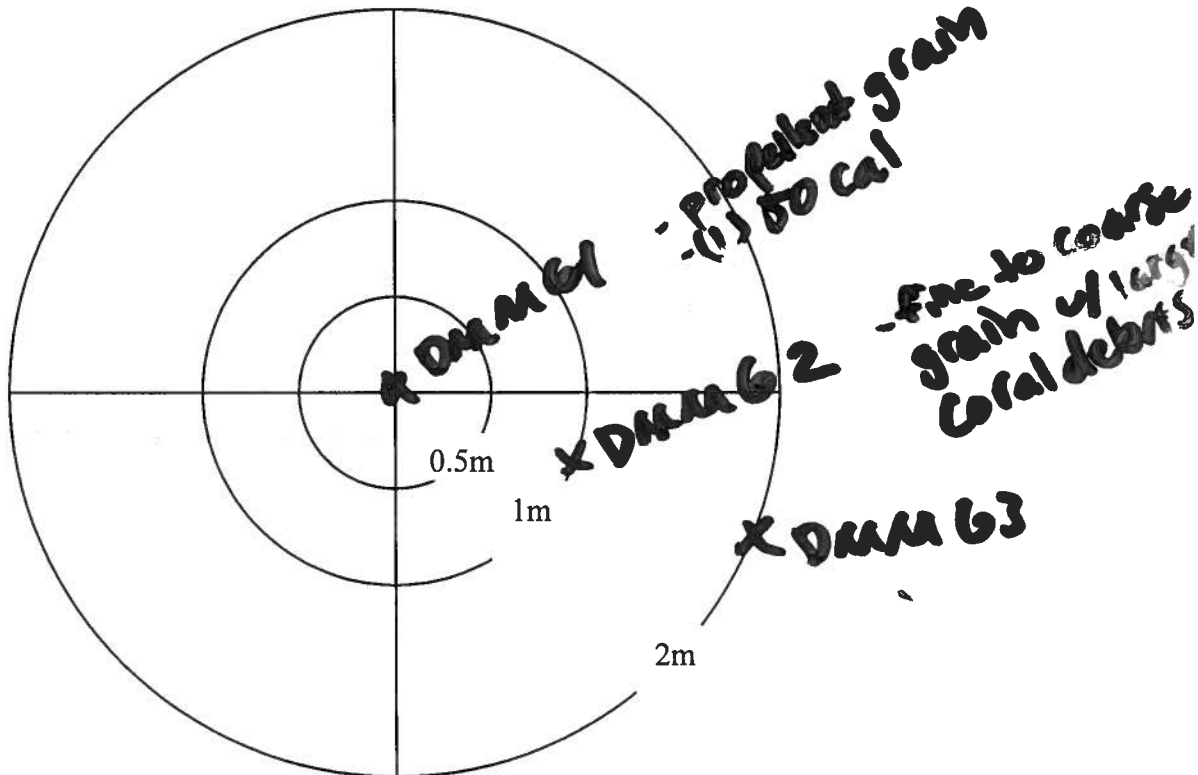
SEDIMENT				
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 64		24.1 m	7/16/12 13:00	
DMM 65			7/16/12 1300	
DMM 66			7/16/12 1300	

<del>SEAWATER</del> Biota				
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 64-0007			7/16/12 1317	

BIOTA				
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 64-L004			7/16/12 1317	

NORTH

DKM  
7-16-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DKM 61

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: C.J. / WH

LATITUDE: 21° 25.614N

LONGITUDE: 158° 12.018W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DKM 61	224m		7/16/12 12:30	
DKM 62			7/16/12 12:30	
DKM 63			7/16/12 12:30	

~~SEAWATER~~ Biota

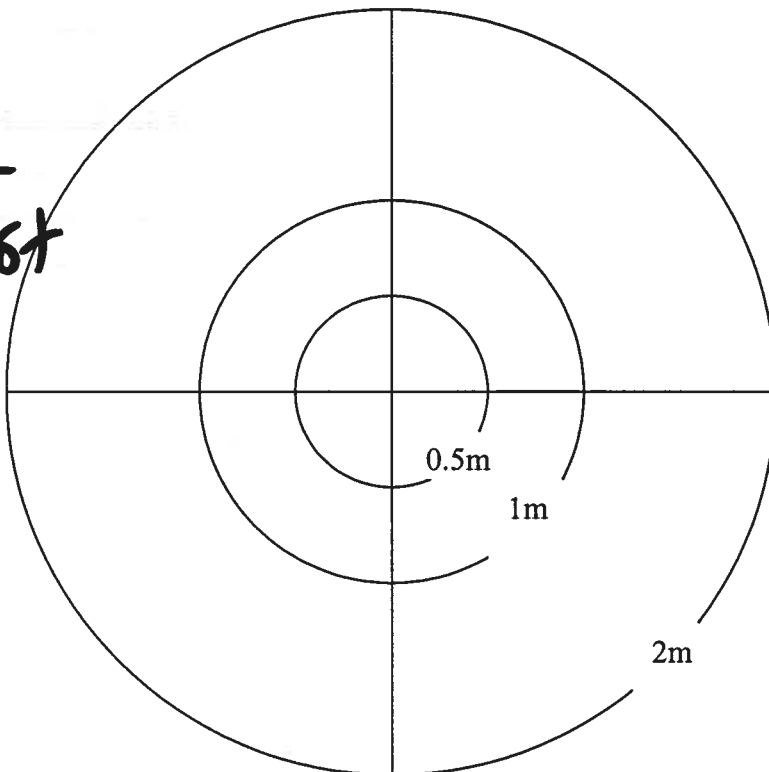
Tag #	Sample #	Sample Location	Date and Time	Comments
<del>DKM 61</del>	<del>0006</del>			

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DKM 61-0006			7/16/12 12:45	
DKM 61-L003			7/16/12 12:45	

NORTH

7-16-12  
 Hydrocast  
 #2  
 near  
 DMM58  
 22.8 m  
 12:02



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Hydrocast #2

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.684

Long: 158° 12.079

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

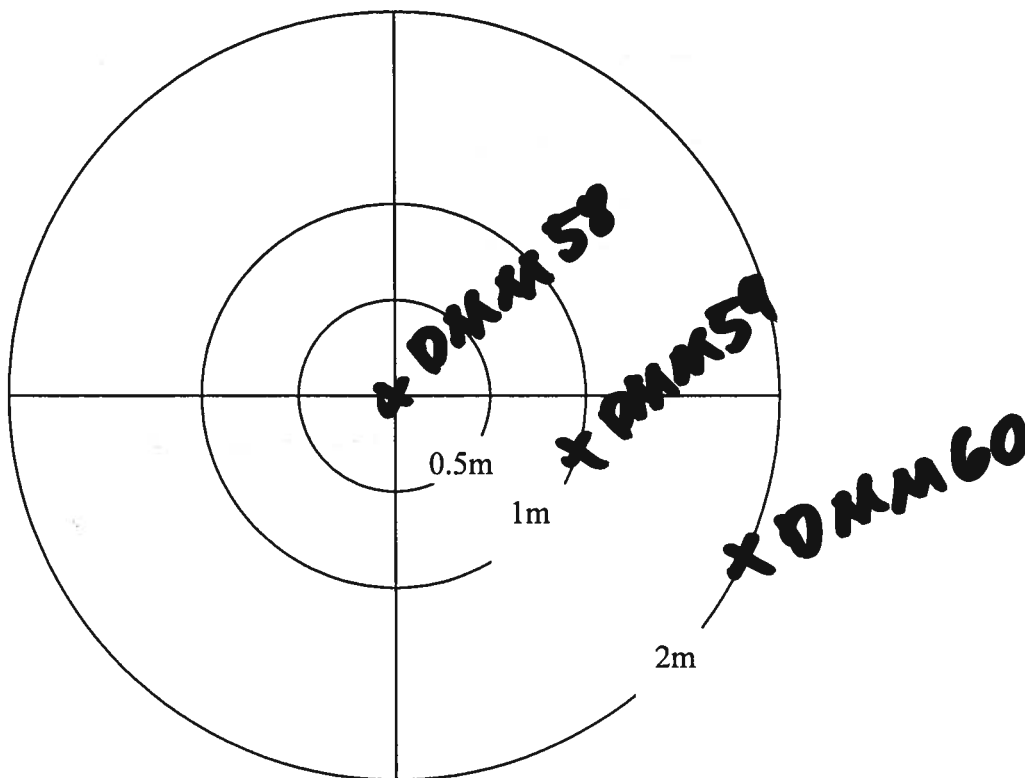
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments



7-16-12  
DMM

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 58 UH SCIENTIST: E. DeCarlo  
 SAMPLE COLLECTOR: C.J./UH  
 LATITUDE: 21° 25.698 N LONGITUDE: 158° 12.089 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 58		22.3m	7-16-12 11:40	} med. grain Sand no apparent clast
DMM 59			7-16-12 11:40	
DMM 60			7-16-12 11:40	

SEAWATER Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 58-0005			<del>7/16/12</del> 7/16/12 12:15	

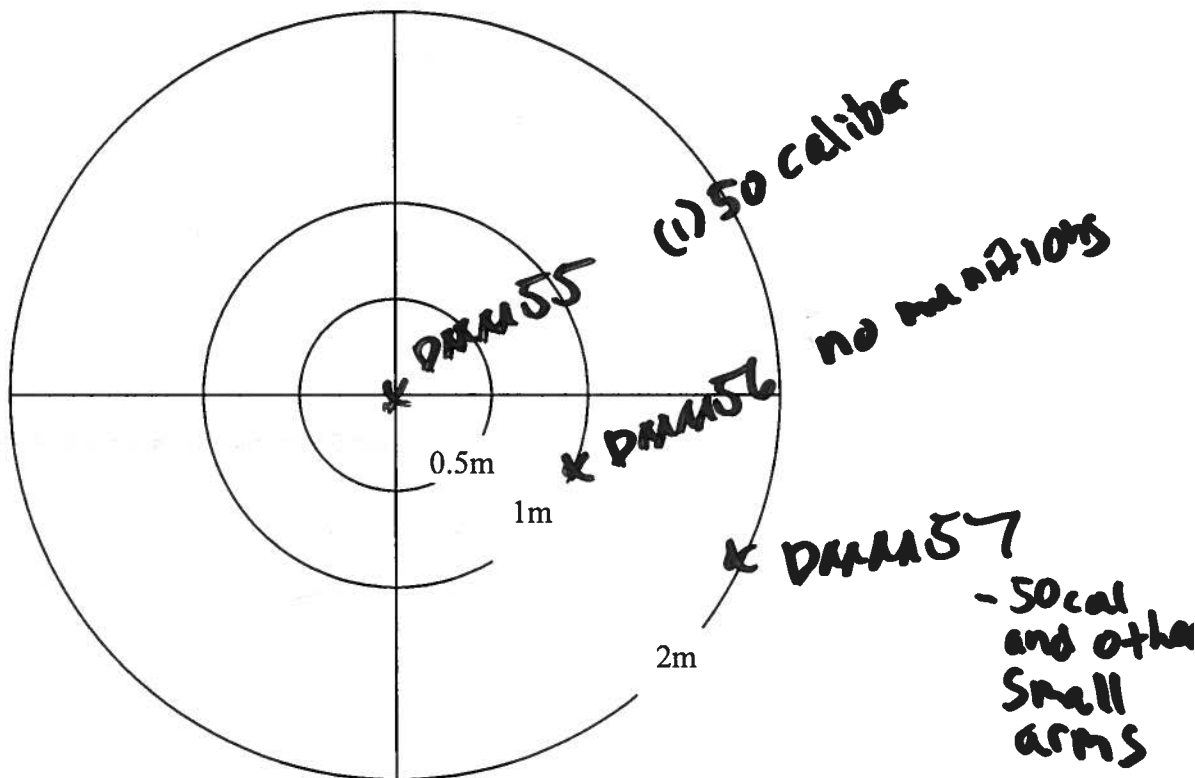
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
no limu				

x Hydrocast <sup>near</sup> at this location - Hydrocast #2

NORTH

DARR  
7-16-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DARR 55

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: C.J. / AH

LATITUDE: 21° 25.718N

LONGITUDE: 158° 12.087W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DARR 55	17.0m		7/16/12 1100	0ft
DARR 56			7/16/12 1100	3ft
DARR 57			7/16/12 1100	6ft

SEAWATER Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
DARR 55	0004		7/16/12 1130	

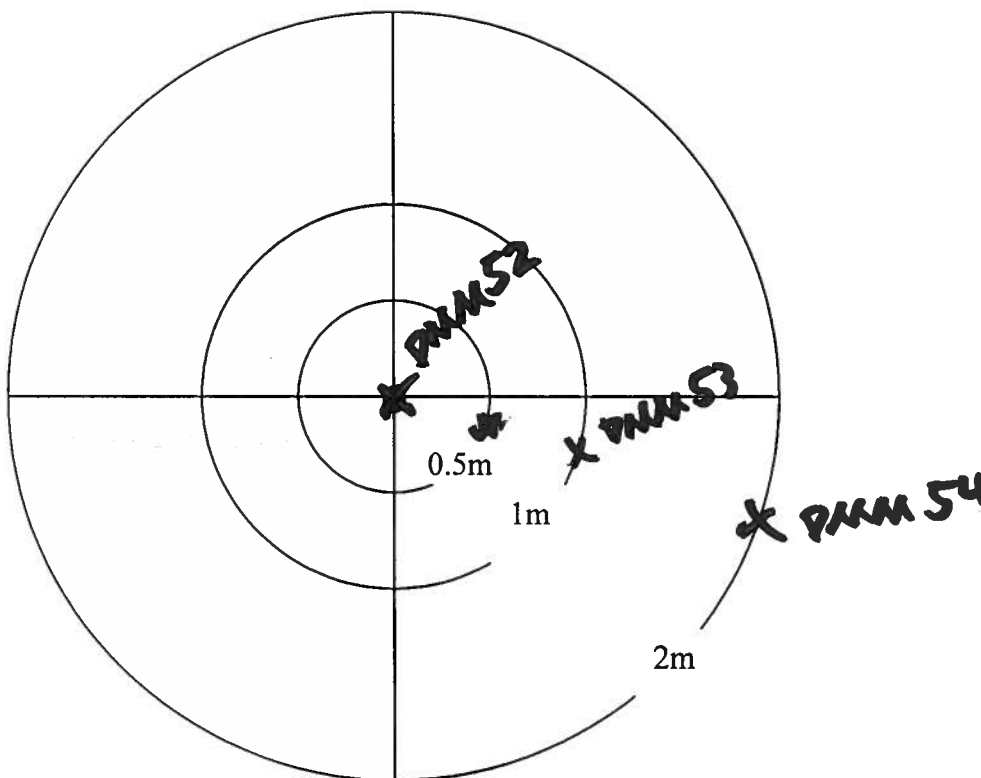
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DARR 55	L002		7/16/12 1130	

NORTH

DMM

7-16-12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM52

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ / UH

LATITUDE: 21° 25.720N

LONGITUDE: 158° 12.088W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM52		21.4 m	7/16/12 0930	0 ft
DMM 53			7/16/12 0930	3 ft
DMM 54			7/16/12 0930	6 ft

~~SEAWATER~~ Biota

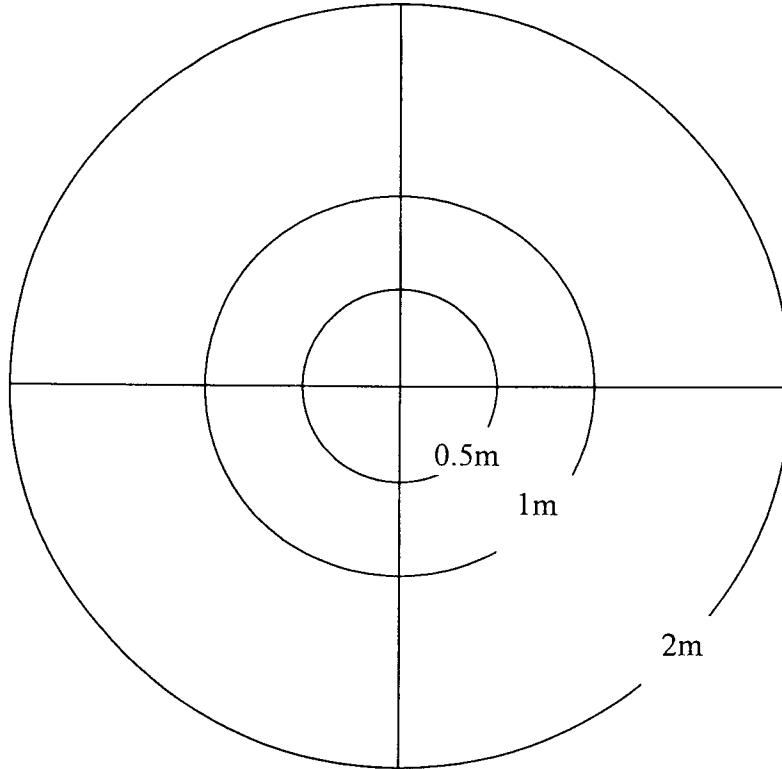
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM52-0001			7/16/12 10:00	
<del>DMM52-0002</del>			7/16/12 10:30	
DMM52-0003			7/16/12 10:50	
DMM52-4001			7/16/12 10:50	

\* Hydrocast at this location Hydrocast #1

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: WJ/UH

Lat: 21° 25.704' N  
Long: 158° 11.881' W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

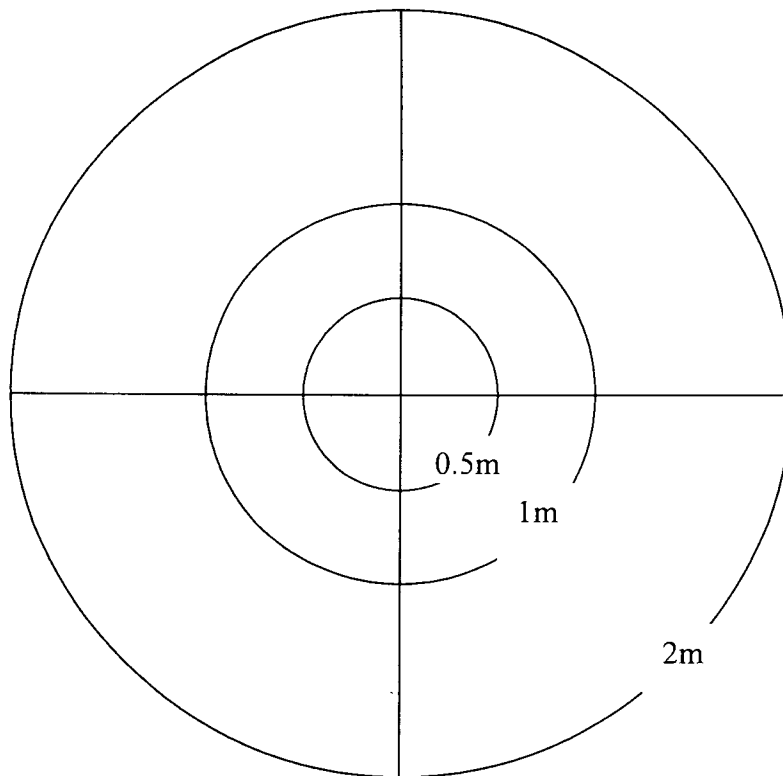
BIOTA <sup>aka</sup> (fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F015	ORD 323F	50 m ft <sub>exp</sub>	7/19/12 2100	Red, Female
F016	ORD 324F	50 m ft <sub>exp</sub>	7/19/12 2100	White, Male

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.715N

Long: 158° 11.885W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (fish)

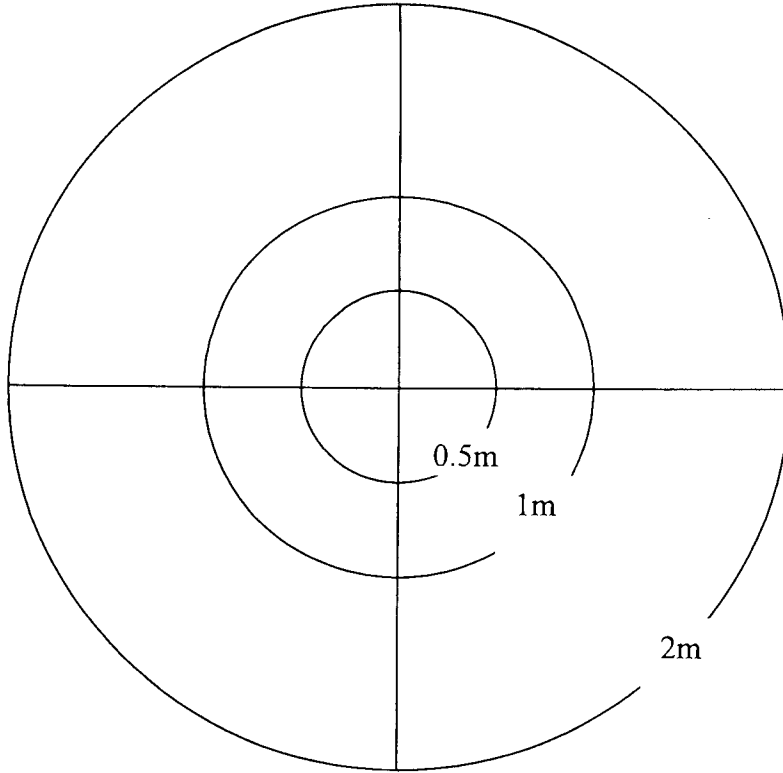
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
F017	ORD325F	50m <del>ft</del> <sub>depth</sub>	7/19/12 2100	White, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: AJ/UH

Lat: ~~Long~~ 21° 25.728 N

Long: <sup>082</sup>158° 11.890 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

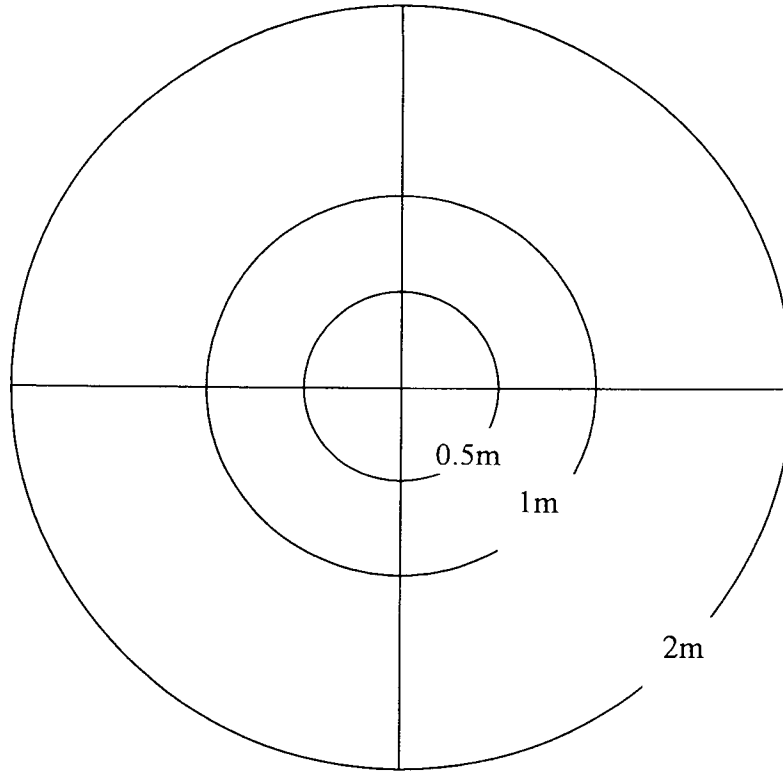
BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F018	ORD026F	50mft <sub>exp</sub>	7/19/12 2100	white, male

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.734N  
Long: 158° 11 901W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

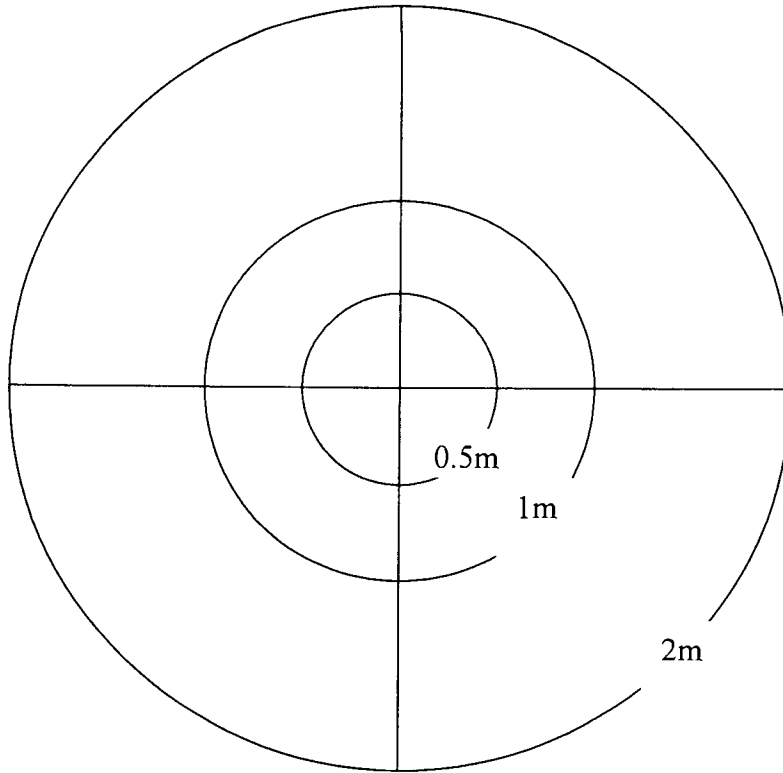
BIOTA (Fish)

Tag #	Sample #	Sample Location	Date and Time	Comments
FO19	ORD 227F	50m depth	7/19/12 2100	Red, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.745 N

Long: 158° 11.980 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (fish)

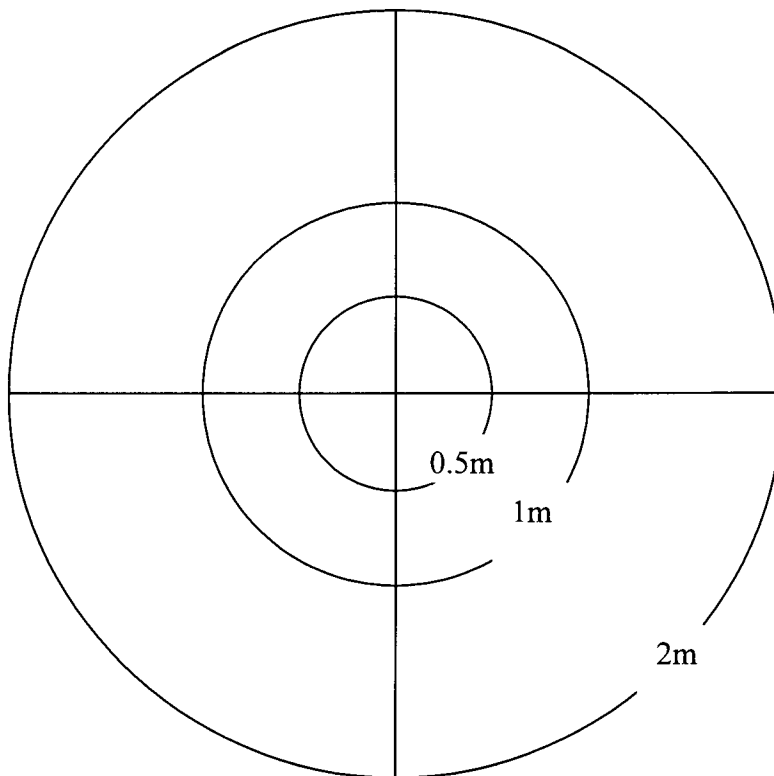
Tag #	Sample #	Sample Location	Date and Time	Comments
F020	ORD 328F	50m depth	7/19/12 2100	Red, male
F021	ORD 329F	↓	2100	white, male
F022	ORD 330F	↓	2100	Red, Female
F023	ORD 331F	↓	2130	white, male



ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7/18/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: AJ/UH

Lat 21° 27.537 N

Long 158° 12.808 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

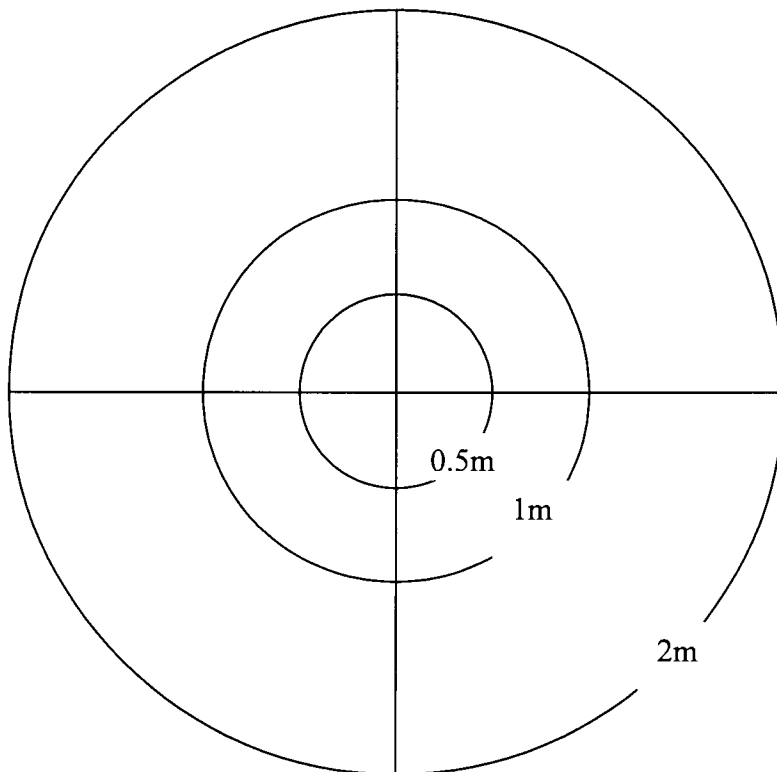
BIOTA (Fish)

Tag #	Sample #	Sample Location	Date and Time	Comments
F001	ORD301F		7/18/12 1315	Red, Female
F002	ORD302F		↓	Red, Female
F003	ORD303F			Red, Female
F004	ORD304F			Red, Female
F005	ORD305F			Red, Female
F006	ORD306F			Red, Male

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
7/18/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: OJ/WH

Lat: 21° 27.518 N

Long: 158° 12.141 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

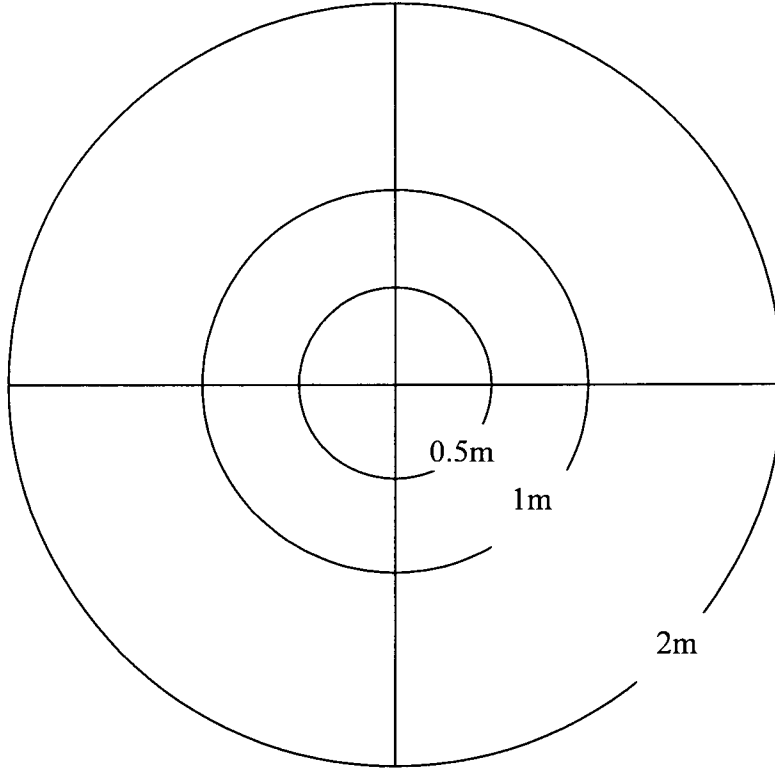
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
F007	ORD 307F		7/18/12 1315	white, Female
F008	ORD 308F		↓	white, Female
F009	ORD 309F			white, Female
F010	ORD 310F			white, Female
F011	ORD 311F			white, Female
F012	ORD 312F			white, Male
EXTRA	EXTRA			white, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/uhl

Lat: 21° 25.575 N

Long: 158° 11.820 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

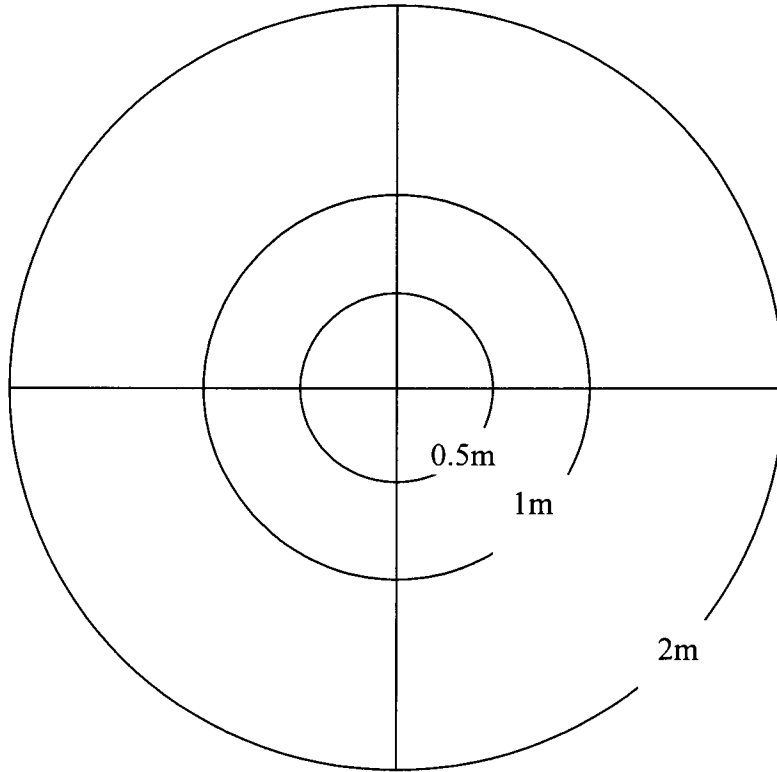
BIOTA (fish) (depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
F002	ORD 313F	60mFLxp	7/19/12 2017	Red male

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.541 N  
Long: 158° 11.798 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

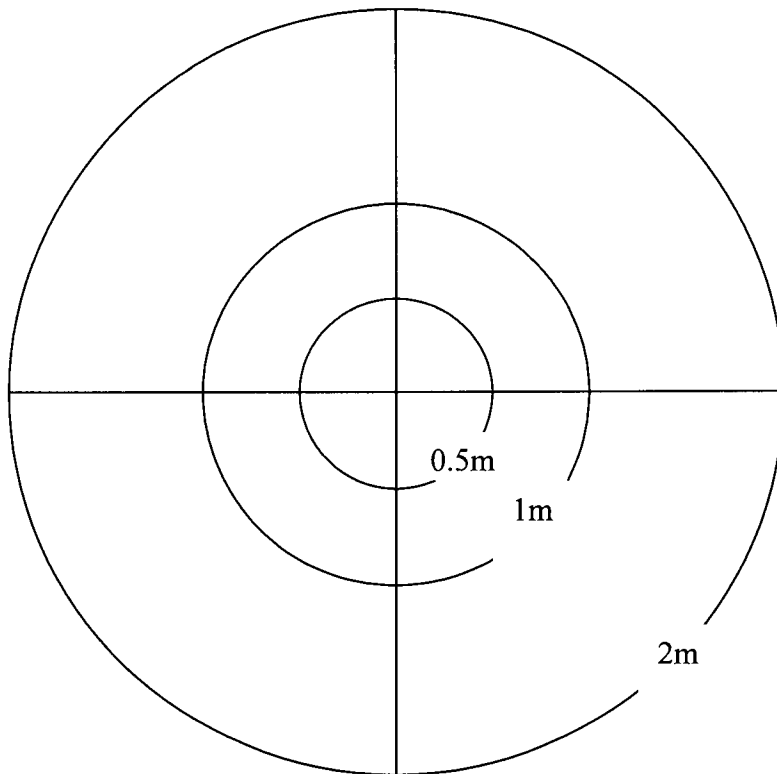
BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F005	ORD 314F	60m ft depth	7/19/12 2011	Red, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.533 N

Long: 158° 11.798 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

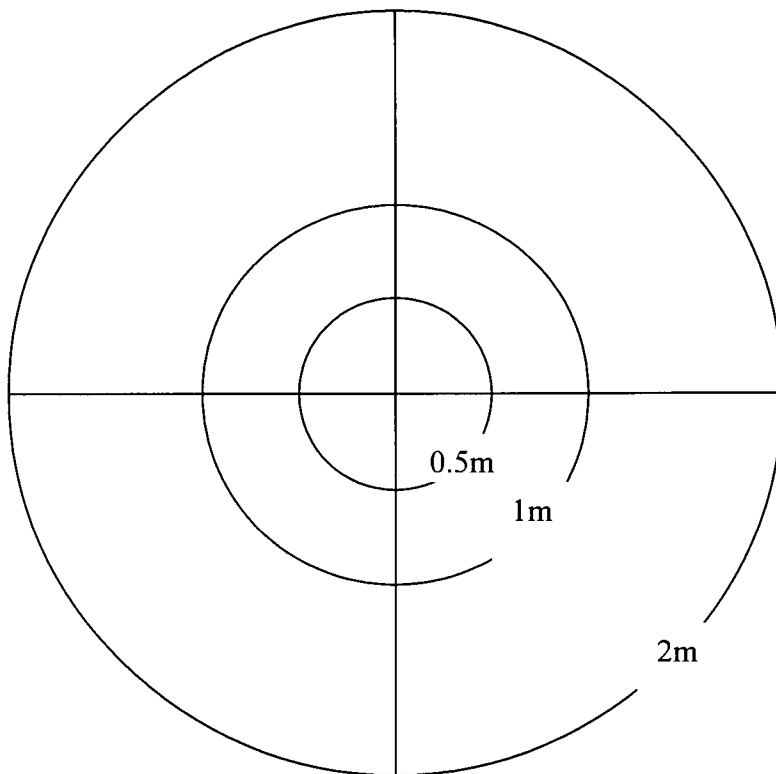
BIOTA (Fish) (depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
E006	ORD315F	60 ft depth	7/19/12 2017	Red, Male

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.575 N

Long: 158° 11.820 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

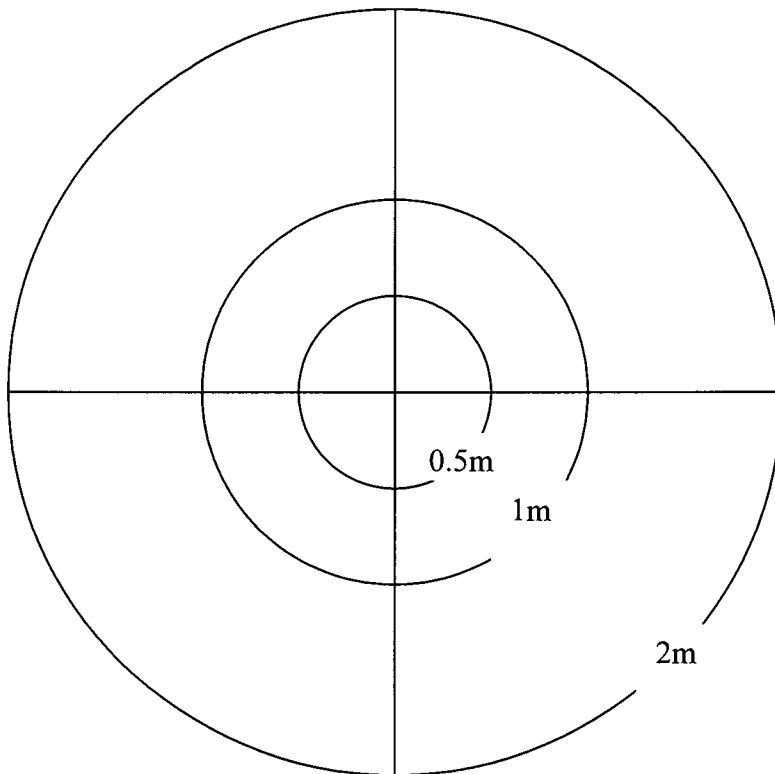
BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F001	EXTRA	60m ft <sub>depth</sub>	7/19/12 2017	Red Male

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.557 N

Long: 158° 11.805 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

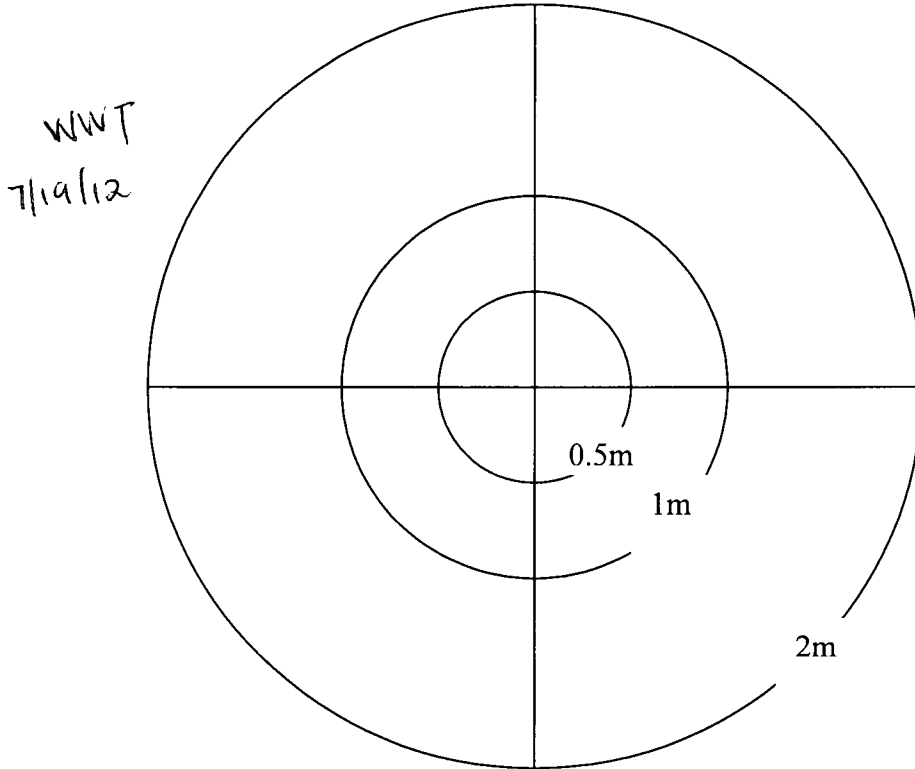
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F003	Extra	60 ft <sup>WWT</sup>	7/19/12 2017	Red Male

ORDNANCE REEF Sample Collection Sheet

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.579 N

Long: 158° 11.809 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

(fish)

(depth)

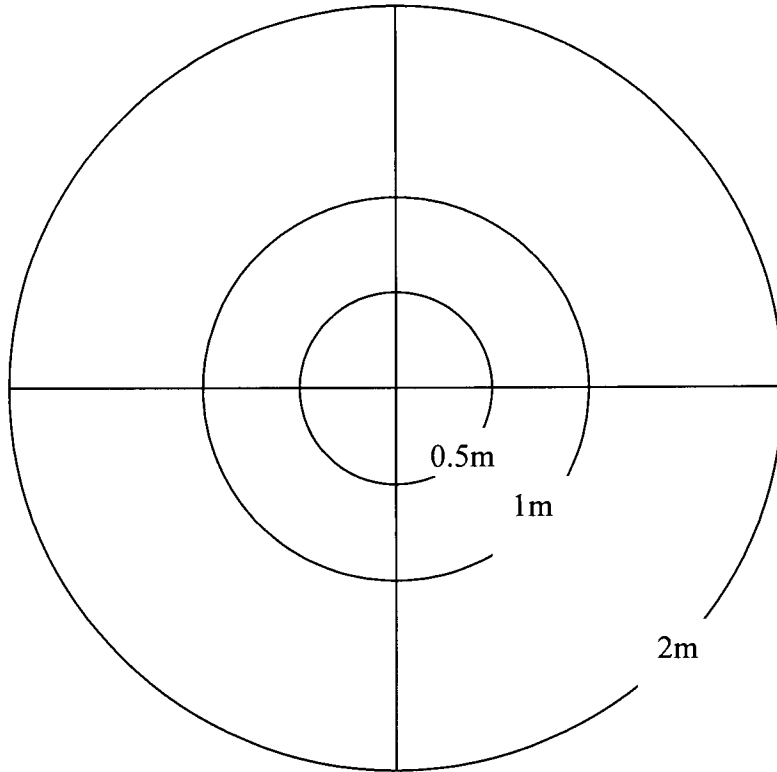
Tag #	Sample #	Sample Location	Date and Time	Comments
<u>FOOT</u>	<u>EXTRA</u>	<u>00 m ft. off</u>	<u>7/19/12 2017</u>	<u>Red Female</u>



ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.533 N

Long: 158° 11.797 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

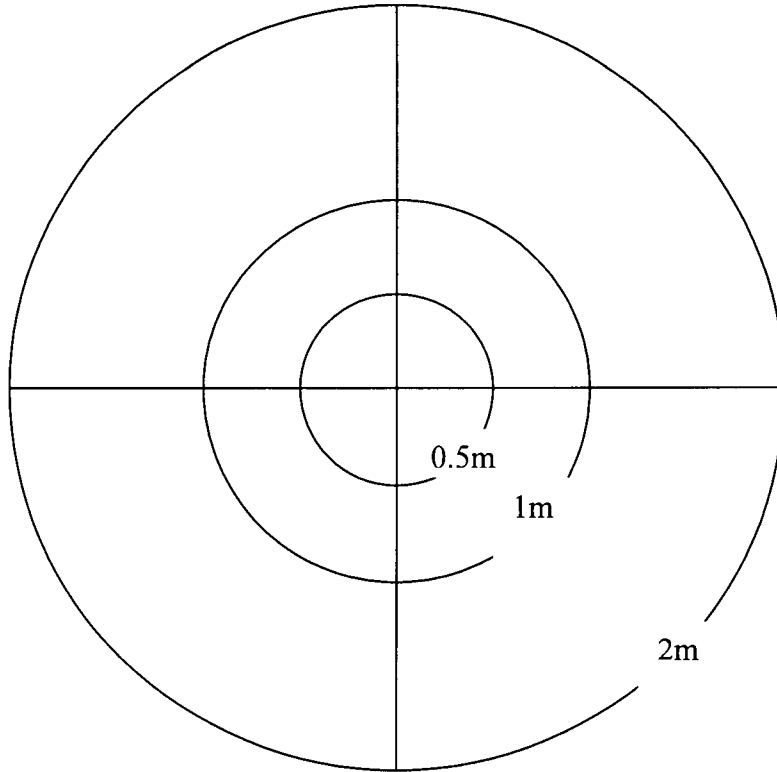
BIOTA (Fish) (depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
F008	EXTRA	60 ft EXP	7/19/12 2017	Red, female
F007	ORD316F	60m ft EXP	7/19/12 2017	white, male

ORDNANCE REEF Sample Collection Sheet

NORTH

WWT  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWT

UH SCIENTIST: E. De carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.532N

SEDIMENT

Long: 158° 11.791W

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (Fish)

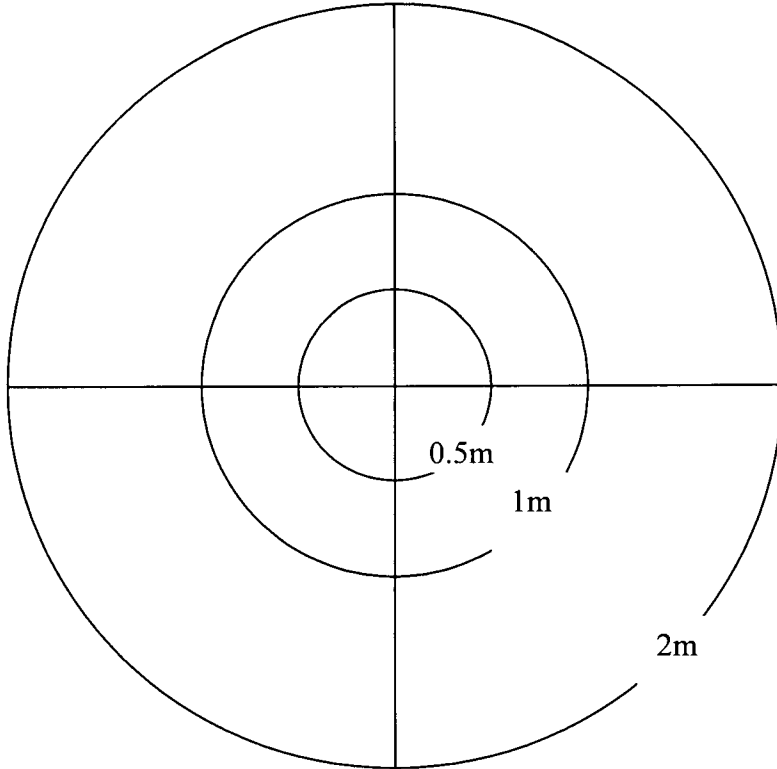
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
F009	ORD 317F	60 m-ft deep	7/19/12 2017	white Female

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.673 N

Long: 158° 11.801 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

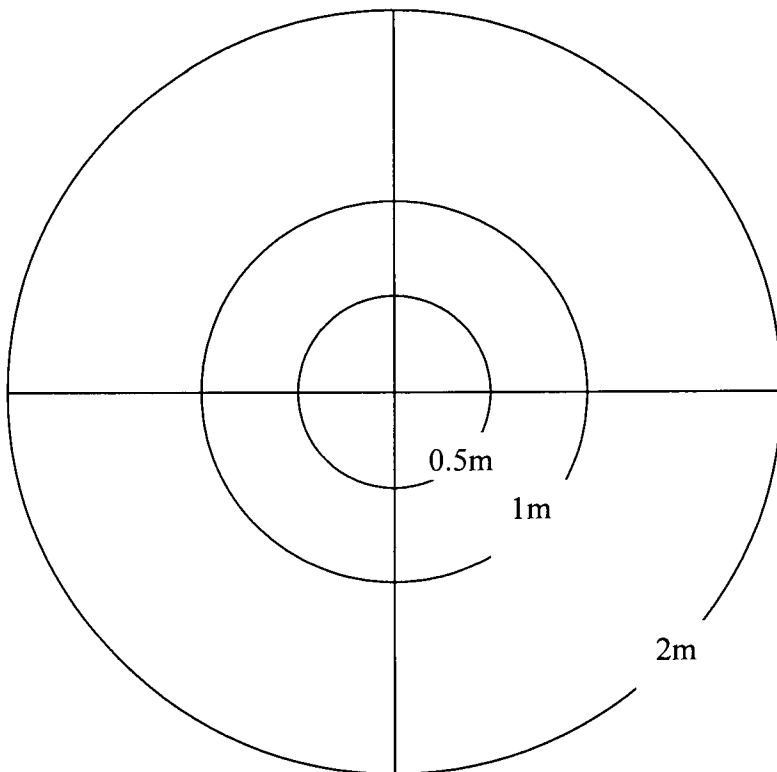
BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
F010	BRD 318F	50m depth	7/19/12 2100	Red, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21°25.685 N

Long: 158° 11.872 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

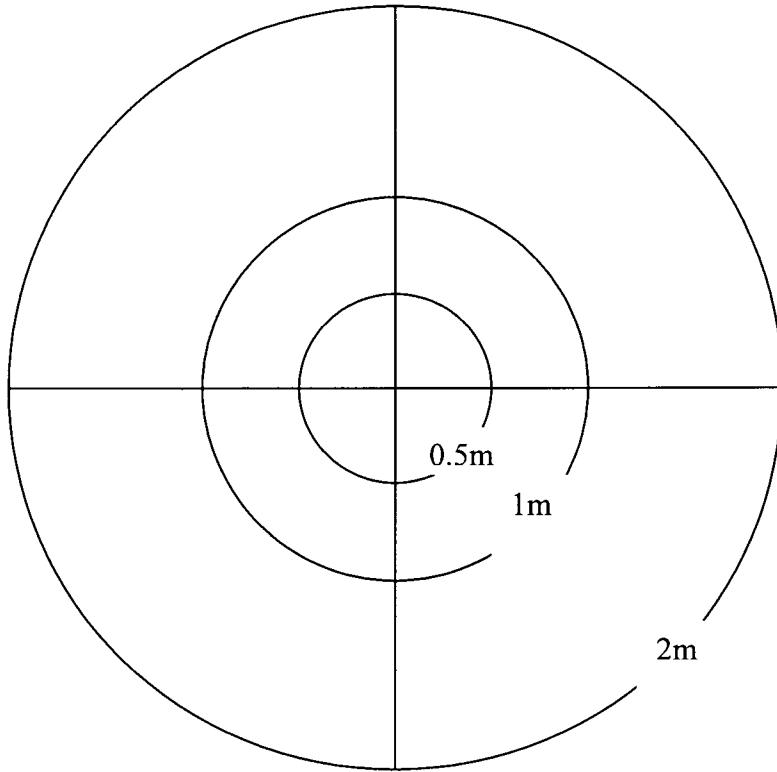
BIOTA (fish) (depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
F011	ORD19F	50 m ft deep	7/19/12 2100	white, male
F012	ORD20F	50 m ft deep	↓	Red, Female
F013	ORD21F	50 m ft deep		Red, Female

ORDNANCE REEF Sample Collection Sheet

NORTH

DM1M  
7/19/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DM1M

UH SCIENTIST: E. DeCarb

SAMPLE COLLECTOR: CS/UH

Lat: 21° 25.704'N

Long: 158° 11.878'W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

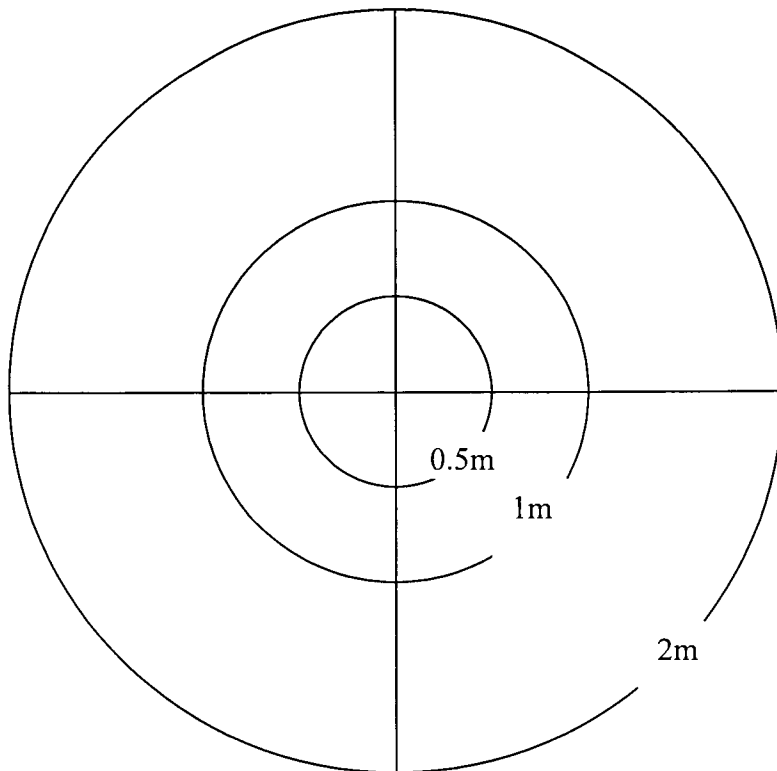
BIOTA (Fish)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
<u>FO14</u>	<u>ORD 322F</u>	<u>50 m ft deep</u>	<u>7/19/12 2100</u>	<u>white female</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CT/UH

LATITUDE: 21° 25.283

LONGITUDE: 158° 11.786

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

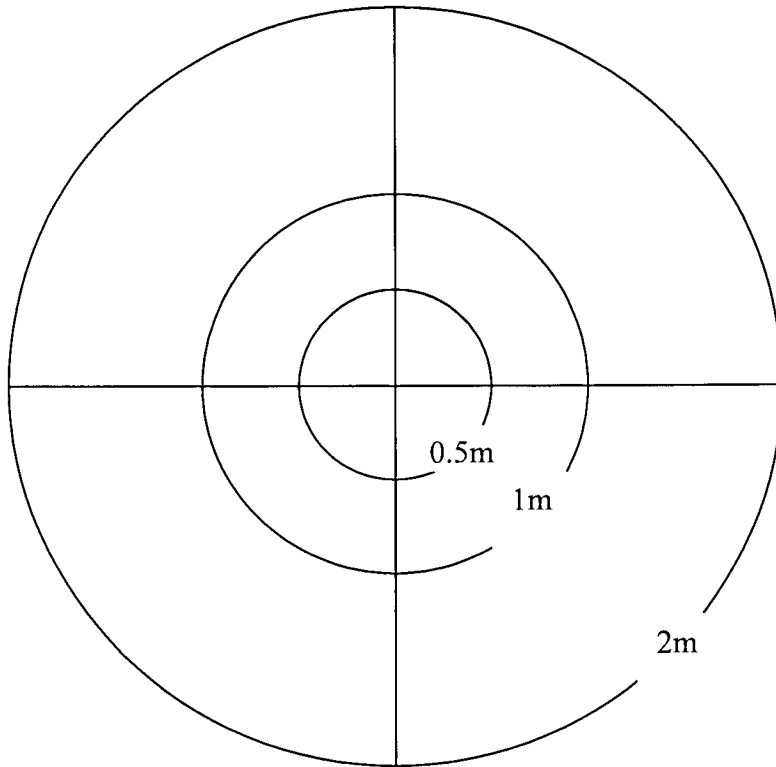
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
C001		120 ft tk	7/21/12 0809	pulled up on 2nd WWTP drop

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

LATITUDE: 21° 25.250

LONGITUDE: 158° 11.768

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

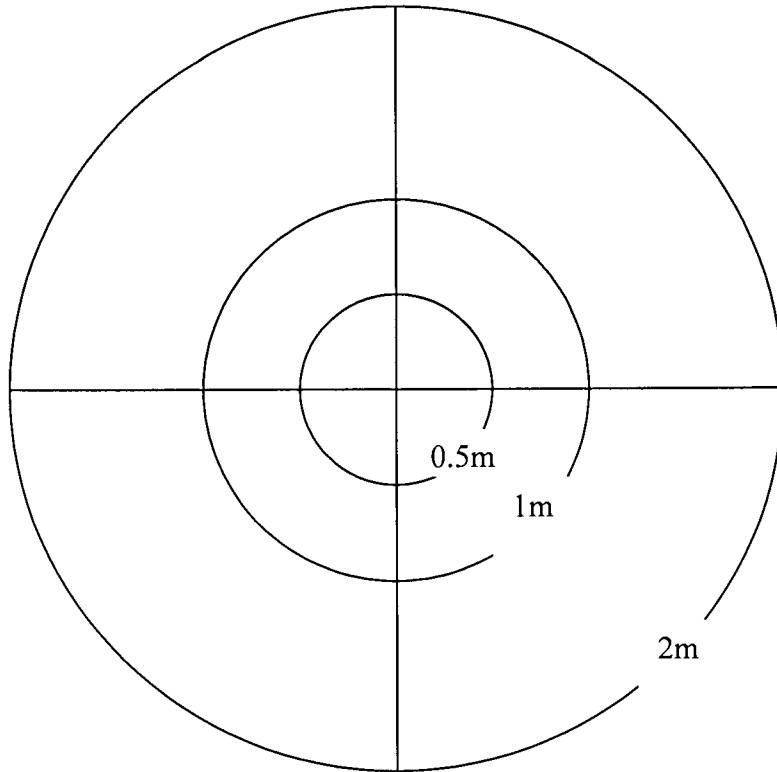
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>C002</u>		<u>120m ft</u> <u>jk</u>	<u>7/31/12 0859</u>	<u>pulled up on 2<sup>nd</sup> WWTP drop</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: CJ/ut

LATITUDE: 21° 25.269

LONGITUDE: 158° 11.738

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

(depth)

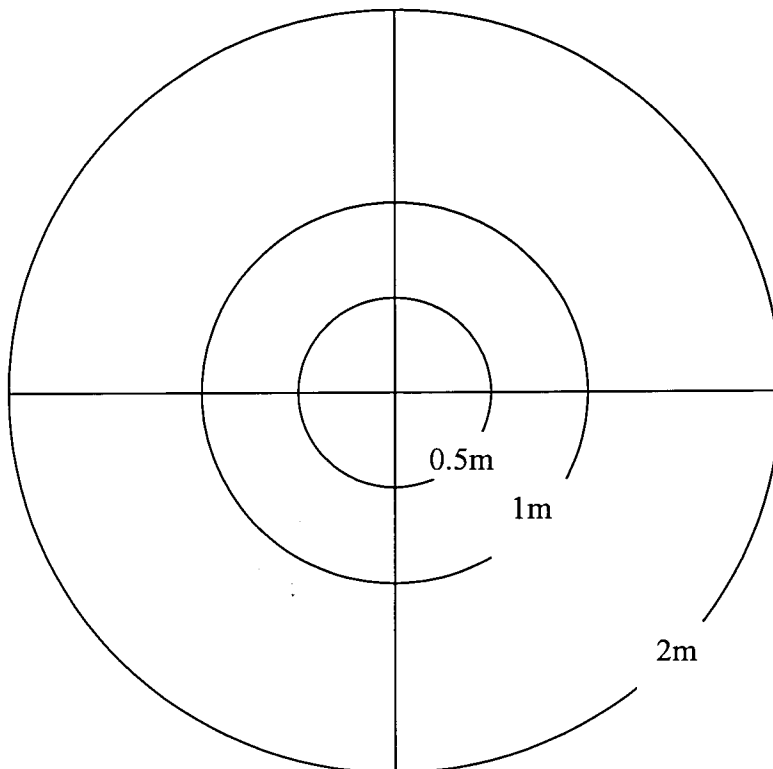
Tag #	Sample #	Sample Location	Date and Time	Comments
<u>C003</u>		<u>120 m ft dk</u>	<u>7/31/12 0903</u>	<u>pulled up on 3<sup>rd</sup> WWTP drop</u>



ORDNANCE REEF Sample Collection Sheet

NORTH

WWTP  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: WWTP

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21°25.088

Long: 158°11.834

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (oab)

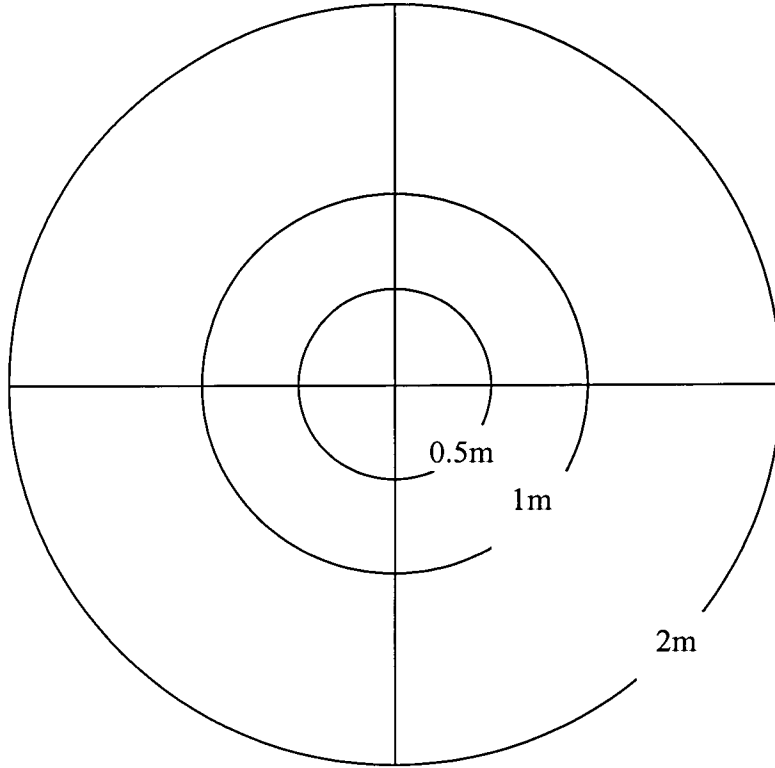
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>COOT</u>		<u>120 m ft</u> dk	<u>7/31/12 1420</u>	<u>1<sup>st</sup> drop</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CT/UH

Lat: 21° 26.186

Long: 158° 12.177

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

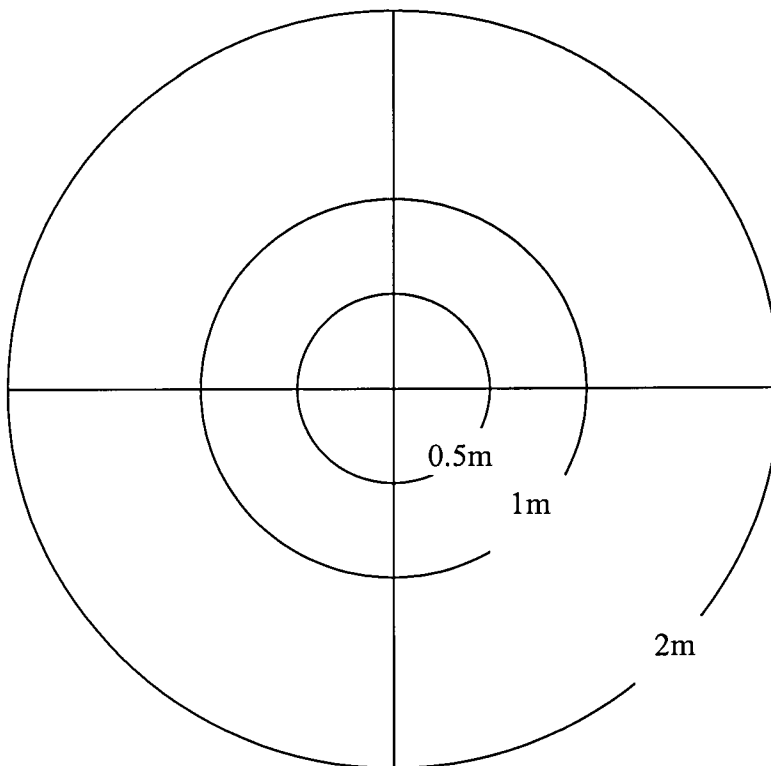
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
C005		110 m ft 2k	7/31/12 1010	pulled up on 1 <sup>st</sup> drop

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CO/UH

Lat: 21°26.229

Long: 158°12.080

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

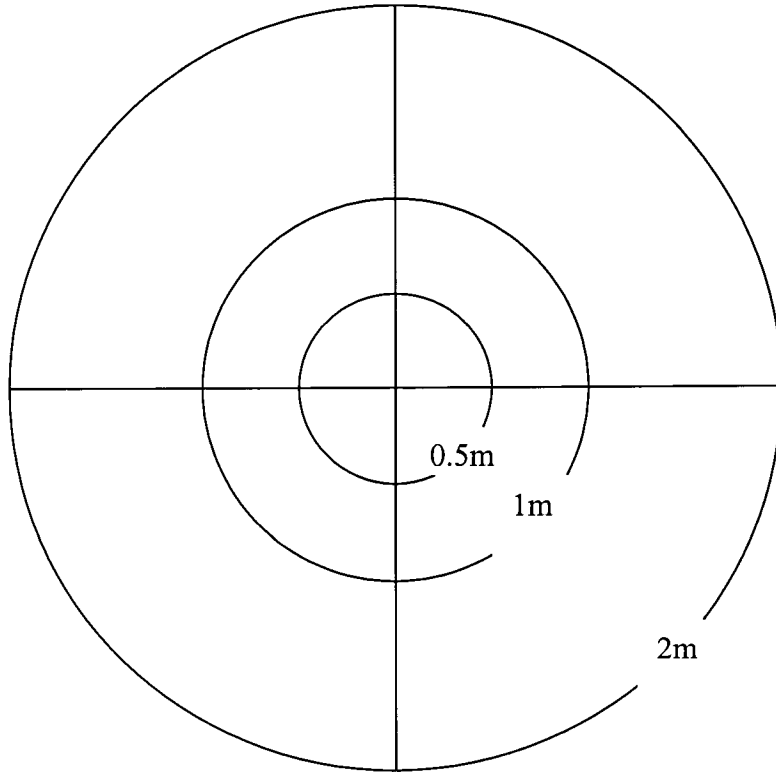
BIOTA (crab) (depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CO06</u>		<u>100m ft</u>	<u>7/31/12 1019</u>	<u>1<sup>st</sup> DMM drop</u>
<u>CO07</u>		<u>100m ft</u> <u>uh</u>	<u>7/31/12 1020</u>	<u>1<sup>st</sup> DMM drop *Eaten by stingray</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 26.144

Long: 158° 12.358

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

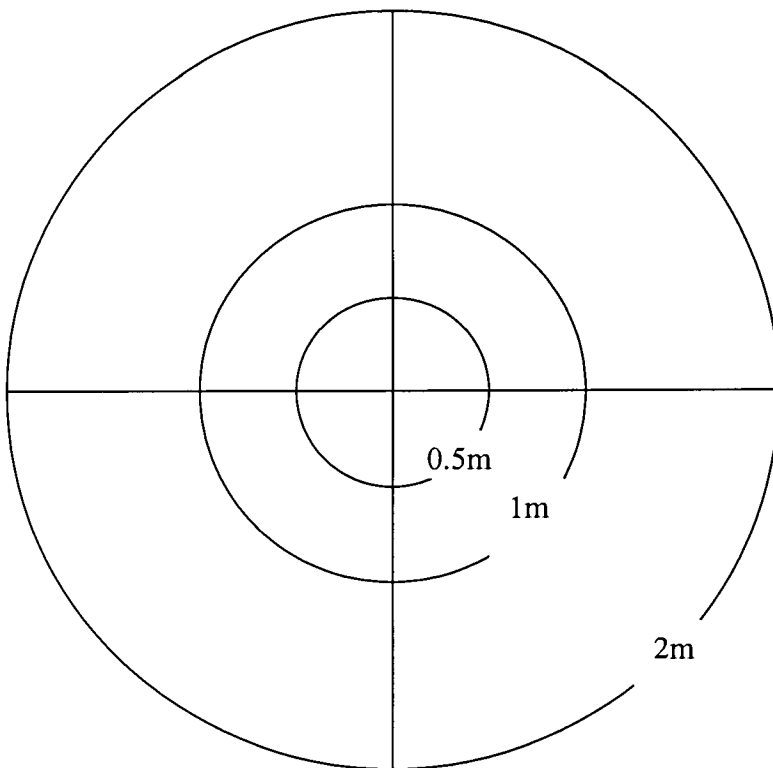
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
C008		120 m ft 14	7/31/12 1135	following replaced 2nd DMM drop

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/uh

Lat: 21° 26.232

Long: 158° 12.224

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

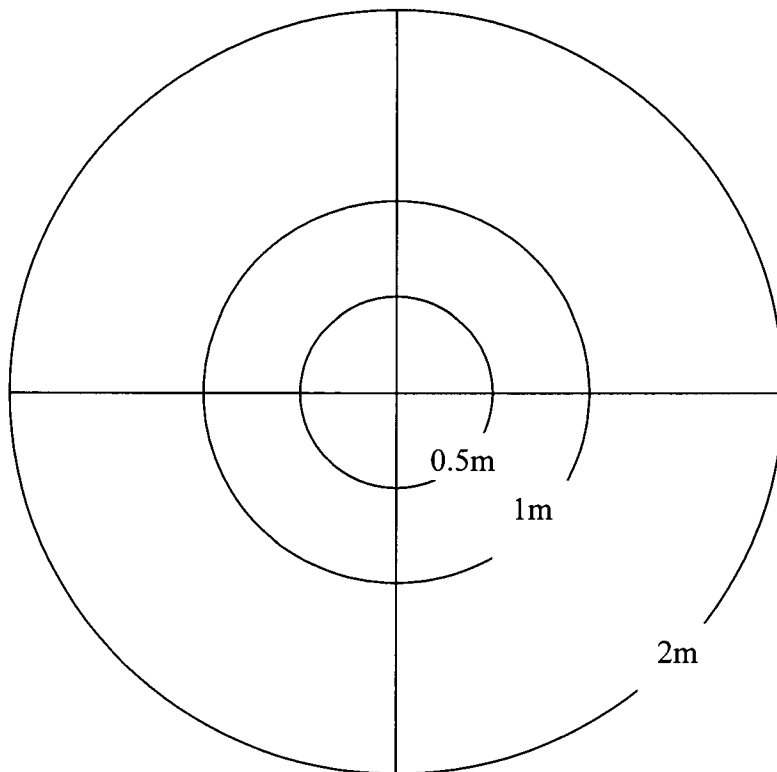
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
C009		90m ft tk	7/31/12 1217	3 <sup>rd</sup> DMM drop

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 26.192

Long: 158° 12.282

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

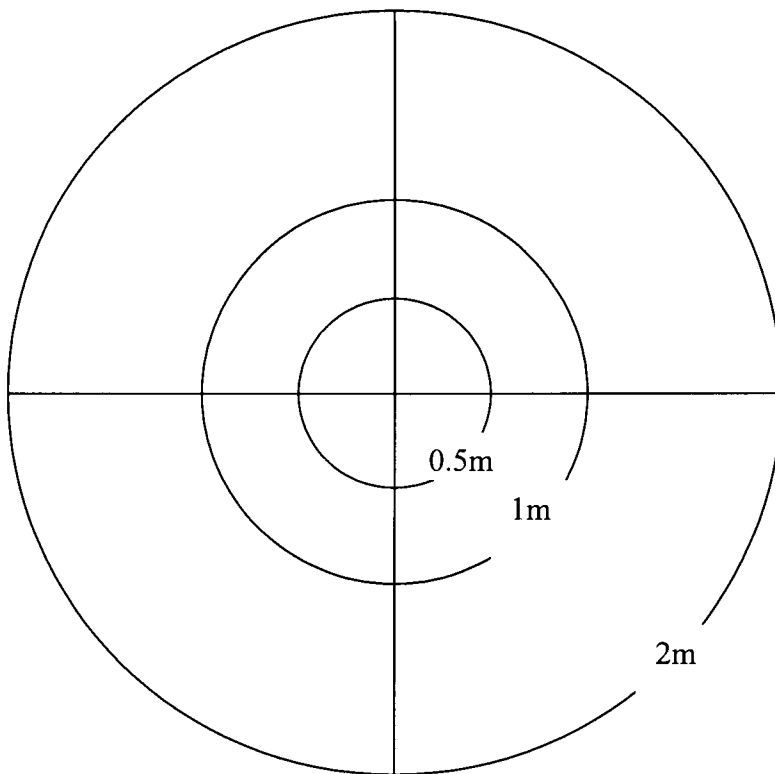
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
CO10		110m ft dk	7/31/12 1222	2nd DMM Drop

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
7/31/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 26.250

Long: 158° 12.234

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

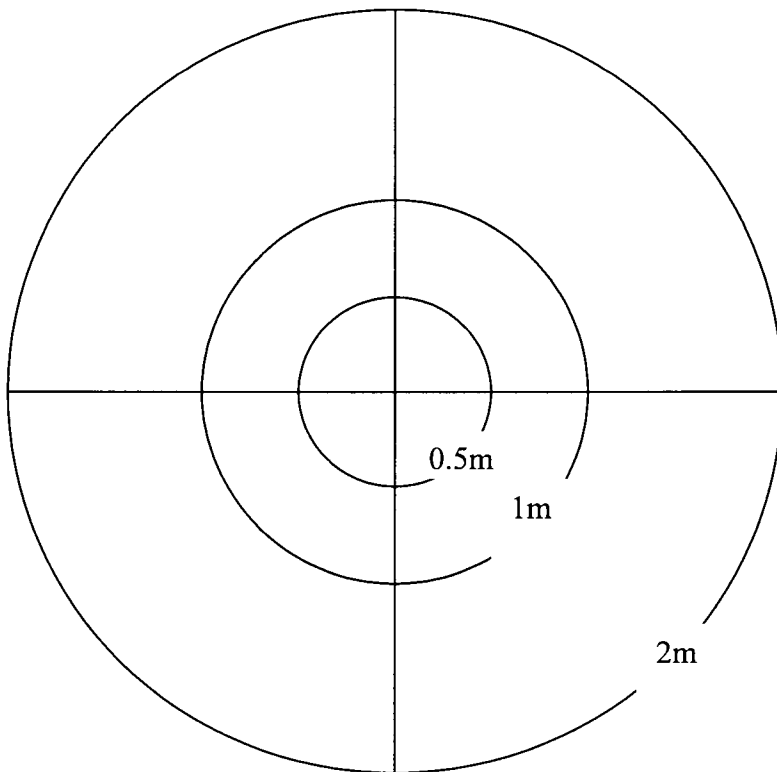
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
CO11		90m ft 1x	7/31/12 1524	4 <sup>th</sup> DMM drop

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
8/2/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 28.363

Long 158° 13.738

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

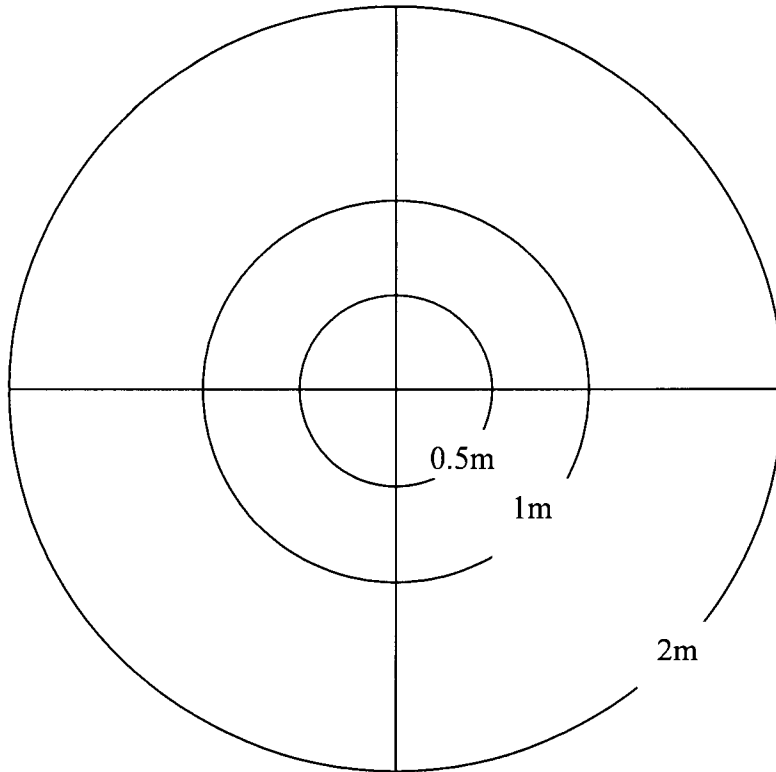
Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
C012		90m ft	8/2/12 0842	and drop slightly outside CON
C013		90m ft	8/2/12 0842	" "



ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
8/2/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/HH

Lat: 21° 28.408

Long: 158° 13.884

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crabs)

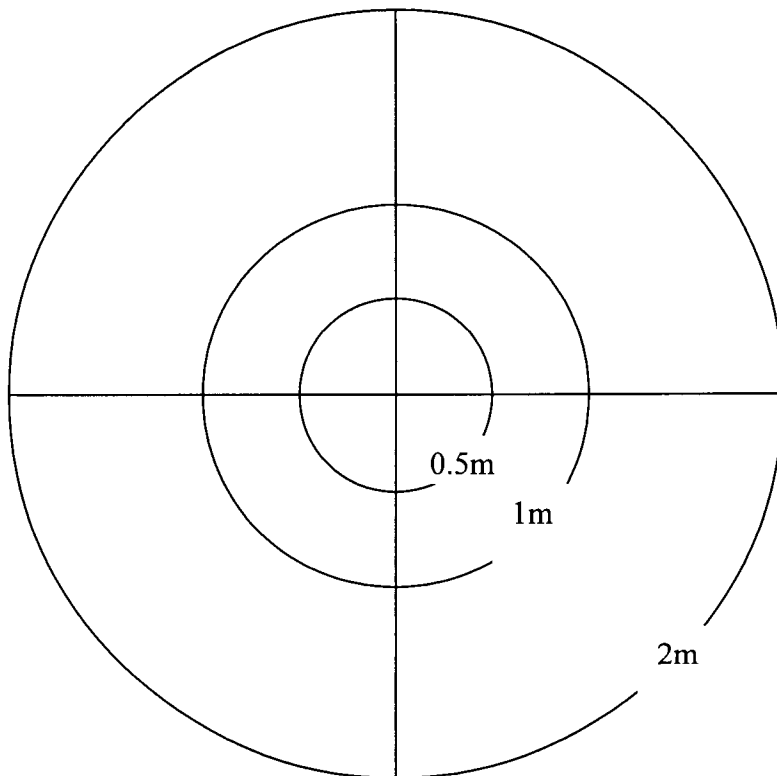
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>C014</u>		<u>exp 120<sup>th</sup> ft</u>	<u>8/2/12 0852</u>	<u>2<sup>nd</sup> drop slightly outside CON</u>
<u>C015</u>		<u>120<sup>th</sup> ft</u>	<u>8/2/12 0852</u>	<u>2<sup>nd</sup> drop slightly outside CON</u>

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
8/2/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: CS/44

Lat: 21° 28.305

Long: 158° 13.793

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

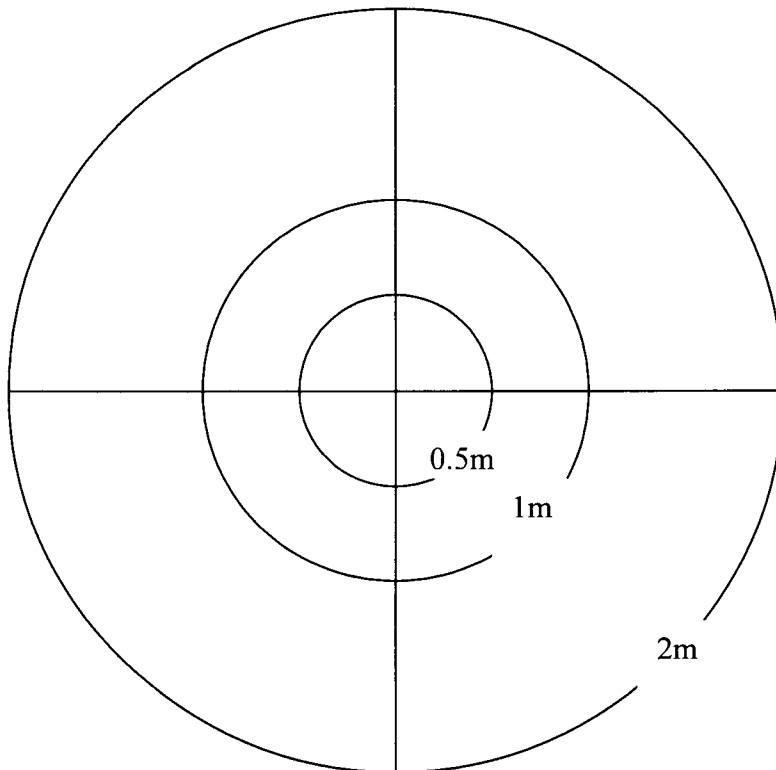
BIOTA (crab)

Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
COL6		100 <sup>ft</sup> ft	8/2/12 0935	2 <sup>nd</sup> drop, slightly outside CON

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
8/2/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: OT/UH

Lat: 21° 28.375  
Long: 158° 13.879

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

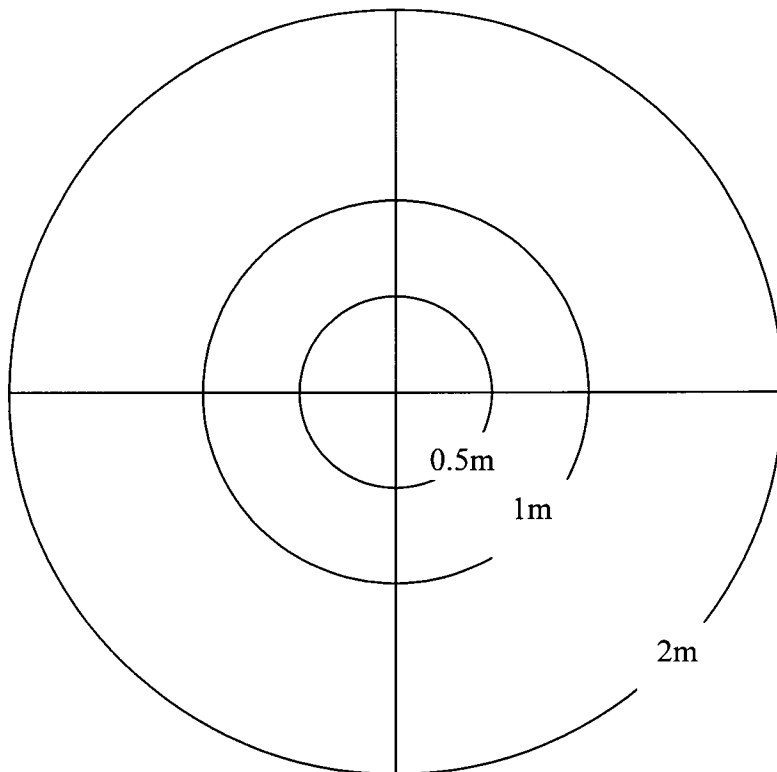
(depth)

Tag #	Sample #	Sample Location	Date and Time	Comments
CO17		100m/ft rk	8/2/12 0941	2 <sup>nd</sup> drop slightly outside CON

ORDNANCE REEF Sample Collection Sheet

NORTH

CON  
8/2/12



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21°28.404  
Long: 158°13.918

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA (crab)

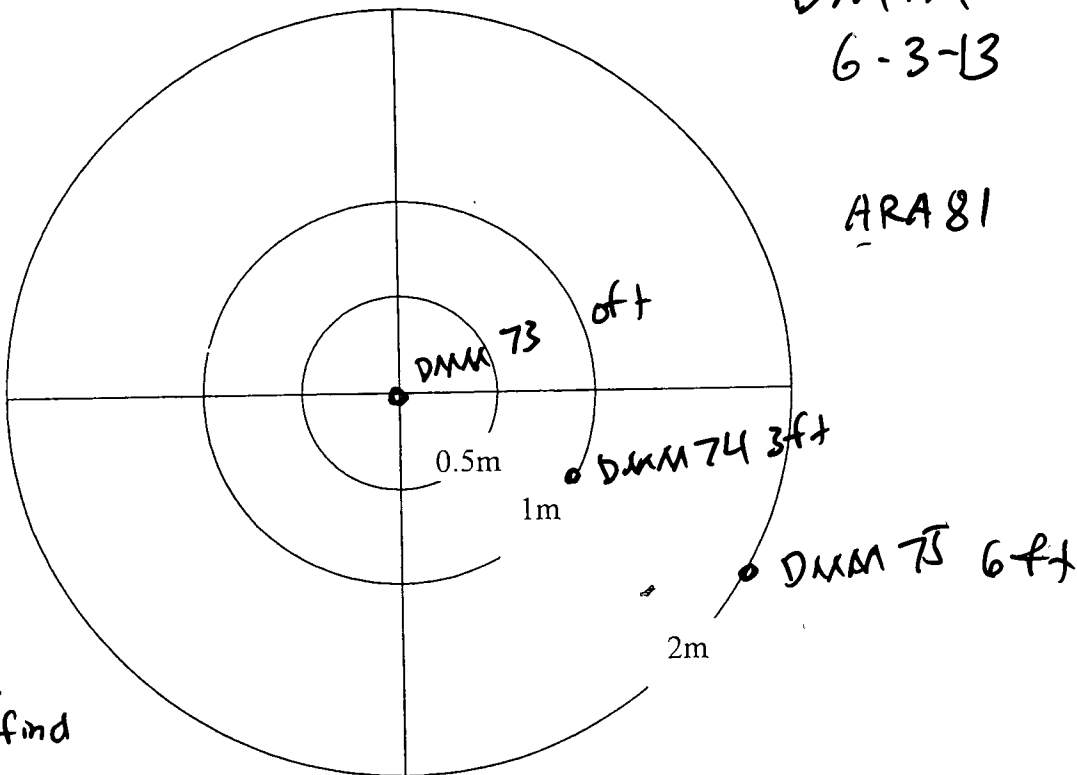
Tag #	Sample #	Sample Location (depth)	Date and Time	Comments
0018		120 m ft du	8/2/12 0947	3rd drop slightly outside CON

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
6-3-13

ARA 81



\*Note abundant  
limu but he's  
difficult to find

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 73

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C. Jelling/uh

Lat: 21° 25.720N

Long: 158° 12.088W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 73	21.4m		6-3-13 0912	0ft
DMM 74	↓			3ft
DMM 75	↓			6ft

SEAWATER Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 73-L001			6-3-13 1025	

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 73-0001			6-3-13 1025	

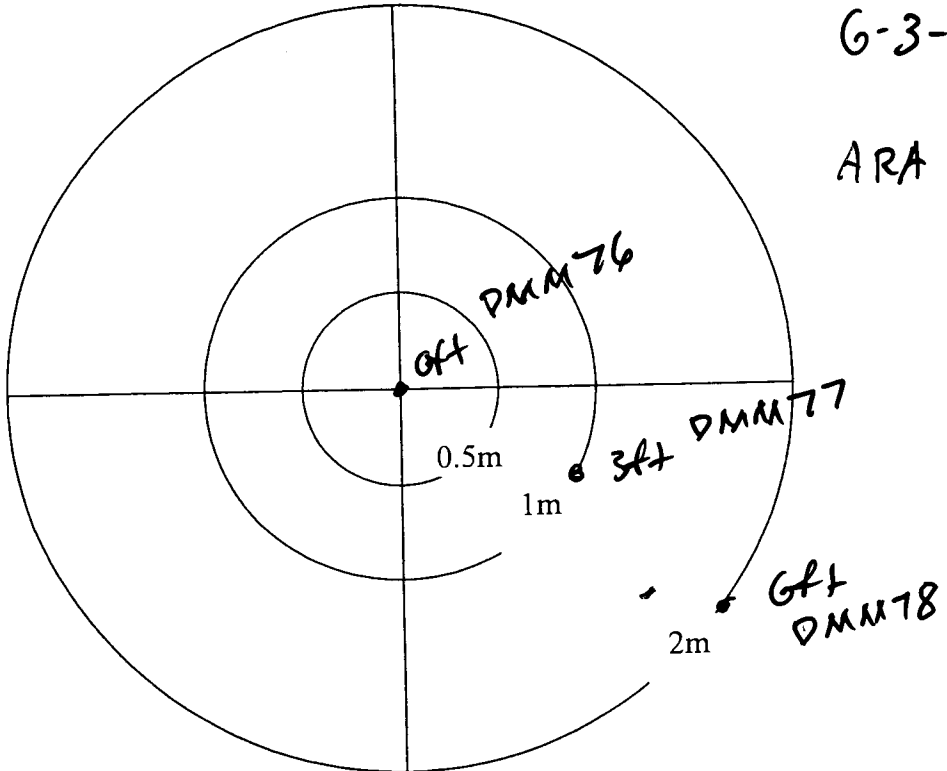
Hydrocast #1 near site at Lat: 21.25.728 Lowered: 0936  
 Long: 158° 12.072 Ret: 0940

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
6-3-13

ARA 97



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 76

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C. Jelling/UH

Lat: 21° 25.718 N

Long: 158° 12.087 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM 76	17.0m		6-3-13 1035	off
DMM 77	↓		↓ ↓	off 3ft
DMM 78	↓			off

~~SEAWATER~~ Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
	DMM 76-0002		6-3-13 1105	very large

BIOTA

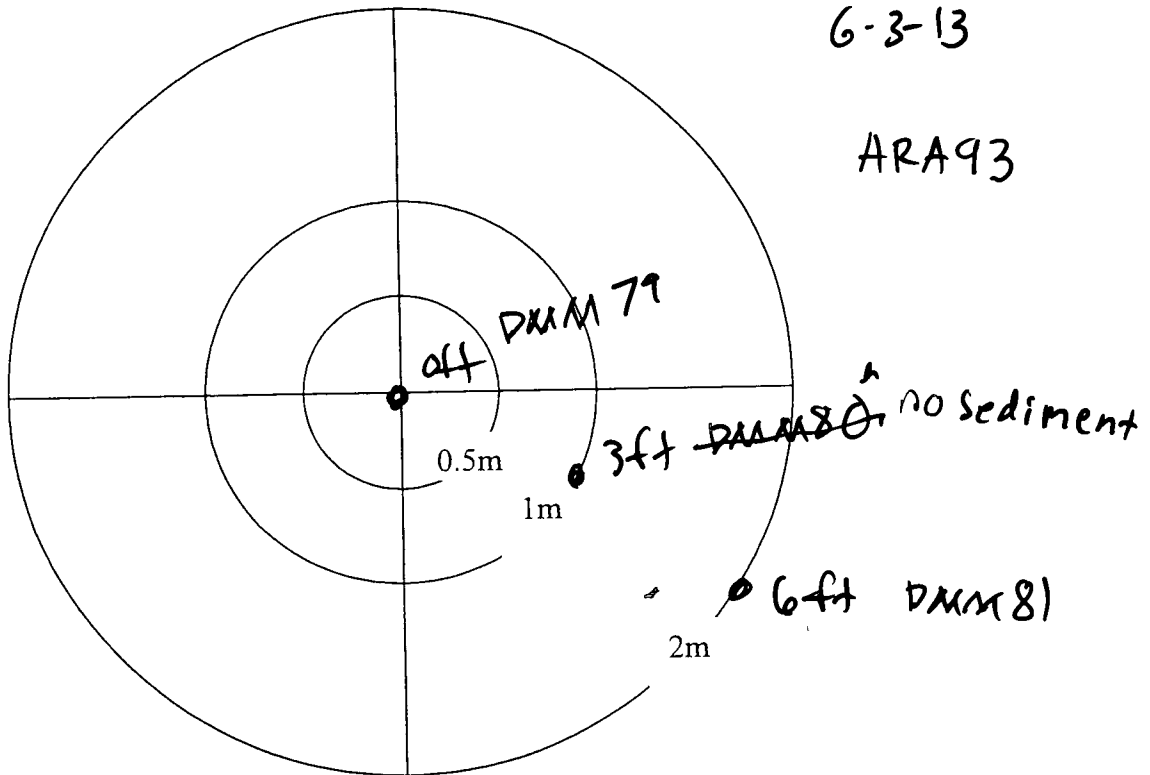
Tag #	Sample #	Sample Location	Date and Time	Comments
	DMM 76-L002		6-3-13 1105	

ORDNANCE REEF Sample Collection Sheet

NORTH

DMM  
6-3-13

ARA93



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM79

UH SCIENTIST: E DeCalle

SAMPLE COLLECTOR: C.J. /UH

Lat: 21° 25.698 N

Long: 158° 12.089 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM79</u>		<u>22.3 m</u>	<u>6-3-13 1116</u>	<u>off</u>
<del><u>DMM80 dk</u></del>		↓	↓	<u>3ft</u> <span style="border: 1px solid black; padding: 2px;">no sediment</span>
<u>DMM81</u>		↓	↓	<u>6ft</u>

SEAWATER biota

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM79-0003</u>			<u>6-3-13 1155</u>	<u>Found under case of 50 Cal</u>

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM79-L003</u>			<u>6-3-13 1155</u>	

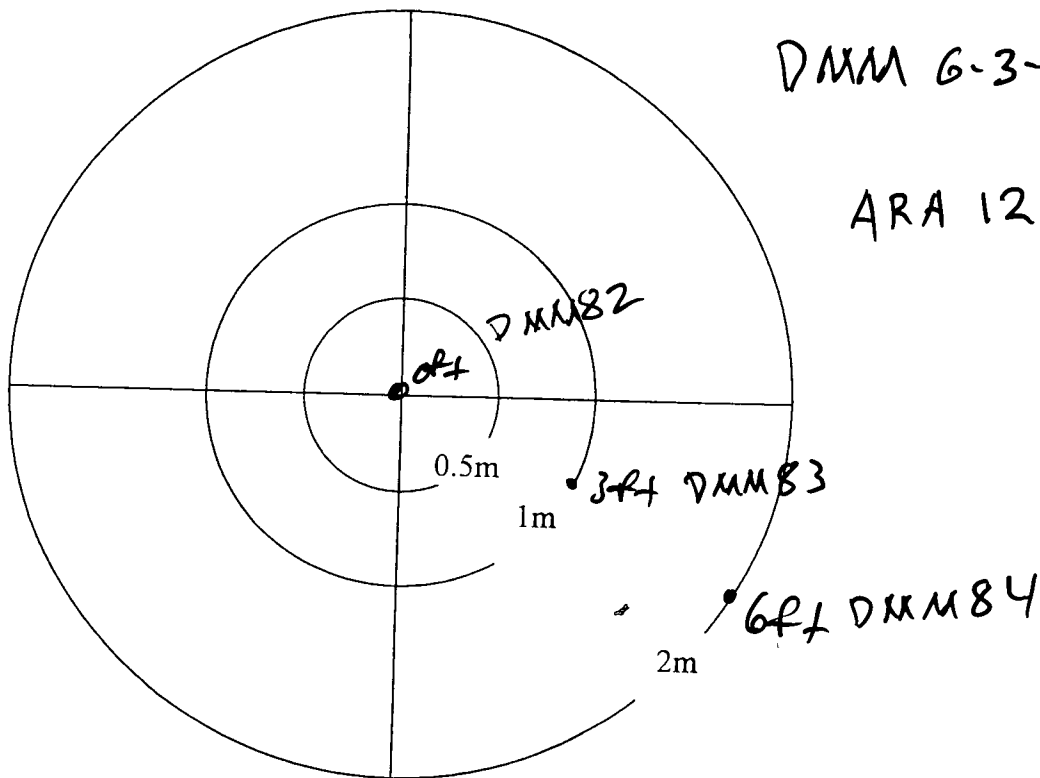
Hydrocast #2 near this site at  
time lowered: 11:21  
Ret: ~~11:25~~ 11:24

Lat: 21° 25.709  
Long: 158° 12.110

NORTH

DMM 6-3-13

ARA 126



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 82

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.614 N

Long: 158° 12.018 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM82		22.4m	6-3-13 1203	off
DMM83		↓	↓ ↓	3ft
DMM84		↓	↓ ↓	6ft

SEAWATER Biota

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM82-0004			6-3-13 1240	

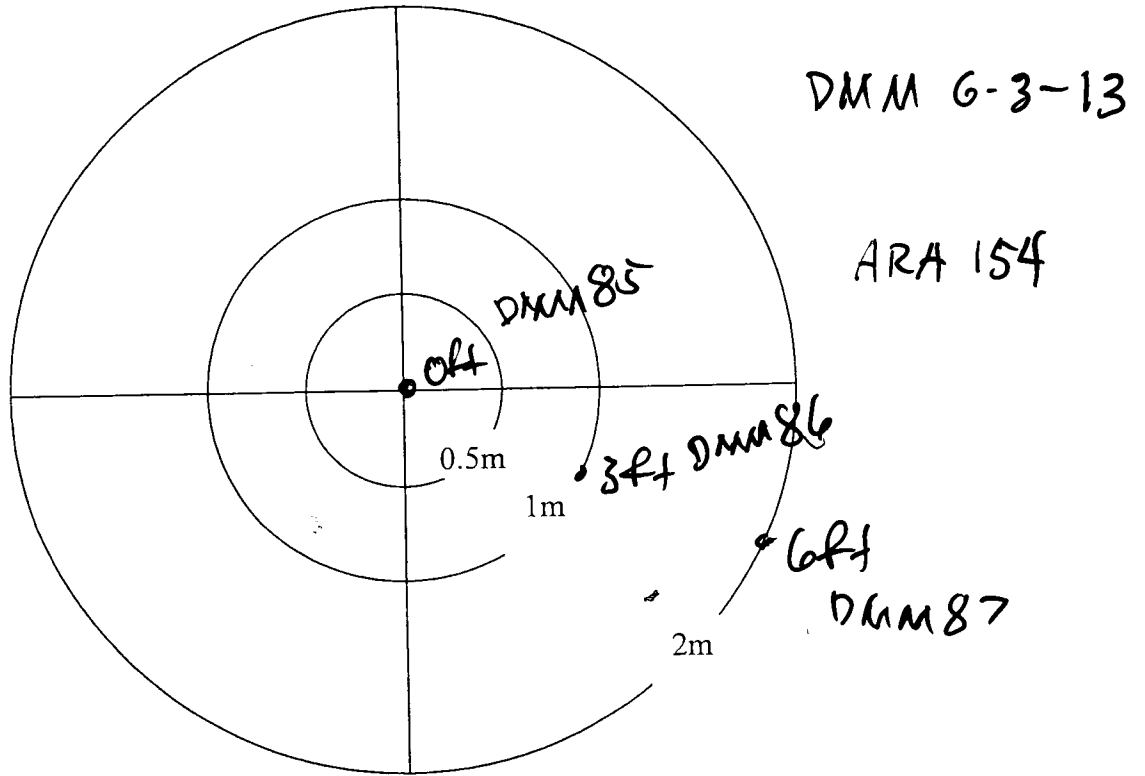
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM82-L004			6-3-13 1306	



ORDNANCE REEF Sample Collection Sheet

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 85

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.823N

Long: 158° 12.170W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 85</u>		<u>24.1m</u>	<u>6-3-13 1325</u>	<u>0ft</u>
<u>DMM 86</u>		↓	↓	<u>3ft</u>
<u>DMM 87</u>				<u>6ft</u>

~~SEAWATER~~ <sup>Biota</sup>

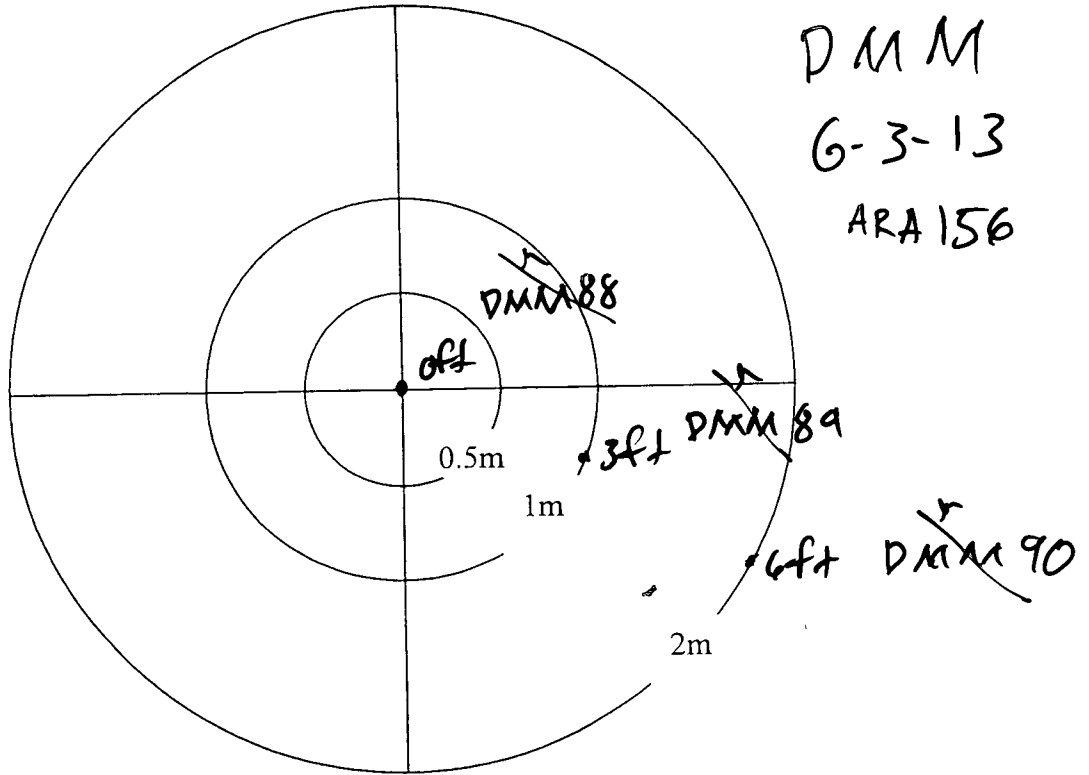
Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 85-0005</u>			<u>6-3-13 1350</u>	

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 85-L005</u>			<u>6-3-13 1350</u>	

ORDNANCE REEF Sample Collection Sheet

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM88  
 SAMPLE COLLECTOR: CJ/UH

UH SCIENTIST: E. DeCarlo  
 Lat: 21° 25.711N  
 Long: 158° 12.065W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<del>DMM88</del>	<del>22.1m</del>	<del></del>	<del>6-3-13 1400</del>	<del>off</del>
<del>DMM89</del>	<del></del>	<del></del>	<del></del>	<del>3ft</del>
<del>DMM90</del>	<del></del>	<del></del>	<del></del>	<del>6ft</del>

~~SEAWATER Biota~~

Tag #	Sample #	Sample Location	Date and Time	Comments
<del></del>	<del></del>	<del></del>	<del></del>	<del></del>

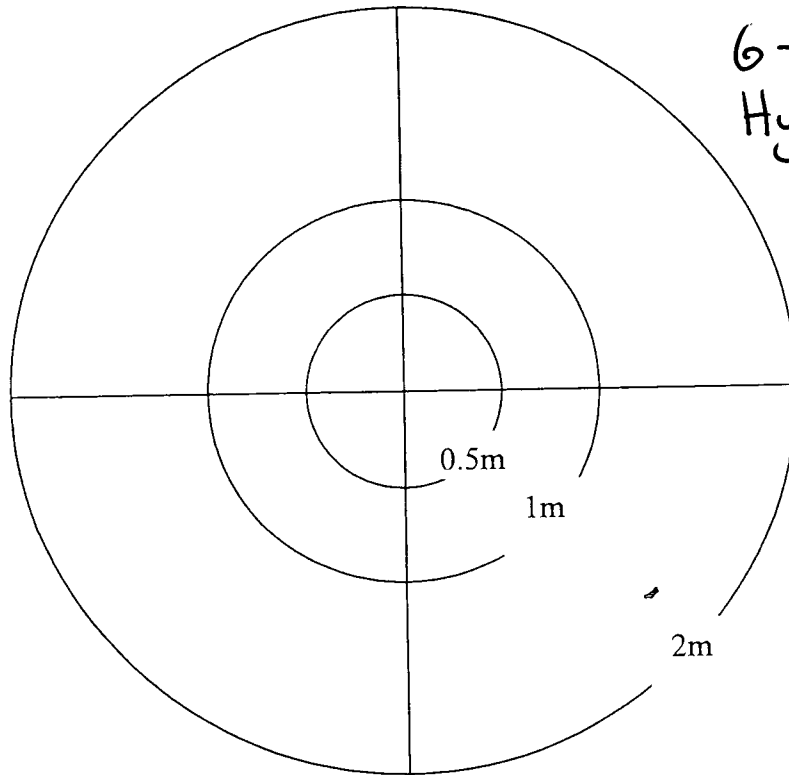
~~BIOTA~~

Tag #	Sample #	Sample Location	Date and Time	Comments
<del></del>	<del></del>	<del></del>	<del></del>	<del></del>

\* No Samples collected. water getting too murky

ORDNANCE REEF Sample Collection Sheet

NORTH



6-3-13  
HydroCast #3  
South of  
DXM Stratum  
60m

Time Lowered: 1444  
Time Ret: 1447

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DXM

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: UH

Lat: 21° 25.382 N

Long: 158° 12.177 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

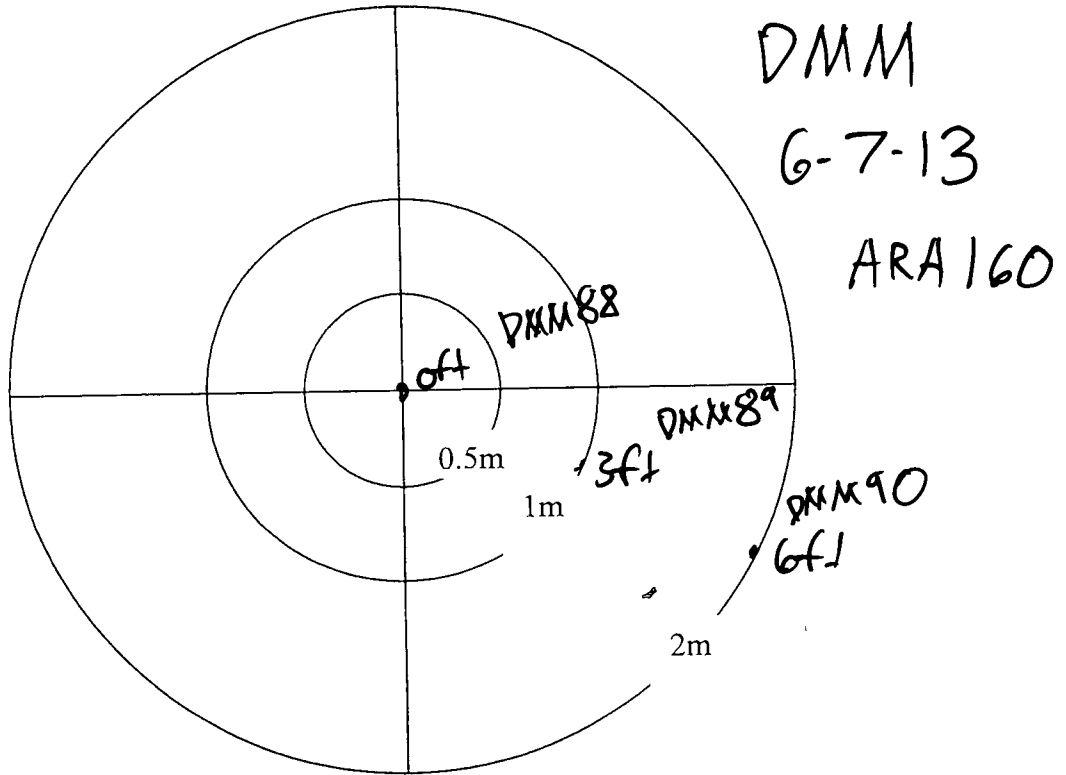
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments

ORDNANCE REEF Sample Collection Sheet

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM88

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 25.846N

Long: 158° 12.369W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM88	43.0m		6-7-13 0915	off
DMM89	↓		↓	3ft
DMM90	↓		↓	6ft

~~SEAWATER~~ <sup>★</sup> Biota

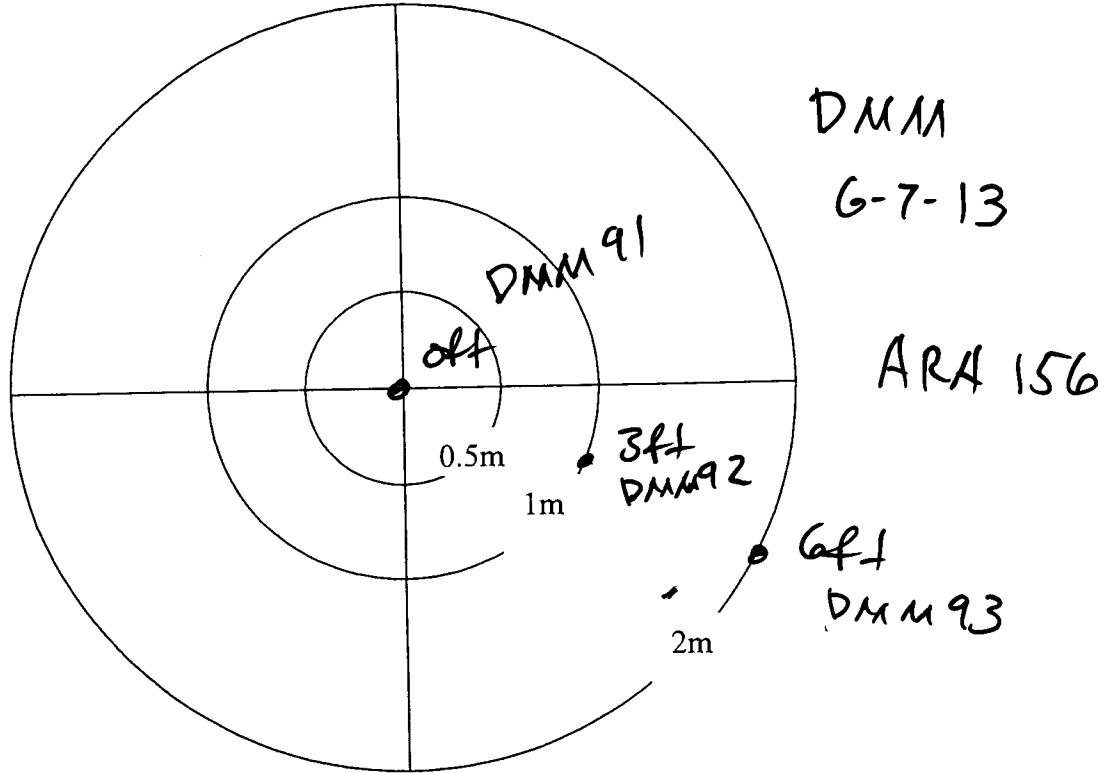
Tag #	Sample #	Sample Location	Date and Time	Comments
DMM88-0006			6-7-13 0942	Found 25ft from marker

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM88-L006			6-7-13 0942	

ORDNANCE REEF Sample Collection Sheet

NORTH



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM 91

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CS/UH

Lat: 21° 25.711N

Long: 158° 12.065 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 91</u>	<u>22.1m</u>		<u>6-7-13 0955</u>	
<u>DMM 92</u>	<u>↓</u>		<u>↓</u>	<u>↓</u>
<u>DMM 93</u>	<u>↓</u>		<u>↓</u>	<u>↓</u>

SEAWATER

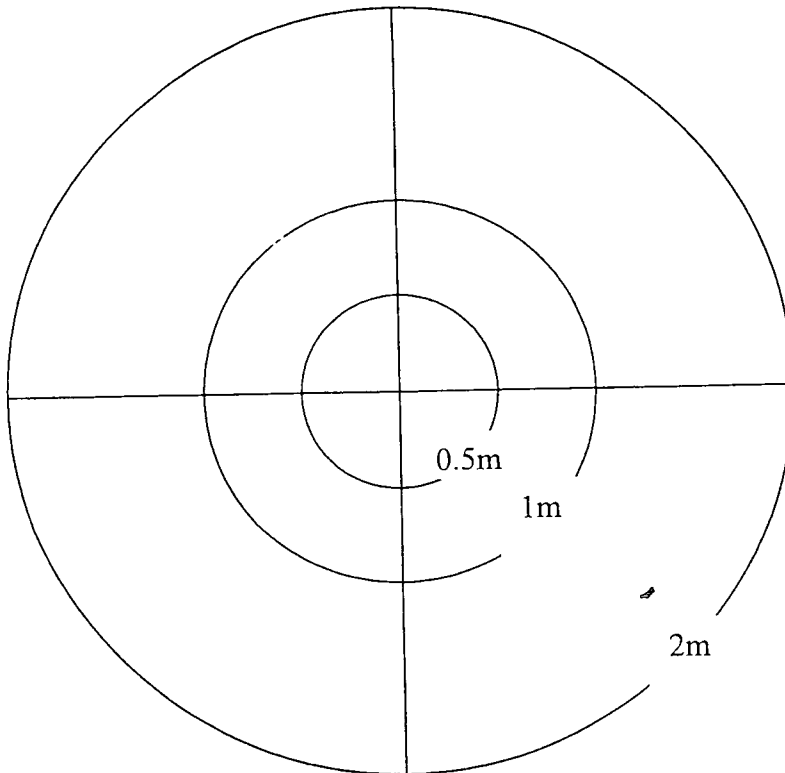
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM 91-0007</u>			<u>6-7-13 1025</u>	
<u>DMM 91-L007</u>			<u>6-7-13 1025</u>	

ORDNANCE REEF Sample Collection Sheet

NORTH



CON1  
6-7-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON52

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 27.533 N <sup>\*for limu</sup>  
Long: 158° 13.090 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON52</u>			<u>6-7-13 1055*</u>	<u>Moved location to find sand</u>
		<u>Lat: 21° 27.526</u>		
		<u>Long: 158° 13.064</u>		<u>Coordinate and</u>
		<u>Depth 13.2 m</u>		<u>Depth for sediment and Octopus</u>

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments
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BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON52-L008</u>			<u>6-7-13 1140</u>	<u>*</u>

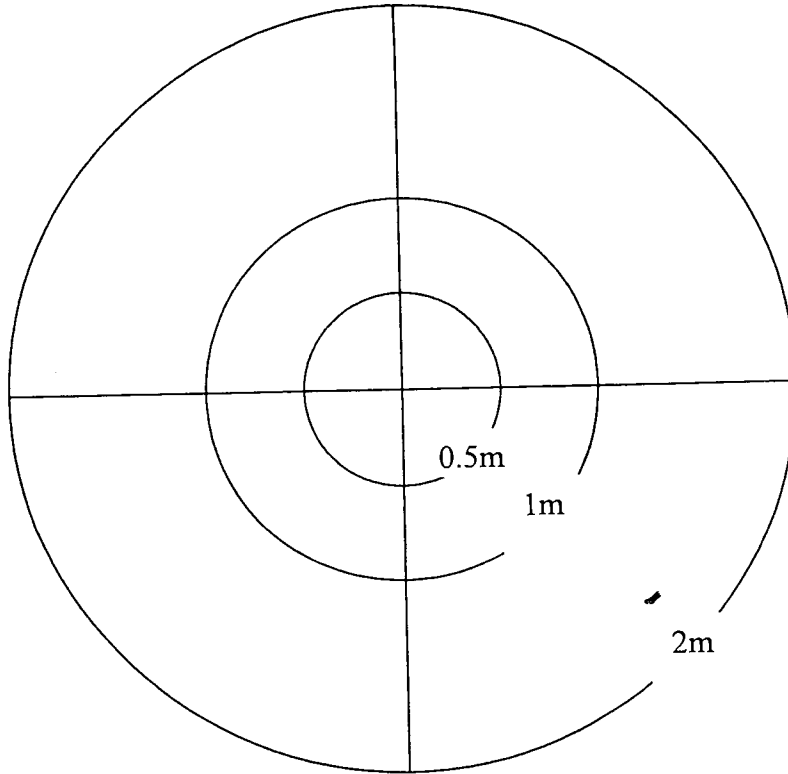
CON52-0008 6-7-13 1217 at Sediment coordinate 5

Hydrocast #4 near CON52 6-7-13  
Lat: 21° 27.522  
Long: 158° 13.091  
Depth: 15.5m

Time lowered: 1113  
Time ret: 1115

ORDNANCE REEF Sample Collection Sheet

NORTH



CON1

6-7-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON53

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 27.404 N

Long: 159° 12.968 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON53	9.0m		6-7-13 1235	
CON54	↓	duplicate	↓ 1245	time for blind duplicate

SEAWATER

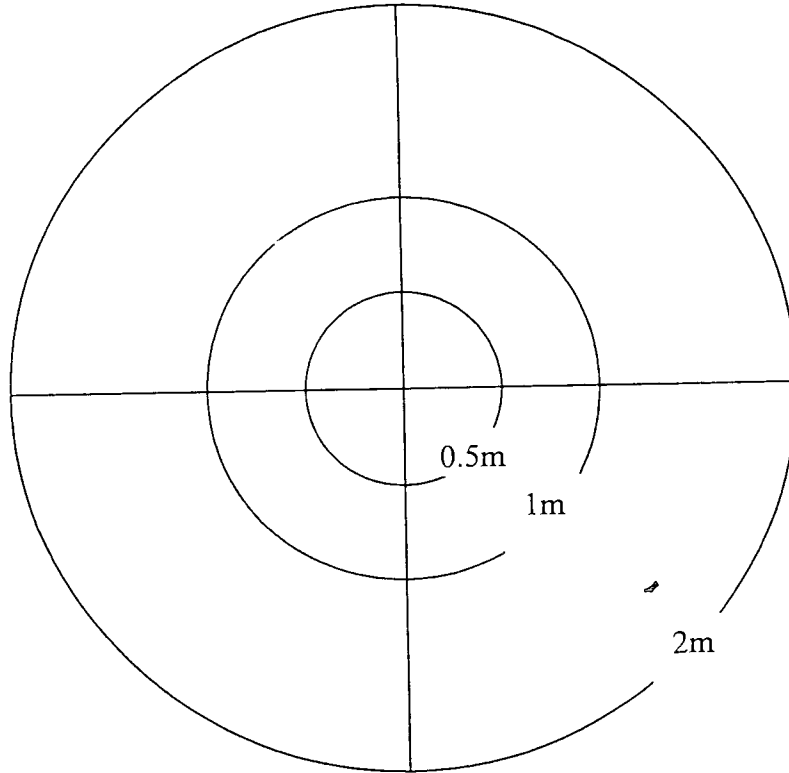
Tag #	Sample #	Sample Location	Date and Time	Comments
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BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON53-0009	9.0m		6-7-13 1253	
CON53-4009	9.0m		6-7-13 1253	

ORDNANCE REEF Sample Collection Sheet

NORTH



CON  
6-7-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON 55

UH SCIENTIST: F. De Carlo

SAMPLE COLLECTOR: CJ/UH

Lat: 21° 27.214  
Long: 158° 12.948

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
CON55	25.8m		6-7-13 1305	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON55-L010	25.8m		6-7-13 <del>1305</del> 1335	

No octopus caught. Difficult to find due to overcast weather. Divers to return to site.

Hydrocast #5 near this location

Lat: 21° 27.206N

Long: 158° 12.951W

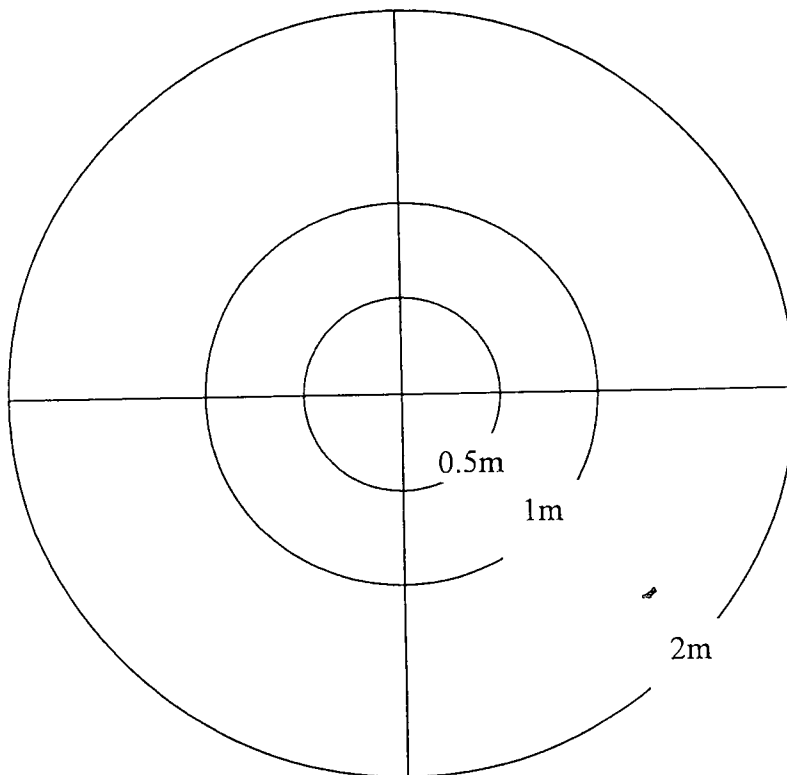
Depth: 26.3m Time lowered: 1309

Time ret: 1312



ORDNANCE REEF Sample Collection Sheet

NORTH



CON  
6-7-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON56

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: UH/CJ

Lat: 21° 27.540N  
Long: 158° 13.076W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON56</u>	<u>14.2m</u>		<u>6-7-13 1345</u>	

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments
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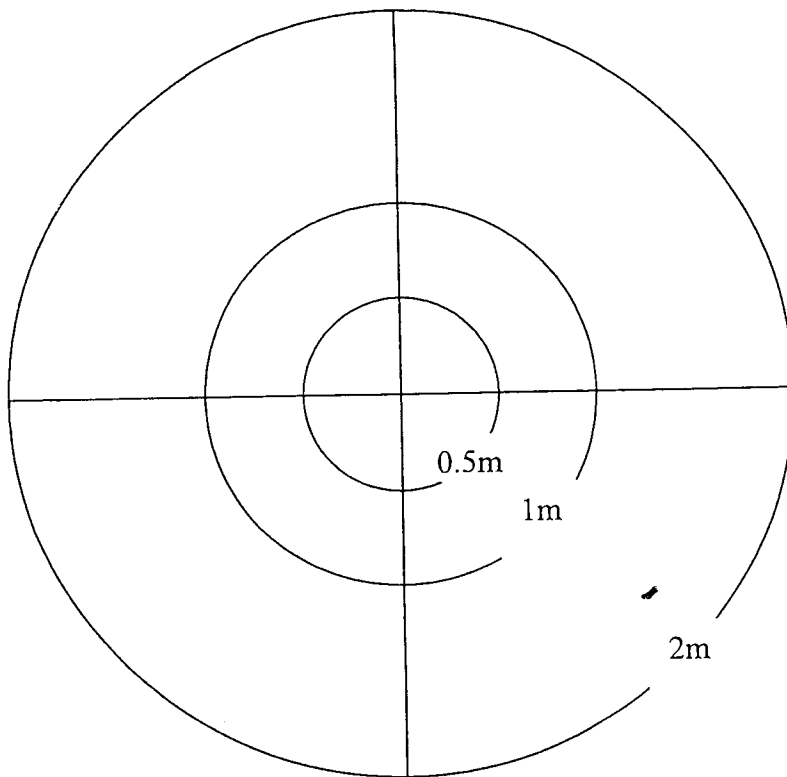
BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CON56-0010</u>	<u>14.2m</u>		<u>6-7-13 1400</u>	

<u>CON56-L011</u>	<u>14.2m</u>		<u>6-7-13 1410</u>	
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ORDNANCE REEF Sample Collection Sheet

NORTH



COM  
6-7-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CONST

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: UH/CJ

Lat: 21° 27.652 N

Long: 158° 13.021 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CONST</u>		<u>5.5m</u>	<u>6-7-13 1415</u>	

SEAWATER

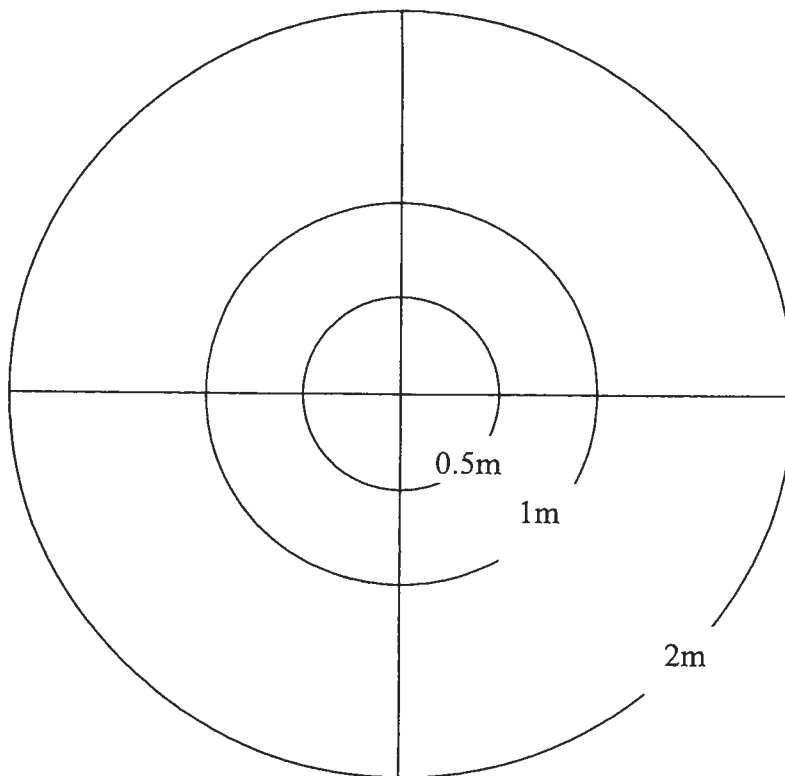
Tag #	Sample #	Sample Location	Date and Time	Comments
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BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>CONST-L012</u>			<u>6-7-13 1437</u>	

no octopus caught. Divers will return to site

NORTH



DMM  
6-19-13

white wake

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.737N

Long: 158° 12 046W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

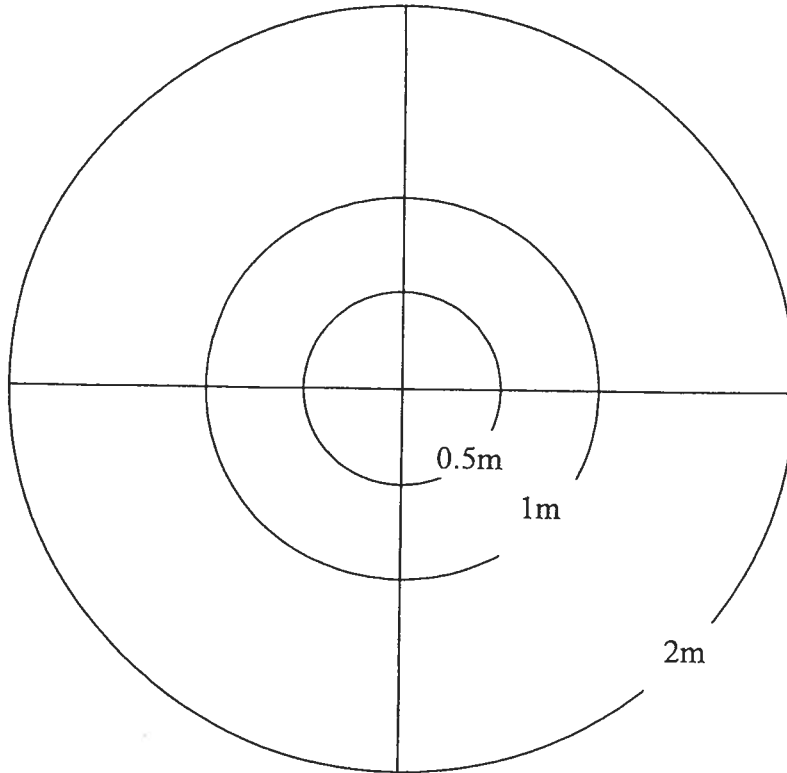
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-FO28	60 ft.	6-19-13	20:45	white wake <del>cor</del>

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J

Lat: 21° 25.729 N

Long: 158° 12.043 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

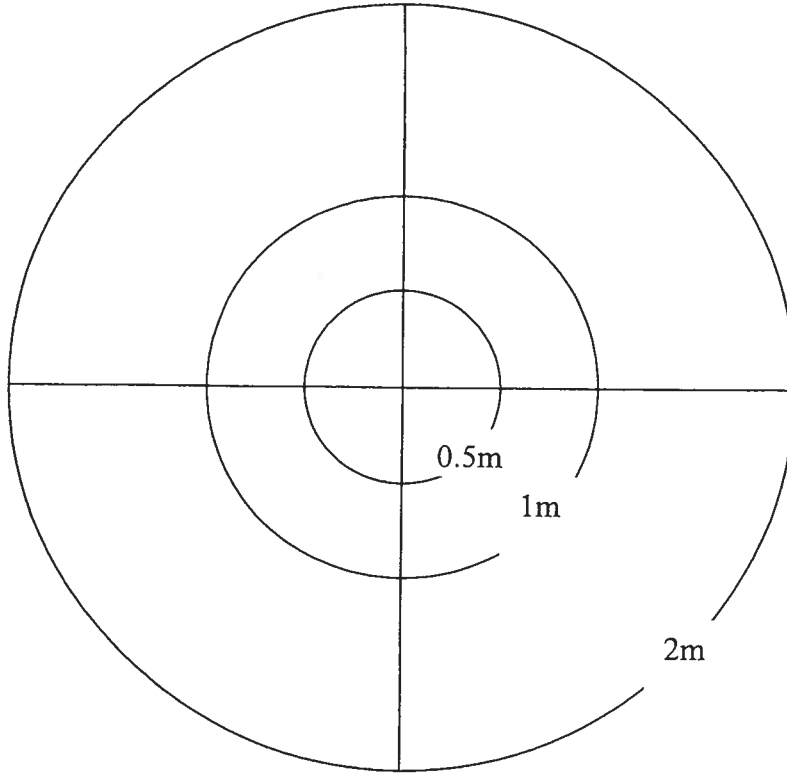
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F029 + DMM-F030		60 ft	6-19-13 20:47	Red, white

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J

Lat: 21° 28.701N

Long: 158° 12.030W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

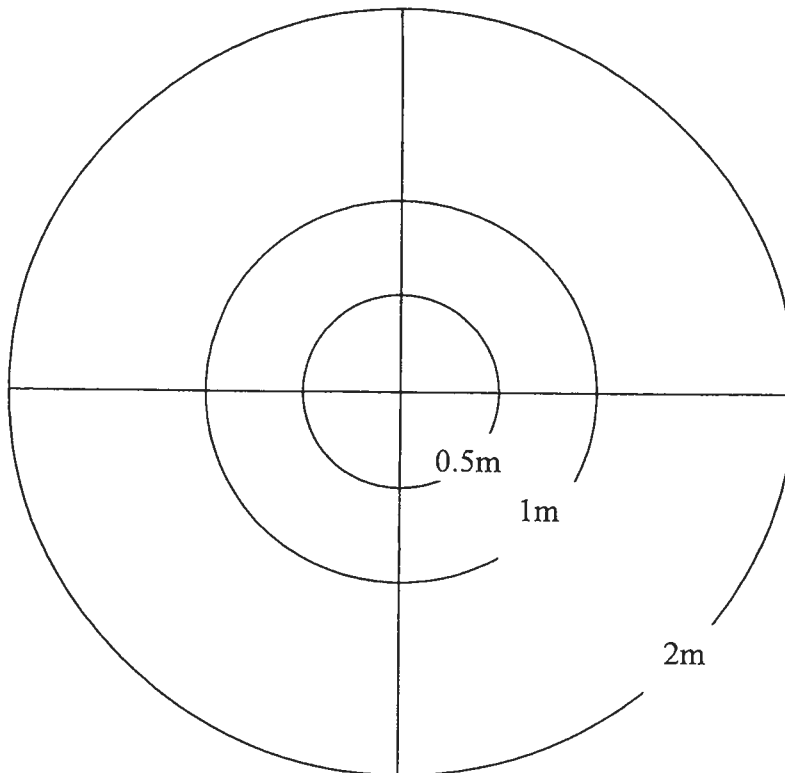
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F031</u>	<u>60 ft.</u>	<u>60 ft.</u>	<u>6-19-13 20:50</u>	<u>Red</u>

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.697N

Long: 158° 12.027W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

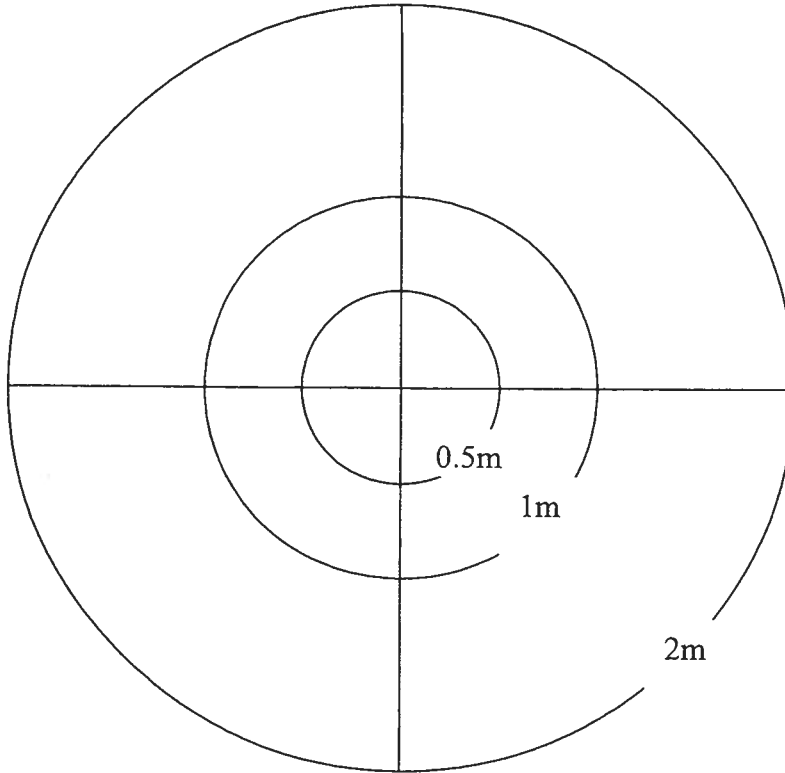
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F032</u>	<u>60 A.</u>	<u>60 A.</u>	<u>6-19-13 20:51</u>	<u>Red</u>

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.673N  
Long: 158° 12.017W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

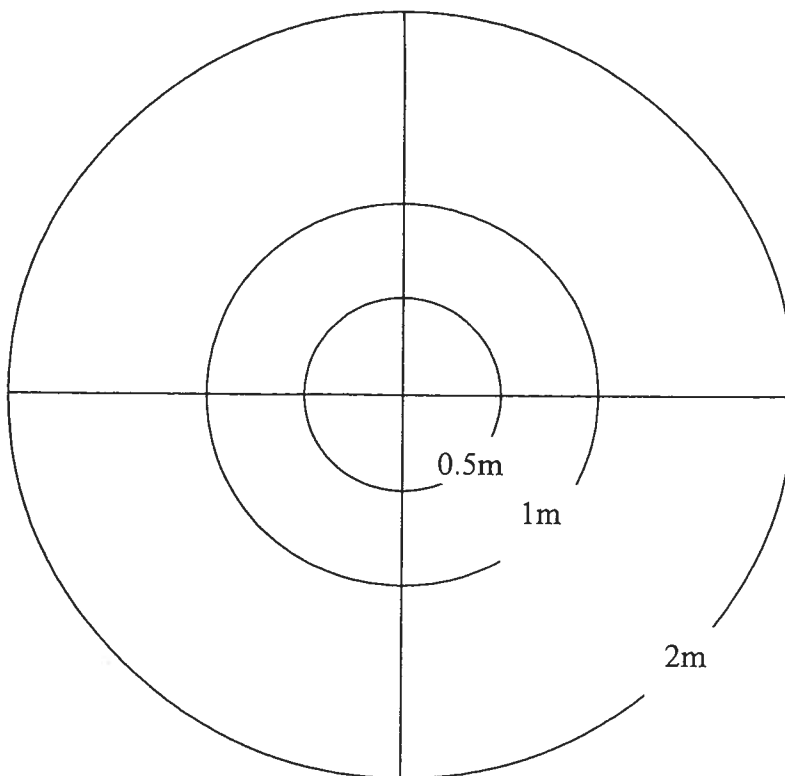
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F033	60 ft.	60 ft.	6-19-13 20:53	Red

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: CJ.

Lat: 21° 29.665N  
Long: 158° 12.019W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

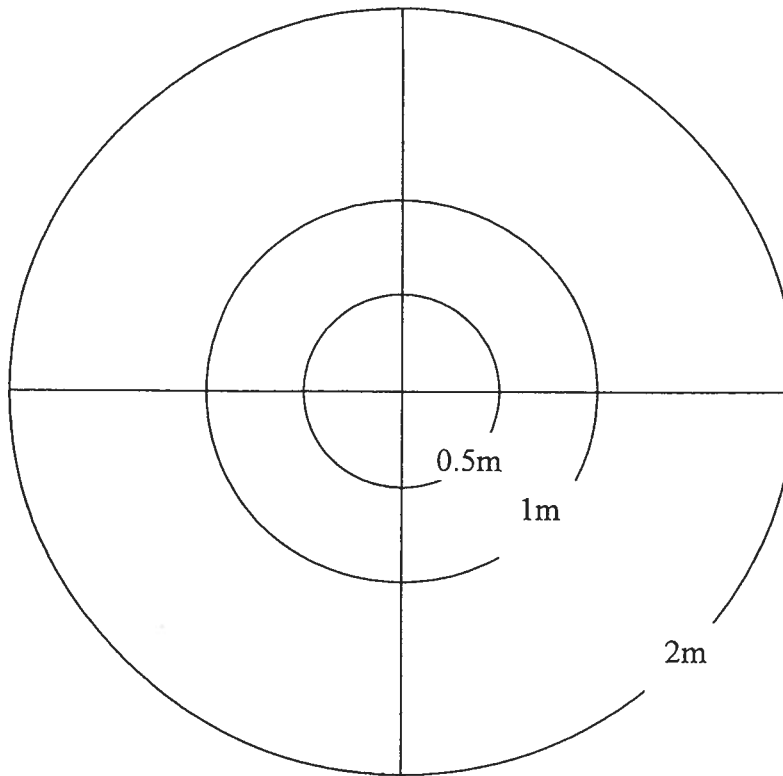
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F034	60ft.	6-19-13	20:54	Red



**NORTH**



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.636 N

Long: 158° 12.006 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

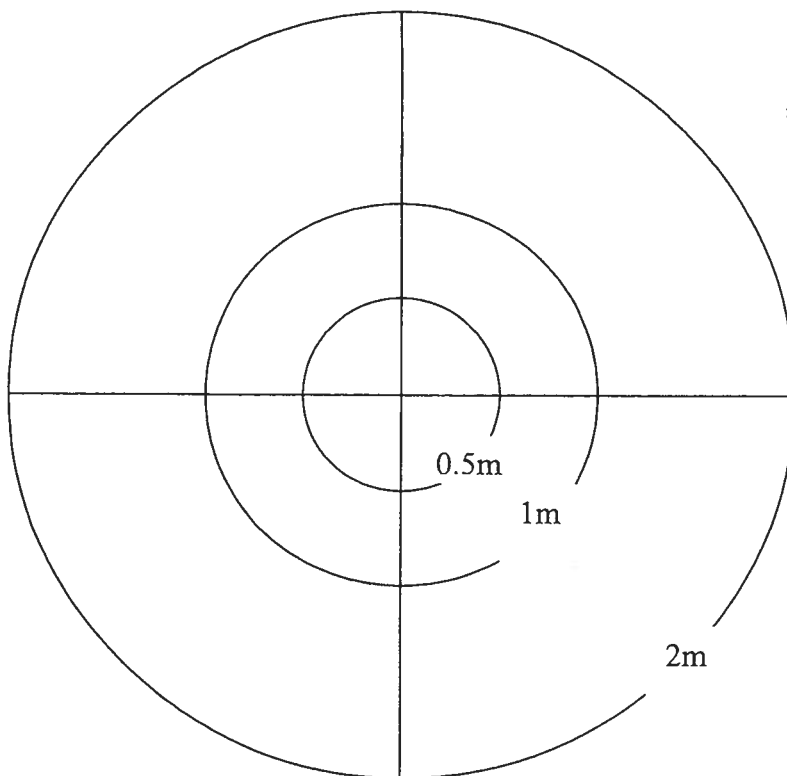
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F035	60 ft.	6-19-13	20:55	Red

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.611N

Long: 158° 12.998 W BK  
11.998 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

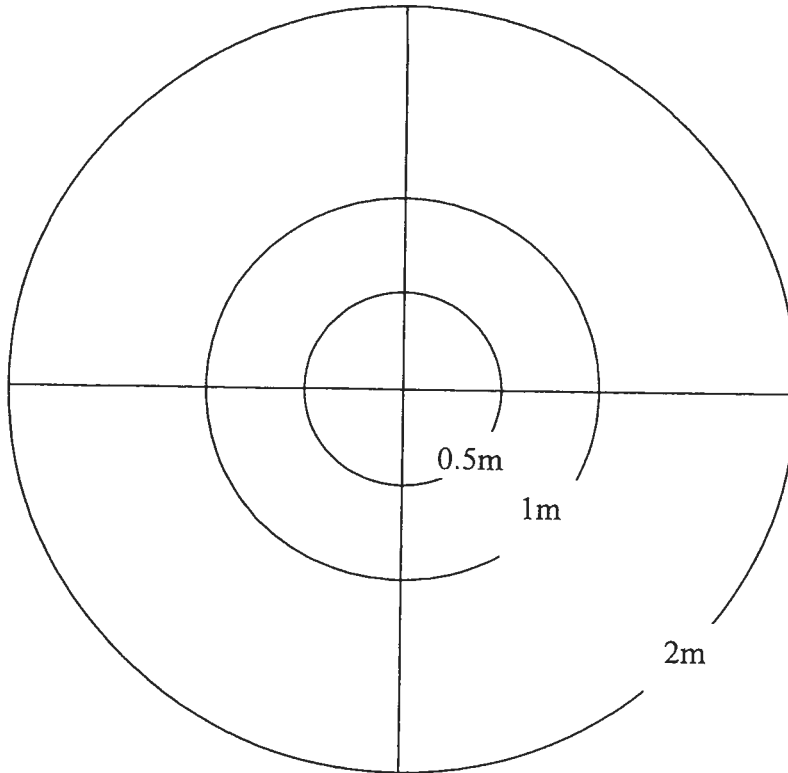
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F036</u>	<u>60ft.</u>	<u>6-19-13</u>	<u>20:57</u>	<u>white</u>

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.609N

Long: 158° 12.000W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

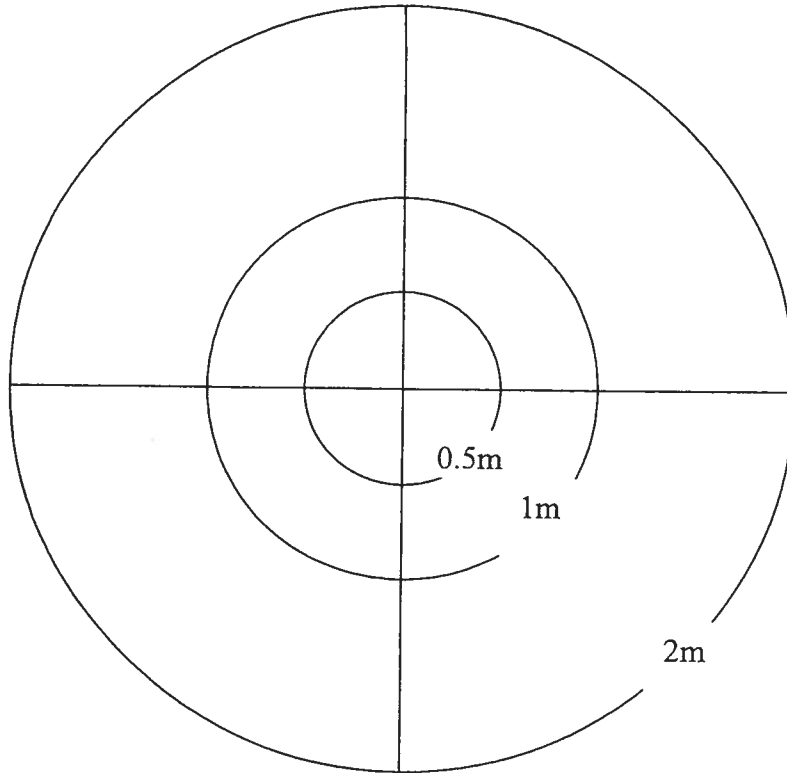
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F037</u>	<u>60 ft.</u>	<u>6-19-13</u>	<u>20:59</u>	<u>White</u>

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.547N

Long: 158° 11.977W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

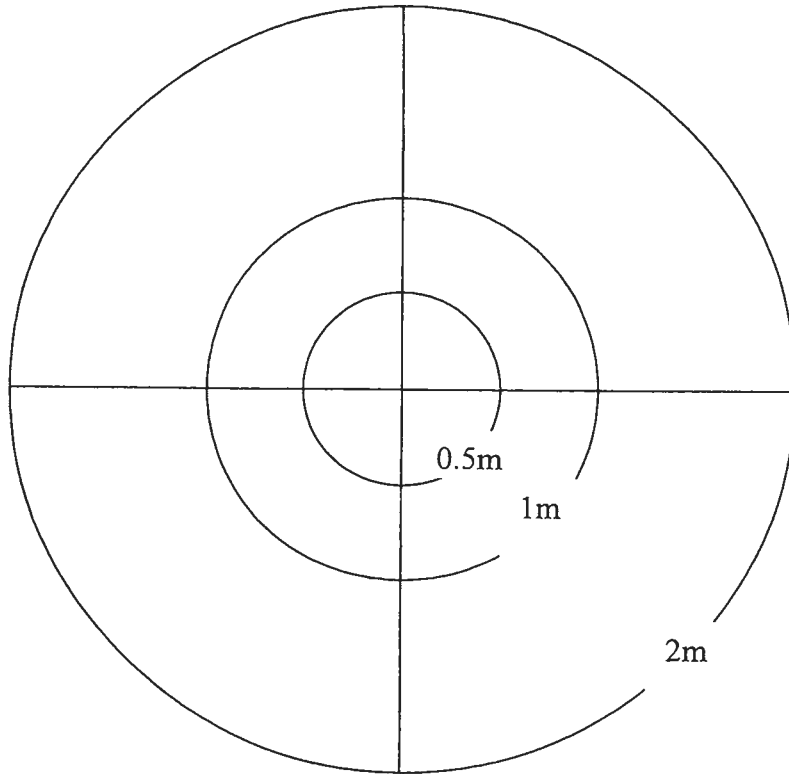
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F038</u>	<u>60ft.</u>	<u>6-19-13</u>	<u>21:00</u>	<u>white</u>

**NORTH**



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.547N

Long: 158° 11.981W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

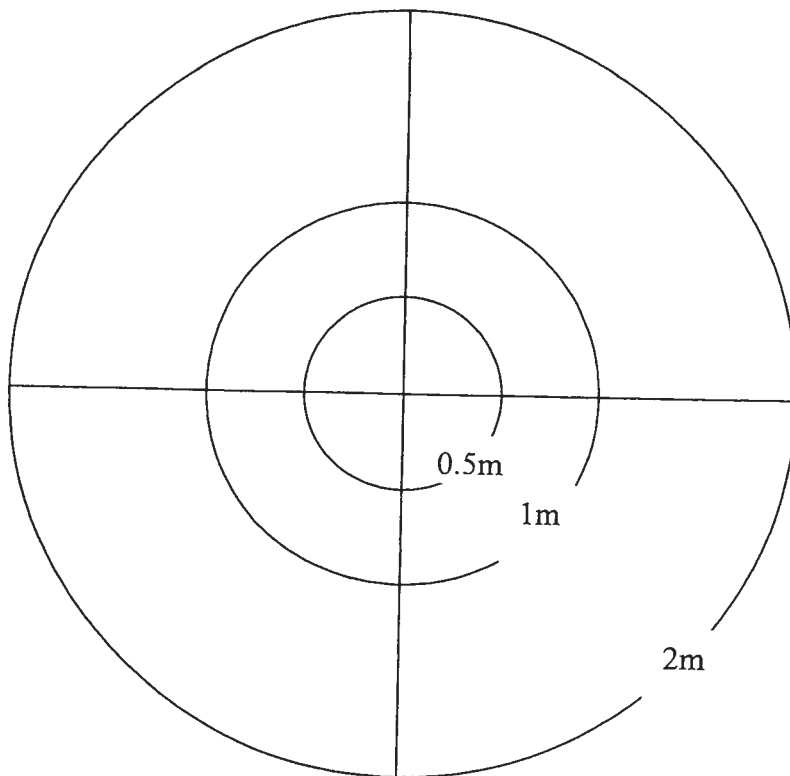
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F039</u>	<u>60 ft.</u>	<u>6-19-13</u>	<u>21:01</u>	<u>white</u>

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.544N

Long: 158° 11.971W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

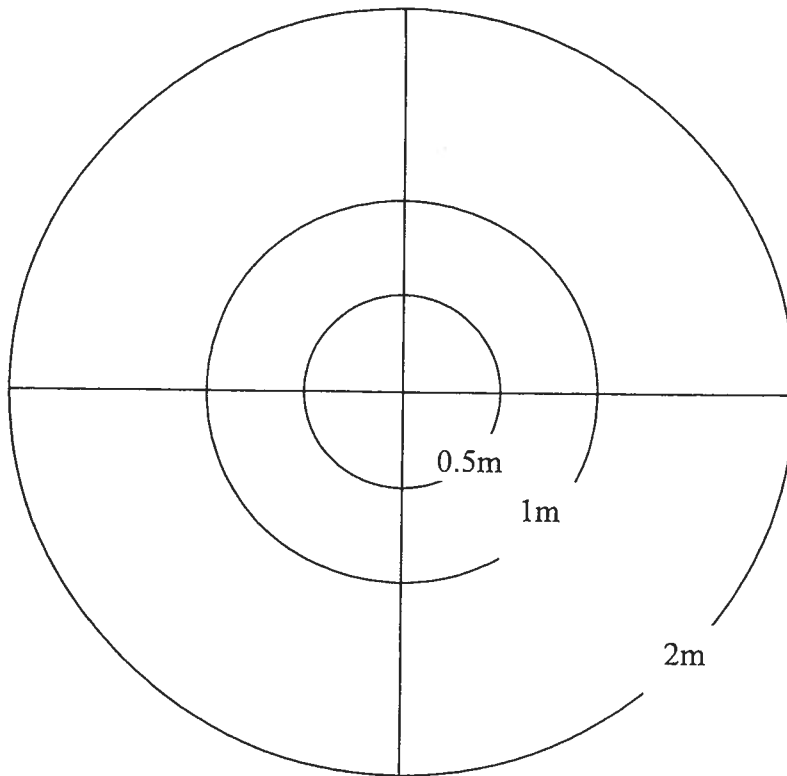
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F040</u>	<u>60 ft.</u>	<u>60 ft.</u>	<u>6-19-13 21:03</u>	<u>Red</u>

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.540N  
Long: 158° 11.967W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

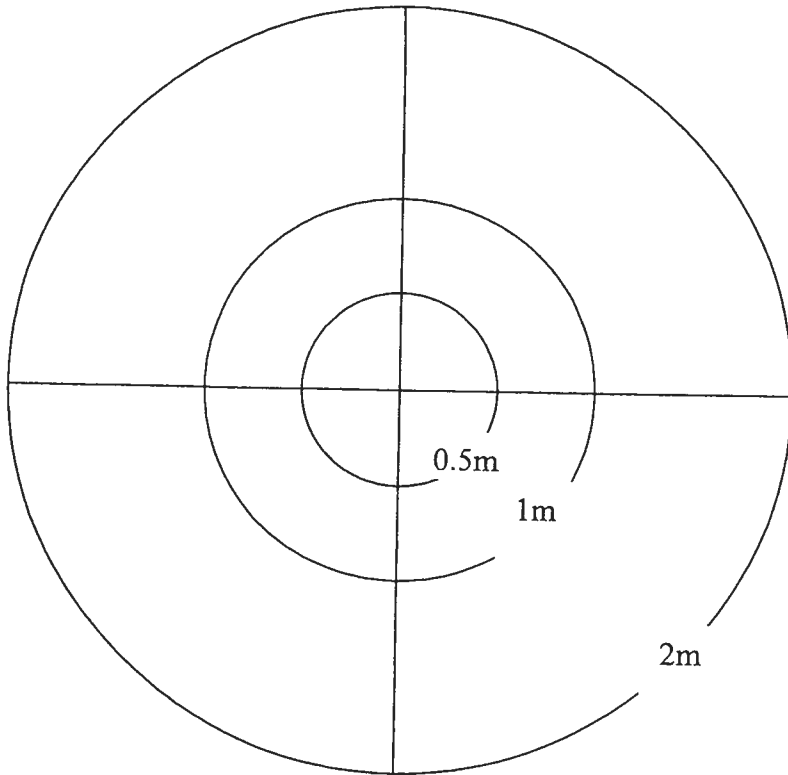
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F041		60ft.	6-19-13 21:05	Red
DMM-F042		↓	↓ ↓	↓
DMM-F043		↓	↓ ↓	↓

ORDNANCE REEF Sample Collection Sheet

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.535 N

Long: 158° 11.965 W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

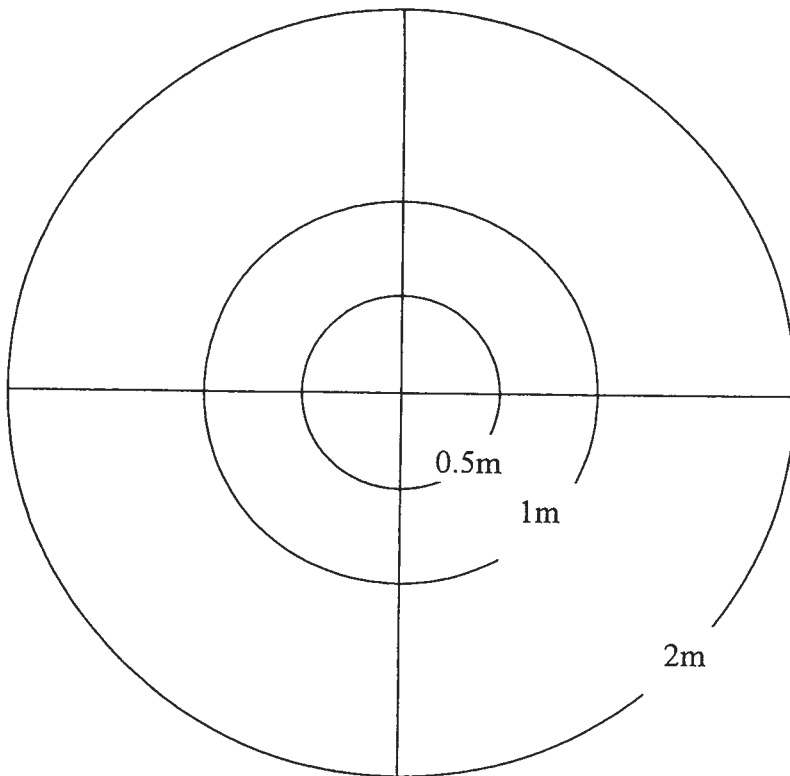
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F044		60 ft.	6-19-13 21:09	white
DMM-F045		↓	↓	↓
DMM-F046		↓	↓	↓
DMM-F047		↓	↓	↓



NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.522N

Long: 158° 11.962W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

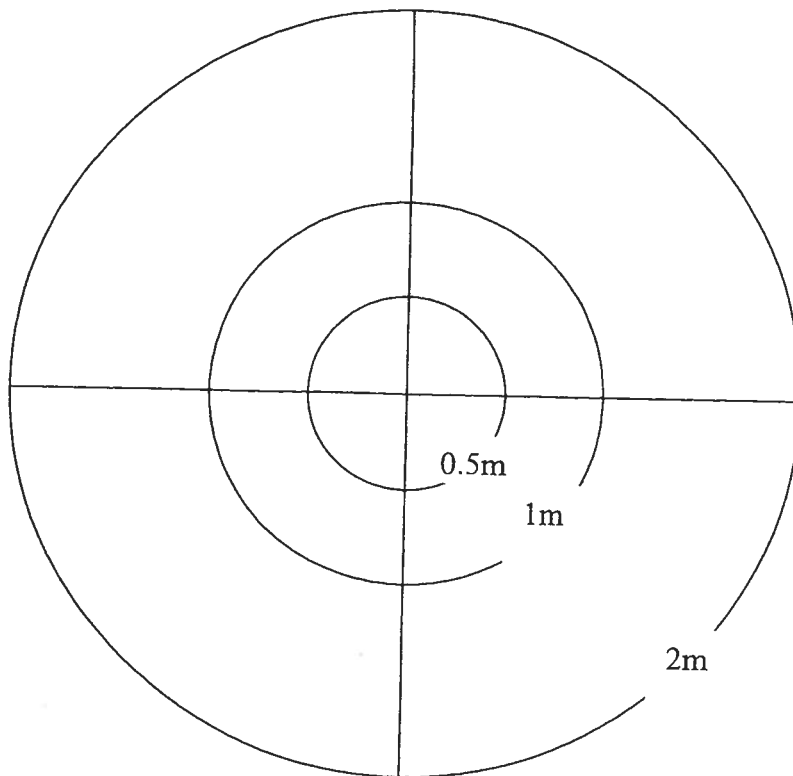
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
<u>DMM-F048</u>	<u>60 ft.</u>	<u>60 ft.</u>	<u>6-19-13 21:10</u>	<u>Red</u>

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.813N  
Long: 158° 11.955W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

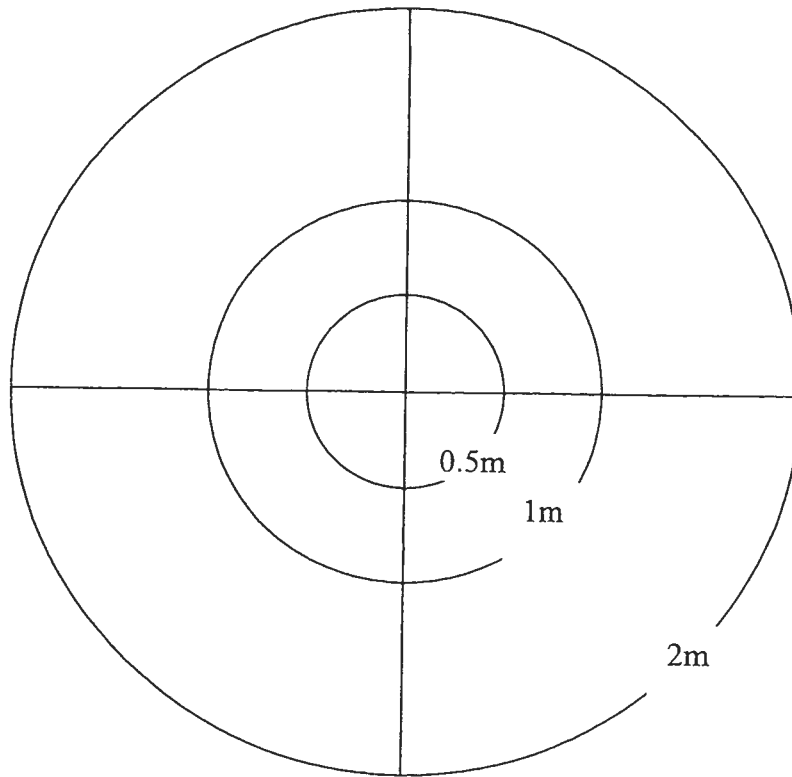
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F049		60 ft.	6-19-13 21:13	white
DMM-F050		↓	↓ ↓ ↓	↓

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.502N  
Long: 158° 11:961W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

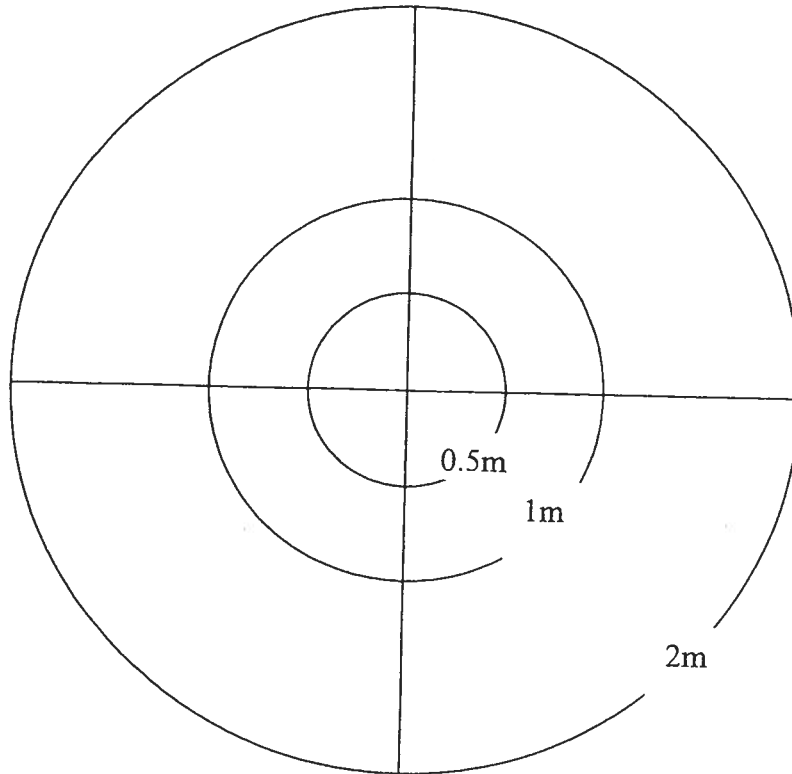
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F051		60ft.	6-19-13 21:14	white
DMM-F052		↓	↓ ↓ ↓	↓

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.497N

Long: 168° 11.953W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

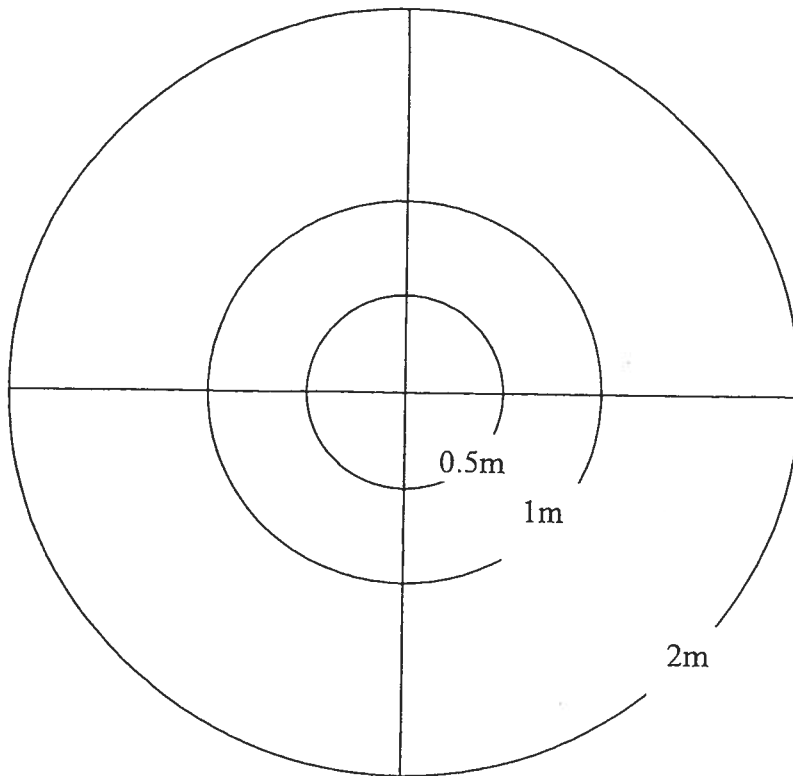
SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F053	60 ft.	6-19-13	21:16	Red
DMM-F054	↓	↓	↓	↓
DMM-F055	↓	↓	↓	↓

NORTH



DMM  
6-19-13

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: DMM

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 25.450N

Long: 158° 11.937W

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

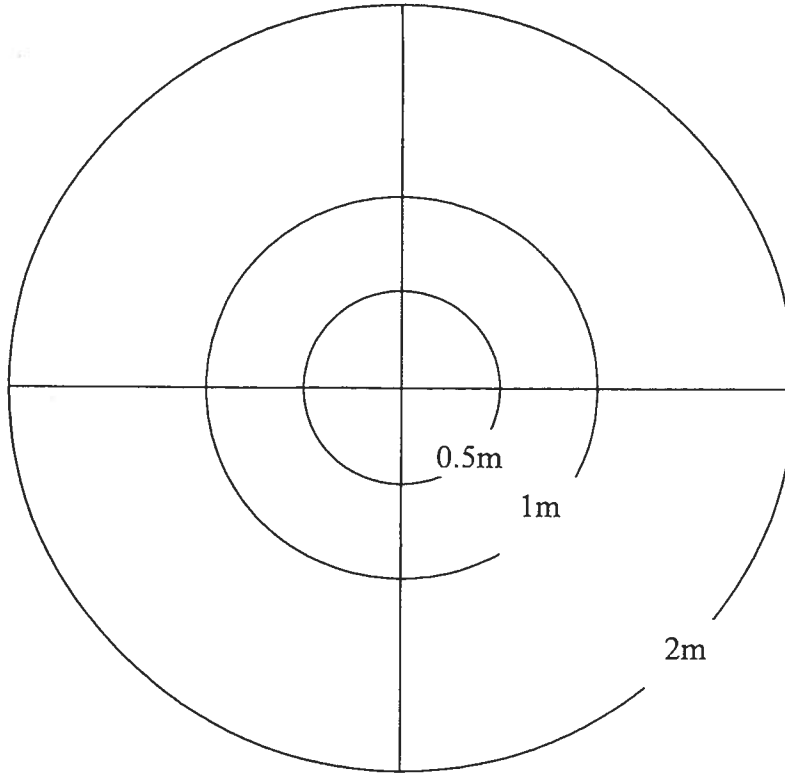
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
DMM-F056-DMM-F061	606H	606H	6-19-13 21:20	Red
DMM-F062-DMM-F074	↓	↓	↓	White

ORDNANCE REEF Sample Collection Sheet

NORTH



CON  
6-11-13  
Red weke

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: C.J.

Lat: 27. 21° 27.180'

Long: 158° 12.429'

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

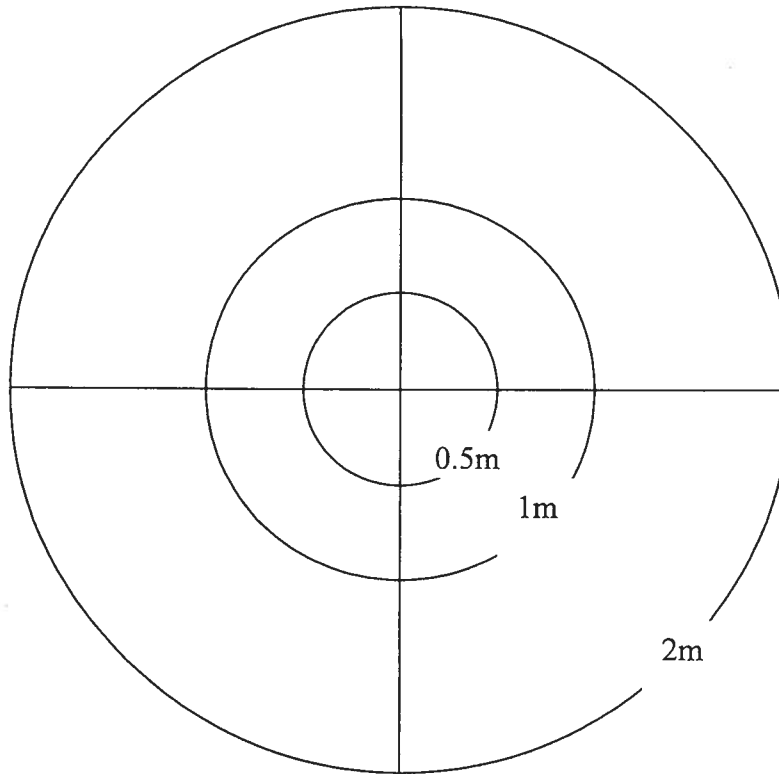
Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON-F001 to CON-F008 and			6/11/13 1325	Red weke
CON-F021 to CON-F027			↓ ↓	coordinates from C.J.

ORDNANCE REEF Sample Collection Sheet

NORTH



CON  
6-11-13

white weke

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: CON

UH SCIENTIST: E. Decarlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 27.549'  
Long: 158° 12.794'

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

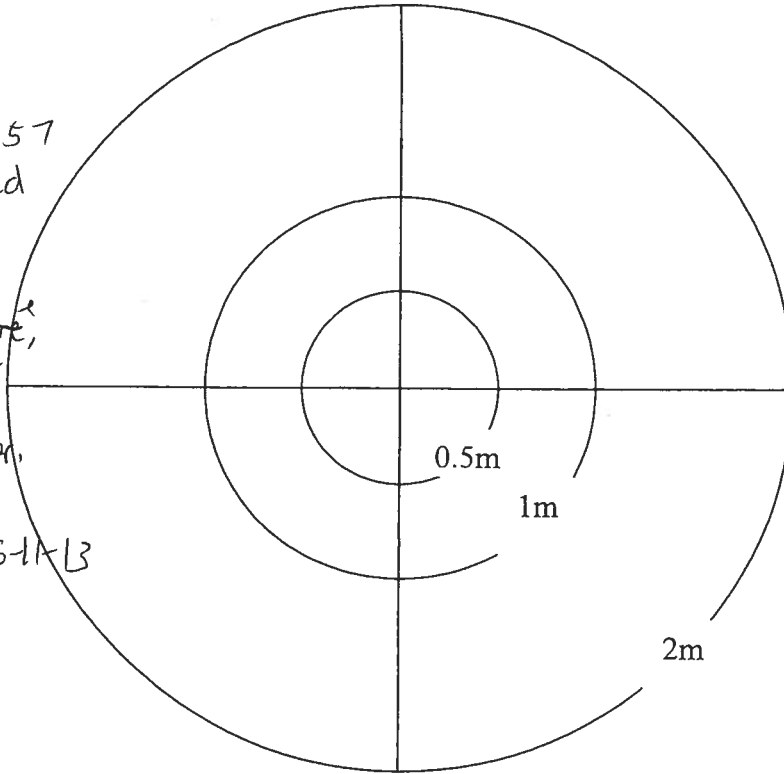
Tag #	Sample #	Sample Location	Date and Time	Comments
CON-F009 +0	CON-F020		6-11-13 13:00	white weke coordinates from C.J.

ORDNANCE REEF Sample Collection Sheet

NORTH

\* Note, when CON 57 was originally visited on 6/7/13, no octopus were caught. ~~therefore,~~ Octopus difficult to find due to overcast weather. Divers returned to the site on 6-11-13

CON  
6-11-13  
Near CON 57



Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Near CON 57

UH SCIENTIST: E. De Carlo

SAMPLE COLLECTOR: C.J.

Lat: 21° 27.661'  
Long: 158° 12.999'

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

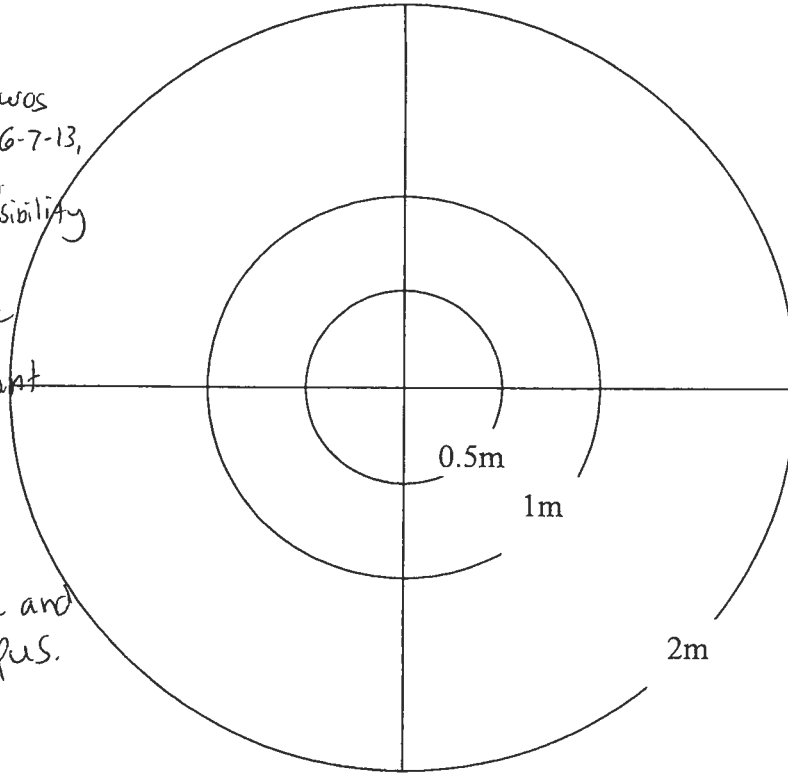
Tag #	Sample #	Sample Location	Date and Time	Comments
CON57-0012	20 ft		6-11-13 12:10	Coordinates provided by C.J.



ORDNANCE REEF Sample Collection Sheet

NORTH

\* Note, when CON55 site was originally visited on 6-7-13, An octopus was not able to be found. visibility was difficult due to over cast weather. Lima collected at the site on 6-7-13 was a very small amount (CON55-L010). Therefore, divers returned to the site on 6-11-13 to collect lima and catch an octopus.



CON  
6-11-13  
Near CON55

Note: Center of circle is munitions object or central point of randomly selected grid. Distances noted are in meters from center.

Instructions: Mark sample locations in the figure above for sediment with an S1, S2, or S3. Log the sample collection details on the lines below, noting whether details are for location S1, S2, or S3. Do the same for seawater, but note seawater with SW1. Note biota collected as B1, B2, B3.

STUDY SITE: Near CON55

UH SCIENTIST: E. DeCarlo

SAMPLE COLLECTOR: C.J.

Lat:  $21^{\circ} \overset{A}{\cancel{27.875}} 27.175 N$   
Long:  $158^{\circ} \overset{dh}{\cancel{12.175}} 12.875 E$

SEDIMENT

Tag #	Sample #	Sample Location	Date and Time	Comments

SEAWATER

Tag #	Sample #	Sample Location	Date and Time	Comments

BIOTA

Tag #	Sample #	Sample Location	Date and Time	Comments
CON55-0D11	80 ft		6-11-13 1045	Coordinates provided by C.J.
CON55-L013	↓		↓ ↓	

*Appendix C*  
*Photo Logs*

## Photo Log



Photo 1: Overview of Ordnance Reef (HI-06).



Photo 4: Transferring sediment collected by the PONAR into a sealed bag.

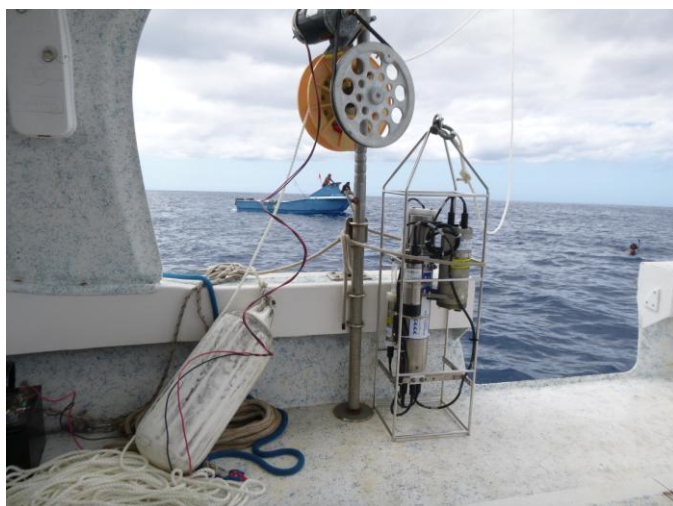


Photo 2: CTD device used to collect water quality data.



Photo 5: Bagged sediment and *limu* samples.



Photo 3: PONAR used for sediment collection at the NPS stratum.



Photo 6: Sediment and biota samples double-bagged and preserved on ice in the cooler.

## Photo Log



Photo 7: Transferring the biota sample from the fisherman to the personnel of UH.

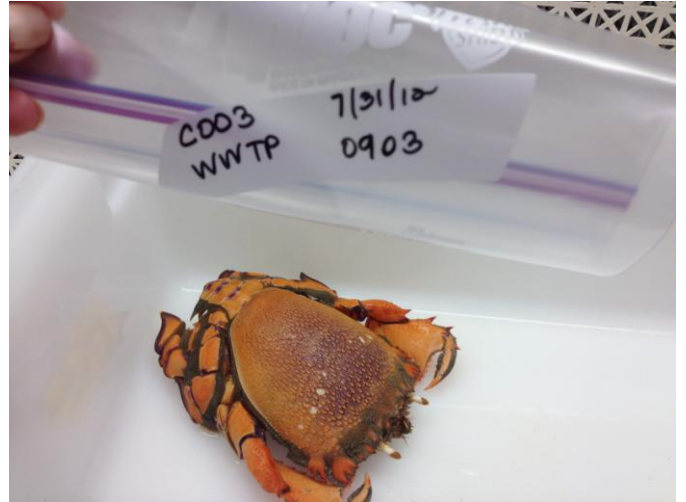


Photo 10: A male Kona crab to be processed in a Class 100 laminar flow hood at UH laboratory.



Photo 8: Local fishermen collecting sediment sample using an inverted sealable bag.



Photo 11: Octopus sample to be processed in a Class 100 laminar flow hood at UH laboratory.



Photo 9: Local fishermen deploying baited crab nets to collect crab samples.



Photo 12: Red Weke collected from the CON stratum.

## Photo Log



Photo 13: White *Weke* collected from the CON stratum.

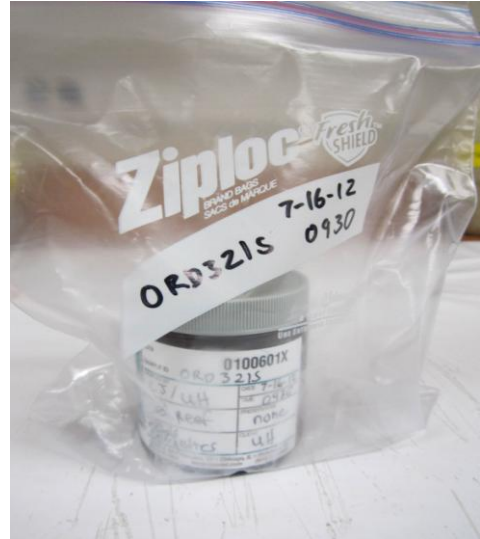


Photo 16: Processed sediment sample to be sent to the laboratory for analysis.



Photo 14: Sieving sediment samples through a 2 millimeter screen sieve.



Photo 17: *Limu* sample collected.



Photo 15: Allowing sediment colloids to settle before decanting the liquid.



Photo 18: Measuring white *Weke* sample before processing.

## Photo Log



Photo 19: Fileting *Weke* samples for laboratory analysis in a Class 100 laminar flow hood at UH.



Photo 21: Collecting crab meat sample in a Class 100 laminar flow hood at UH.



Photo 20: Gutting and de-beaking octopus sample in a Class 100 laminar flow hood at UH.

*Appendix D*  
*Chain of Custody Forms*

West Sacramento

880 Riverside Parkway • West Sacramento, CA 95605

Tel 916-374-4334 • Cel 916-296-1390

LABORATORY USE ONLY

LAB JOB NO. \_\_\_\_\_

LOCATION \_\_\_\_\_

CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to <b>Eric DeCarlo</b>	Project identification		Indicate analyses requested									
Company name <b>University of Hawaii</b>	Job name <b>Ordnance RelF (Hi)</b>											
Address <b>1000 Pope Road</b>	Job number											
City <b>Honolulu</b>	State <b>Hi</b>	ZIP <b>96822</b>										
Phone <b>(808) 456-5924</b>	Contact email address <b>sgarcia@environotinc.com</b>											
Sampler <b>James Terry</b>	# samples in shipment <b>32</b>	Contact email address <b>edecarlo@scest.hawaii.edu</b>										

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Explosive	Metals	Laboratory ID no.
			Water	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other		Date	Time				
ORD 201S			X									8/6/11	1015	1	X	X	
ORD 202S			X									8/6/11	1015	1	X	X	
ORD 203S			X									8/6/11	1045	1	X	X	
ORD 204S			X									8/6/11	1130	1	X	X	
ORD 205S			X									8/6/11	1130	1	X	X	
ORD 206S			X									8/6/11	1130	1	X	X	
ORD 207S			X									8/6/11	1150	1	X	X	
ORD 208S			X									8/6/11	1150	1	X	X	
ORD 209S			X									8/6/11	1150	1	X	X	
ORD 210S			X									8/6/11	1215	1	X	X	

Released by (print / sign) <b>ERIC DECARLO</b>	Date / time released <b>8/11/11 1408</b>	Delivery method <b>Fedex overnight</b>	Received by (print / sign) <b>josopus wu / gncg</b>	Company / Agency affiliation <b>TestAmerica</b>	Date / time received <b>10 AUG 11 0845</b>	Condition noted
---	---	---	--	--	---	-----------------

Comments: \_\_\_\_\_

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 Return to client  
 Archive



West Sacramento

880 Riverside Parkway • West Sacramento, CA 95605

Tel 916-374-4334 • Cel 916-296-1390

LABORATORY USE ONLY

LAB JOB NO. \_\_\_\_\_

LOCATION \_\_\_\_\_

CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to <b>Eric DeCarlo</b>	Project identification		Indicate analyses requested	
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Ref (Hi)</b>			
Address <b>1000 Pope Road</b>	Job number			
City <b>Honolulu</b>				
State <b>Hi</b>				
ZIP <b>96822</b>				
Phone <b>(808) 956-5924</b>	Contact email address <b>sqarcia@environmentinc.com</b>			
Fax				
Sampler <b>James Terry</b>	# samples in shipment <b>32</b>	Contact email address <b>edecarlo@soest.hawaii.edu</b>		

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Explosive	Metals						Laboratory ID no.
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date									
1 ORD 211S			X									8/6/11	1245	1	X	X						
2 ORD 212S			X									8/6/11	1245	1	X	X						
3 ORD 213S			X									8/6/11	1245	1	X	X						
4 ORD 214S			X									8/6/11	1310	1	X	X						
5 ORD 215S			X									8/6/11	1310	1	X	X						
6 ORD 216S			X									8/6/11	1310	1	X	X						
7 ORD 217S			X									8/6/11	1325	1	X	X						
8 ORD 218S			X									8/6/11	1325	1	X	X						
9 ORD 219S			X									8/6/11	1335	1	X	X						
10 ORD 220S			X									8/6/11	1341	1	X	X						

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<b>ERIC H. DECARLO</b>	8/9/11 / 1408		<b>[Signature]</b>	TestAmerica	8/9/11 / 0845	
	/				/	
	/				/	

Comments: \_\_\_\_\_

Please check one:  
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LABORATORY USE ONLY	
LAB JOB NO.	_____
LOCATION	_____
CONTAINERS	_____

## Chain of Custody / Analysis Request Form

Report to: <b>Eric DeCarlo</b>	Project identification		Indicate analyses requested			
Company name: <b>University of Hawaii</b>	Job name: <b>Ordnance Ref (Hi)</b>					
Address: <b>1000 Pope Road</b>	Job number:					
City: <b>Honolulu</b>	State: <b>Hi</b>	ZIP: <b>96822</b>				
Phone: <b>(808) 956-5924</b>	Fax:	Contact email address: <b>sgarcia@environmentinc.com</b>				
Sampler: <b>James Terry</b>	# samples in shipment: <b>32</b>	<b>edecarlo@soest.hawaii.edu</b>				

OU Mail TestAmerica West Sacramento (916) 373-5600	Client sample ID	COMP	GRAB	Matrix							Preservation method	Sampling		No. of containers	Explosive	Metals						Laboratory ID no.
				Water	Soil/Sediment	Wastewater	Drinking water	Sludge	Liquid	Solid		Oil	Other									
1	ORD221S			X								8/6/11	1326	1	X	X						
2	ORD222S			X								8/6/11	1420	1	X	X						
3	ORD223S			X								8/6/11	1435	1	X	X						
4	ORD224S			X								8/6/11	1435	1	X	X						
5	ORD225S			X								8/6/11	1440	1	X	X						
6	ORD226S			X								8/6/11	1445	1	X	X						
7	ORD227S			X								8/7/11	1016	1	X	X						
8	ORD228S			X								8/7/11	1030	1	X	X						
9	ORD229S			X								8/7/11	1035	1	X	X						
10	ORD230S			X								8/7/11	1044	1	X	X						

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<b>ERIC DE CARLO</b>	8/6/11 / 1408		<b>J. C. / J. C. / J. C.</b>	TestAmerica	104499 / 0845	
	/				/	
	/				/	

Comments:

Please check one:  
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West Sacramento  
880 Riverside Parkway • West Sacramento, CA 95605  
Tel 916-374-4334 • Cel 916-296-1390

LABORATORY USE ONLY

LAB JOB NO. \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to: Eric DeCarlo  
 Company name: University of Hawaii  
 Address: 1000 Pope Road  
 City: Honolulu State: Hi ZIP: 96822  
 Phone: (808) 456-5924 Fax: \_\_\_\_\_  
 Sampler: James Terry # samples in shipment: 32

Project identification  
 Job name: Ordnance Ref (Hi)  
 Job number: \_\_\_\_\_  
 Contact email address: sgarcia@environmentinc.com  
edeclarlo@seest.hawaii.edu

Indicate analyses requested  
 Explosive 4330  
 Metals

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No. of containers	Explosive	Metals	Laboratory ID no.		
			Water	Seaf. Sed.	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date					Time	
<u>ORD231S</u>			X										<u>8/7/11</u>	<u>1044</u>	<u>1</u>	X	X		
<u>ORD232S</u>			X										<u>8/7/11</u>	<u>1049</u>	<u>1</u>	X	X		

Released by (print / sign): <u>ERIC H DECARLO</u>	Date / time released: <u>8/9/11 1408</u>	Delivery method: _____	Received by (print / sign): <u>JHC</u>	Company / Agency affiliation: <u>TestAmerica</u>	Date / time received: <u>10 AUG 11 0845</u>	Condition noted: _____

## Chain of Custody / Analysis Request Form

1236006

Report to: Eric De Carlo		Project identification		Indicate analyses requested
Company name University of Hawaii		Job name Ordnance Reef		
Address 1000 Pope Road MSB 510		Job number 1108		
City Honolulu		P.O. number		
State HI		ZIP 96822		
Phone 808-956-5924	Fax	Contact email address edecarlo@soest.hawaii.edu	Date results needed Standard TAT	
Sampler UH	# samples in shipment 10-25			

Item no.	Client sample ID	COMIP	GRAB	Matrix										Preservation method	Sampling		No. of containers	Laboratory ID no.								
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Date		Time											
1	ORD3010		X												7/18/12	10:30	1	X	X							
2	ORD3020 dup		X												7/17/12	12:50	1	X	X							
3	ORD3030		X												7/18/12	9:55	1	X	X	X						
4	ORD3040		X												7/18/12	10:50	1	X	X	X						
5	ORD3050 MS/MSD		X												7/17/12	13:25	1	X	X							
6	ORD3070		X												7/17/12	12:05	1	X	X	X						
7	ORD3080		X												7/17/12	12:15	1	X	X							
8	ORD3090		X												7/17/12	11:45	1	X	X	X						
9	ORD3100		X												7/16/12	14:12	1	X	X	X						
10	ORD3110		X												7/16/12	11:30	1	X	X	X						

8330 Energetics  
 6020 Metals  
 Arsenic Speciation (Brooks Rand)

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
DECARLO / <i>[Signature]</i>	8/15/2012	Fed Ex	Nick Barnett / <i>[Signature]</i>	TAL-WS	8/14/12, 1300	-5.0° TB: 0°
Weidenfel / <i>[Signature]</i>	9/5/12	Fed Ex	<i>[Signature]</i> Tyler Parker	BRL	9/6/12, 0900	-1.0°C

Comments: Please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD" respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispos. by lab  
 Return to client  
 Archive

## Chain of Custody / Analysis Request Form

1236006

Report to: <b>Eric De Carlo</b>		Project identification		Indicate analyses requested
Company name <b>University of Hawaii</b>		Job name <b>Ordnance Reef</b>		
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>		
City State ZIP <b>Honolulu HI 96822</b>		P.O. number		
Phone <b>808-956-5924</b>	Fax	Contact email address <b>edecarlo@soest.hawaii.edu</b>	Date results needed <b>standard TAT</b>	
Sampler <b>UH</b>	# samples in shipment <b>10 25</b>			

8330 Energetics  
 6020 Metals  
 Arsenic Speciation (Brooks Rand)

Item no.	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No. of containers	Laboratory ID no.		
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time	
1	ORD3130		X									X	7/16/12	12:45	1	X	X	
2	ORD3140		X									X	7/16/12	12:15	1	X	X	
3	ORD3150 dup		X									X	7/16/12	13:17	1	X	X	
4	ORD3160		X									X	7/16/12	10:50	1	X	X	
5	ORD301L dup		X									X	7/17/12	12:50	1	X	X	X
6	ORD302L		X									X	7/18/12	9:55	1	X	X	X
7	ORD303L		X									X	7/17/12	13:25	1	X	X	X
8	ORD304L		X									X	7/18/12	10:30	1	X	X	X
9	ORD305L MS/MSD		X									X	7/18/12	10:50	1	X	X	X
10	ORD306L dup		X									X	7/16/12	10:50	1	X	X	X

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DECARLO / [Signature]</i>	8/15/2012	FedEX	Nick Barnett / [Signature]	TAL-WS	8/16/12 / 1300	-5.0° TB=0°
<i>Weidentel / [Signature]</i>	9/5/12 16:00	FedEX	[Signature] Tyler Rankin	BRL	9/6/12 0900	-1.0°C

Comments: please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD," respectively. send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

**Please check one:**  
 Dispose by lab  
 Return to client  
 Archive

1236006

## Chain of Custody / Analysis Request Form

Report to: Eric De Carlo			Project identification				Indicate analyses requested								
Company name University of Hawaii			Job name Ordnance Reef				8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)						
Address 1000 Pope Road MSB 510			Job number 1108												
City Honolulu			P.O. Number												
State HI			ZIP 96822												
Phone 808-958-5924			Contact email address edecarlo@soest.hawaii.edu												
Sampler UH			# samples in shipment 10/25				Date Results Needed Standard TAT								

Item no.	Client sample ID	COMP	GRAB	Matrix								Sampling			No. of containers	Laboratory ID no.				
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method	Date			Time			
1	ORD307L		X												7/16/12	11:30	1	X	X	X
2	ORD308L		X												7/16/12	12:45	1	X	X	X
3	ORD309L		X												7/16/12	13:17	1	X	X	X
4	ORD310L		X												7/16/12	14:12	1	X	X	X
5	ORD311L		X												7/17/12	10:20	1	X	X	X
6																				
7																				
8																				
9																				
10																				

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
DE CARLO / [Signature]	8/15/2012	FedEx	Nick Barnett / [Signature]	TAL-WS	8/16/12 / 1300	-2.5 °C
Weidenfall / [Signature]	9/5/12 11600	FedEx	Taylor Rankin / [Signature]	BRL	9/6/12 / 0900	-1.0 °C

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD," respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

LAB JOB NO. \_\_\_\_\_ BRL Report 1236006  
LOCATION \_\_\_\_\_  
CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

1236006

Report to: <b>Eric De Carlo</b>		Project identification				Indicate analyses requested
Company name <b>University of Hawaii</b>		Job name <b>Ordinance Reef</b>				
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>				
City State ZIP <b>Honolulu HI 96822</b>		P.O. number				
Phone <b>808-956-5924</b>		Contact email address <b>ede Carlo@scst.hawaii.edu</b>		Date results needed <b>Standard TAT</b>		
Sampler <b>UH</b>	Fax	# samples in shipment <b>10-33</b>				

8380 Energetics  
 6020 Metals  
 Arsenic Speciation (Brooks Rand)

Item no.	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No. of containers	Laboratory ID no.				
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time			
1	ORD 303F Dup		X										7/18/12	13:15	1	X	X			
2	ORD 306F		X										7/18/12	13:15	1	X	X	X		
3	ORD 307F		X										7/18/12	13:15	1	X	X			
4	ORD 308F MS/MSD		X										7/18/12	13:15	1	X	X			
5	ORD 312F		X										7/18/12	13:15	1	X	X	X		
6	ORD 313F		X										7/19/12	20:17	1	X	X			
7	ORD 314F		X										7/19/12	20:17	1	X	X			
8	ORD 315F		X										7/19/12	20:17	1	X	X	X		
9	ORD 316F		X										7/19/12	20:17	1	X	X			
10	ORD 317F		X										7/19/12	20:17	1	X	X	X		

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DECLARLO / [Signature]</i>	8/15/2012	FedEX	Nick Barnett / Nick Barnett	TAL-WS	8/16/12 1300	3.5° TB:1.8°
<i>Weidertel / [Signature]</i>	9/5/12 1600	FedEX	[Signature] / Tyler Rankin	BRL	9/6/12 10700	-1.0°C

Comments: Please prepare duplicates and MS/MSD for samples identified with "DOP" and "MS/MSD," respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand lab in Seattle, WA for analysis.

- Please check one:
- Dispose by lab
  - Return to client
  - Archive

## Chain of Custody / Analysis Request Form

1236006

Report to: <b>Eric De Carlo</b>		Project identification		Indicate analyses requested
Company name <b>University of Hawaii</b>		Job name <b>Ordnance Reef</b>		
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>		
City <b>Honolulu</b>	State <b>HI</b>	P.O. number		
Phone <b>808-956-5924</b>	Fax	Contact email address <b>edecarlo@soest.hawaii.edu</b>	Date results needed <b>Standard TAT</b>	
Sampler <b>UH</b>	# samples in shipment <b>33 <del>10</del> WSP</b>			

8330 Energetics  
 6020 Metals  
 Arsenic Speciation (Breaks Rand)

Item no.	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No. of containers	Laboratory ID no.							
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time						
1	ORD318F		X												7/19/12	21:00	1	X	X				
2	ORD319F		X												7/19/12	21:00	1	X	X				
3	ORD320F		X												7/19/12	21:00	1	X	X				
4	ORD323F		X												7/19/12	21:00	1	X	X	X			
5	ORD325F		X												7/19/12	21:00	1	X	X				
6	ORD326F		X												7/19/12	21:00	1	X	X	X			
7	ORD327F <b>DUP</b>		X												7/19/12	21:00	1	X	X				
8	ORD329F		X												7/19/12	21:00	1	X	X				
9																		X	X				
10																		X	X				

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DE CARLO</i>	8/15/12 1600	FedEx	Nick Barnett / Nick Barnett	TAL-WS	8/16/12 1300	3.5" TB:1.8"
<i>Weidert</i>	9/5/12 1600	FedEx	<i>3022</i> / Tyler Rankin	BRL	9/6/12 0900	-1.0°C

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD," respectively. send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

- Please check one:
- Dispose by lab
  - Return to client
  - Archive



LAB JOB NO. \_\_\_\_\_

LOCATION \_\_\_\_\_

BRL Report 1236006

CONTAINERS \_\_\_\_\_

1236006

## Chain of Custody / Analysis Request Form

Report to: <b>Eric De Carlo</b>				Project identification				Indicate analyses requested																						
Company name <b>University of Hawaii</b>				Job name <b>Ordnance Reef</b>				8330 Energetics 6020 Metals Arsenic Speciation (Brooks Rand)																						
Address <b>1000 Pope Road MSB</b>				Job number <b>1108</b>																										
City <b>Honolulu</b>		State <b>HI</b>		ZIP <b>96822</b>		P.O. Number																								
Phone <b>808-956-5984</b>		Fax		Contact email address <b>edecarlo@scest.hawaii.edu</b>																Date Results Needed <b>Standard TAT</b>										
Sampler <b>UH</b>		# samples in shipment <b>to type 33</b>																												
Item no.	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No. of containers	Laboratory ID no.														
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time													
1	ORD301C		X										X	7/31/12	8:09	1	X	X												
2	ORD302C		X										X	7/31/12	8:59	1	X	X	X											
3	ORD303C		X										X	7/31/12	9:03	1	X	X												
4	ORD304C		X										X	7/31/12	14:20	1	X	X												
5	ORD305C		X										X	7/31/12	10:10	1	X	X	X											
6	ORD306C MS/MSD		X										X	7/31/12	10:19	1	X	X												
7	ORD307C DUP		X										X	7/31/12	11:35	1	X	X												
8	ORD308C		X										X	7/31/12	12:17	1	X	X	X											
9	ORD309C		X										X	7/31/12	12:22	1	X	X												
10	ORD310C		X										X	7/31/12	15:24	1	X	X												

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DE CARLO / Eric De Carlo</i>	8/15/2012	Fed EX	Nick Burnett / Nick Burnett	TAL-WS	8/14/12 1300	3.5" TB:1.8"
<i>Weidenthal / M Weidenthal</i>	9/6/12 1600	Fed EX	Tyler Rank / Tyler Rank	BRL	9/6/12 1000	-1.0°C

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD" respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:

- Dispose by lab  
 Return to client  
 Archive

1236006

## Chain of Custody / Analysis Request Form

Report to: <b>Eric De Carlo</b>	Project identification		Indicate analyses requested	
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Reef</b>	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">8880 Energetics</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">6020 Metals</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Arsenic Speciation (Brooks Rand)</div> </div>		
Address <b>1000 Pope Road MSB510</b>	Job number <b>1108</b>			
City <b>Honolulu</b> State <b>HI</b> ZIP <b>96822</b>	P.O. Number			
Phone <b>808-956-5924</b>	Contact email address <b>ede Carlo@soest.hawaii.edu</b>			
Sampler <b>UHT</b>	# samples in shipment <b>10 vials 33</b>	Date Results Needed <b>Standard TAT</b>		

Item no.	Client sample ID	COMP	GRAB	Matrix									Preservation method	Sampling			No. of containers	Laboratory ID no.					
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other		Date	Time								
1	<del>ORD3160</del> <sup>dup</sup> ORD311C DUP		X													8/2/12	8:42	1	X	X			
2	ORD312C		X													8/2/12	8:52	1	X	X	X		
3	ORD313C		X													8/2/12	9:35	1	X	X			
4	ORD314C		X													8/2/12	9:41	1	X	X			
5	ORD315C		X													8/2/12	9:47	1	X	X	X		
6																							
7																							
8																							
9																							
10																							

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DELARLO / [Signature]</i>	8/15/12	Fed Ex	Nick Barnett / [Signature]	TAL-WS	8/16/12 1300	3.5" TB: 1.8"
<i>Weidert / [Signature]</i>	9/5/12 1600	Fed Ex	Tyler Rankin / [Signature]	BRL	9/6/12 0900	-1.0°C

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

## Chain of Custody / Analysis Request Form

1236006-2

Report to: <b>Eric De Carlo</b>	Project identification		Indicate analyses requested
Company name: <b>University of Hawaii</b>	Job name: <b>Ordnance Reef</b>		
Address: <b>1000 Pope Road MSB 510</b>	Job number: <b>1108</b>		
City: <b>Honolulu</b> State: <b>HI</b> ZIP: <b>96822</b>	P.O. number:		
Phone: <b>808-956-5924</b> Fax:	Contact email address: <b>edecarlo@soest.hawaii.edu</b>	Date results needed: <b>Standard TAT</b>	
Sampler: <b>UH</b>	# samples in shipment: <b>25</b>		

8330 Energetics  
 6020 Metals  
 Arsenic Speciation (Brooks Rand)

Item no.	Client sample ID	COMP	GRAB	Matrix										Preservation method	Sampling		No. of containers	Laboratory ID no.	
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Date		Time				
1	ORD3010		X											X	7/18/12	10:30	1	X X	
2	ORD3020 dup		X											X	7/17/12	12:50	1	X X	
3	ORD3030		X											X	7/18/12	9:55	1	X X X	
4	ORD3040		X											X	7/18/12	10:50	1	X X X	
5	ORD3050 MS/MSD		X											X	7/17/12	13:25	1	X X	
* 6	ORD3070		X											X	7/17/12	12:05	1	X X X	
7	ORD3080		X											X	7/17/12	12:15	1	X X	
8	ORD3090		X											X	7/17/12	11:45	1	X X X	
9	ORD3100		X											X	7/16/12	14:12	1	X X X	
10	ORD3110		X											X	7/16/12	11:30	1	X X X	

\* only sample ORD3070 in this shipment

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
DE CARLO / [Signature]	8/15/2012	FedEx	Nick Barnett / [Signature]	TAL-WS	8/14/12 1300	-5.0° TB: 0°
Weidantel / [Signature]	9/6/12 16:00	FedEx	[Signature]	BRL	9/7/12 1800	

Comments: Please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD" respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

**Please check one:**

- Dispose by lab
- Return to client
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**Chain of Custody / Analysis Request Form**

Report to <b>Eric De Carlo</b>		Project identification				<b>Indicate analyses requested</b>									
Company name <b>University of Hawaii</b>		Job name <b>Ordinance Reef</b>				<b>8330 Energetics</b>	<b>6090 Metals</b>	<b>Arsenic Speciation (Brooks Rand)</b>							
Address <b>1000 Pope Road MSB</b>		Job number <b>1108</b>													
City <b>Honolulu</b>	State <b>HI</b>	ZIP <b>96822</b>		P O Number											
Phone <b>808-956-5984</b>	Fax	Contact email address <b>edecarlo@screst.hawaii.edu</b>		Date Results Needed <b>Standard TAT</b>											
Sampler <b>UH</b>	# samples in shipment <b>to go 33</b>														

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling			No. of containers	Laboratory ID no.		
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date	Time				
1. ORD301C	X										X	7/31/12	8:09	1	X	X		
2. ORD302C	X										X	7/31/12	8:59	1	X	X	X	
3. ORD303C	X										X	7/31/12	9:03	1	X	X		
4. ORD304C	X										X	7/31/12	14:20	1	X	X		
5. ORD305C	X										X	7/31/12	10:10	1	X	X	X	
6. ORD306C MS/MSD	X										X	7/31/12	10:19	1	X	X		
7. ORD307C Dup	X										X	7/31/12	11:35	1	X	X		
8. ORD308C	X										X	7/31/12	12:17	1	X	X	X	
9. ORD309C	X										X	7/31/12	12:22	1	X	X		
10. ORD310C	X										X	7/31/12	15:24	1	X	X		

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DECLARU/EAH</i>	8/15/12	Fed EX	Nick Bennett / Nick Bennett	TAL-WS	8/14/12 / 1300	3.5" TB:1.8"

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

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West Sacramento  
**Honolulu**  
 99-193 Aiea Heights Drive Suite 124 Aiea, HI 96701-3900  
 808-486-LABS (5227) • Fax 808-486-2456

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**Chain of Custody / Analysis Request Form**

Report to <b>Eric De Carlo</b>	Project identification		Indicate analyses requested	
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Reef</b>	8330 Energetics 6020 Metals Arsenic Speciation (Brooks Rand)		
Address <b>1000 Pope Road MSB510</b>	Job number <b>1108</b>			
City <b>Honolulu</b>	P O Number			
State <b>HI</b>	Contact email address <b>edeclaro@soest.hawaii.edu</b>			
ZIP <b>96822</b>	Date Results Needed <b>Standard TAT</b>			
Phone <b>808-956-5924</b>	# samples in shipment <b>10 x 33</b>			
Sampler <b>UH</b>				

Client sample ID	COMP	GRAB	Matrix							Preservation method	Sampling			No. of containers	Laboratory ID no.			
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid		Oil	Other	Date			Time		
<del>ORD3160</del> <b>ORD311C Dup</b>		X											8/2/12	8:42	1	X	X	
<del>ORD3160</del> <b>ORD312C</b>		X											8/2/12	8:52	1	X	X	X
<b>ORD313C</b>		X											8/2/12	9:35	1	X	X	
<b>ORD314C</b>		X											8/2/12	9:41	1	X	X	
<b>ORD315C</b>		X											8/2/12	9:47	1	X	X	X

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<b>DECARLO / [Signature]</b>	<b>8/15 / 2012</b>	<b>Fed EX</b>	<b>Nick Barnett / [Signature]</b>	<b>TAL-WS</b>	<b>8/16/12 / 1300</b>	<b>3.5" TB: 1.8"</b>

Comments: **Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.**

- Please check one:**
- Dispose by lab
  - Return to client
  - Archive

LAB JOB NO \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to: Eric De Carlo  
 Company name: University of Hawaii  
 Address: 1000 Pepee Road MSB 510  
 City: Honolulu HI State: HI ZIP: 96822  
 Phone: 808-956-5924 Fax: \_\_\_\_\_  
 Sampler: UH # samples in shipment: 10-33  
 Project identification: Job name: Ordnance Reef  
 Job number: 1108  
 P O number: \_\_\_\_\_  
 Contact email address: edcarlo@sest.hawaii.edu Date results needed: Standard TAT

Indicate analyses requested

*8330 Energetics  
 6020 Metals  
 Arsenic Speciation (Brooks Rand)*

Item no.	Client sample ID	COMP	GRAB	Matrix										Preservation method	Sampling		No of containers	Laboratory ID no		
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Date		Time					
1	ORD 303F Dup		X																	
2	ORD 305F		X																	
3	ORD 307F		X																	
4	ORD 308F MS/MSD		X																	
5	ORD 312F		X																	
6	ORD 313F		X																	
7	ORD 314F		X																	
8	ORD 315F		X																	
9	ORD 316F		X																	
10	ORD 317F		X																	

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<u>DECLARLO/ETH</u>	<u>8/15/2012</u>	<u>FedEX</u>	<u>Nick Barnett/Nick Barnett</u>	<u>TAL-MS</u>	<u>8/14/12/1300</u>	<u>3.5 TB:1.8</u>

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD," respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

LAB JOB NO \_\_\_\_\_  
LOCATION \_\_\_\_\_  
CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to <b>Eric De Carlo</b>	Project identification		Indicate analyses requested  <i>8330 Energetics</i> <i>6020 Metals</i> <i>Arsenic Speciation (Brooks Band)</i>
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Reef</b>		
Address <b>1000 Pope Road MSB 510</b>	Job number <b>1103</b>		
City <b>Honolulu</b> State <b>HI</b> ZIP <b>96822</b>	P O number		
Phone <b>808-956-5924</b> Fax	Contact email address <b>edecarlo@soest.hawaii.edu</b>	Date results needed <b>Standard TAT</b>	
Sampler <b>UH</b>	# samples in shipment <b>33 exp</b>		

Item no.	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Laboratory ID no.			
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time		
1	ORD318F		X										X	7/19/12	21:00	1	X	X	
2	ORD319F		X										X	7/19/12	21:00	1	X	X	
3	ORD320F		X										X	7/19/12	21:00	1	X	X	
4	ORD323F		X										X	7/19/12	21:00	1	X	X	X
5	ORD325F		X										X	7/19/12	21:00	1	X	X	
6	ORD326F		X										X	7/19/12	21:00	1	X	X	X
7	ORD327F <b>DUP</b>		X										X	7/19/12	21:00	1	X	X	
8	ORD329F		X										X	7/19/12	21:00	1	X	X	
9													X				X	X	<b>DUP</b>
10													X				X	X	<b>exp</b>

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DECARLO/UDH</i>	8/15/12	FedEX	Nick Barnett / Nick Barnett	TAL-WS	8/16/12 1300	3.5" TB 1.8"
	/				/	
	/				/	

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD," respectively send aliquots of tissue selected for arsenic speciation to Brooks Band Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

TestAmerica - Honolulu

99-193 Aiea Heights Drive Suite 121 • Aiea, HI 96701-3900  
 808-486-LABS (5227) • Fax 808-486-2456

A24160472

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## Chain of Custody / Analysis Request Form

Report to <b>Eric De Carlo</b>	Project identification		
Company name <b>University of Hawaii</b>	Job name <b>Ordinance Reef</b>	Indicate analyses requested  5330 Energetics 6020 Metals Arsenic Speciation/Bricks Panel	
Address <b>1000 Pope Road MSB510</b>	Job number <b>1108</b>		
City <b>Honolulu</b> State <b>HI</b> ZIP <b>96822</b>	P.O. number		
Phone <b>808-956-5924</b>	Contact email address <b>ede Carlo@soest.hawaii.edu</b>		Date results needed <b>Standard TAT</b>
Sampler <b>UH</b>	# samples in shipment <b>10-25</b>		

TestAmerica West Sacramento (916) 373-5600

Item no.	Client sample ID	COMP	GRAB	Matrix							Preservation method	Sampling		No of containers	Laboratory ID no	
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid		Oil	Other			Date
1	ORD3130		X								X	7/16/12	12:45	1	X X	
2	ORD3140		X								X	7/16/12	12:15	1	X X	
3	ORD3150 dup		X								X	7/16/12	13:17	1	X X	
4	ORD3160		X								X	7/16/12	10:50	1	X X	
5	ORD301L dup		X								X	7/17/12	12:50	1	X X X	
6	ORD302L		X								X	7/18/12	9:55	1	X X X	
7	ORD303L		X								X	7/17/12	13:25	1	X X X	
8	ORD304L		X								X	7/18/12	10:30	1	X X X	
9	ORD305L MS/MSD		X								X	7/18/12	10:50	1	X X X	
10	ORD306L dup		X								X	7/16/12	10:50	1	X X X	

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
DECLARCO / [Signature]	8/15/2012	FedEX	Nick Barnett / Nick Barnett	TAL-WS	8/16/12 / 1300	-5.0° TB=0°
	1				1	
	1				1	

Comments: Please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD," respectively. send aliquots of residue selected for arsenic speciation to Brooks Rand Lab in Seattle WA for analysis.

- Please check one:
- Dispose by lab
  - Return to client
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808-486-LABS (5227) • Fax 808-486-2456

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LOCATION	_____
CONTAINERS	_____

### Chain of Custody / Analysis Request Form

Report to <b>Eric De Carlo</b>	Project identification		Indicate analyses requested			
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Reef</b>	Job number <b>1108</b>	<b>8330 Energetics</b>	<b>6020 Metals</b>	<b>Arsenic Speciation (Brooks Rand)</b>	
Address <b>1000 Pope Road MSB 510</b>	P O Number					
City <b>Honolulu</b>	State <b>HI</b>	ZIP <b>96822</b>	Contact email address <b>edecarlo@scesst.hawaii.edu</b>		Date Results Needed <b>Standard TAT</b>	
Phone <b>808-956-5924</b>	Fax	# samples in shipment <b>10 <del>25</del></b>	Sampler <b>UH</b>			

TestAmerica West Sacramento (916) 373-5600

	Client sample ID	COMP	GRAB	Matrix								Sampling		No of containers	Laboratory ID no.				
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method			Date	Time		
1	ORD307L		X																
2	ORD308L		X																
3	ORD309L		X																
4	ORD310L		X																
5	ORD311L		X																
6																			
7																			
8																			
9																			
10																			

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>DE CARLO / [Signature]</i>	8/15/2012	FedEX	Nick Barnett	TAL-WS	8/16/12 / 1300	2.5 <sup>NS</sup> 8/16/12 -50 TBS U

Comments: Please prepare duplicates and MS/MSD for samples identified with "DUP" and "MS/MSD," respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
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### LABORATORY USE ONLY

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LOCATION \_\_\_\_\_

CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to: Eric De Carlo

Company name: University of Hawaii

Address: 1000 Pope Road MSB 510

City: Honolulu State: HI ZIP: 96822

Phone: 808-956-5924 Fax: \_\_\_\_\_

Sampler: UH # samples in shipment: 10 ~~25~~

Project identification

Job name: Ordnance Reef

Job number: 1108

P.O. number: \_\_\_\_\_

Contact email address: ede Carlo @ seest.hawaii.edu

Date results needed: Standard TAT

Indicate analyses requested

*8330 Energetics*

*6020 Metals*

*Arsenic Speciation (Brick Panel)*

TestAmerica West Sacramento (916) 373-5600

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Laboratory ID no
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date		
1 ORD3010		X									X	7/18/12	10:30	1	X X
2 ORD3020 dup		X									X	7/17/12	12:50	1	X X
3 ORD3030		X									X	7/18/12	9:55	1	X X X
4 ORD3040		X									X	7/18/12	10:50	1	X X X
5 ORD3050 MS/MSD		X									X	7/17/12	13:25	1	X X
6 ORD3070		X									X	7/17/12	12:05	1	X X X
7 ORD3080		X									X	7/17/12	12:15	1	X X
8 ORD3090		X									X	7/17/12	11:45	1	X X X
9 ORD3100		X									X	7/16/12	14:12	1	X X X
10 ORD3110		X									X	7/16/12	11:30	1	X X X

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>De Carlo / [Signature]</i>	<i>8/15/12</i>	<i>Fed Ex</i>	<i>Nick Barnett / Nick Barnett</i>	<i>TAL-WS</i>	<i>8/14/12 1300</i>	<i>-5.0' TB: 0'</i>

Comments: *Please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD" respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.*

Please check one:  
 Discard by lab  
 Return to client  
 Archive

West Sacramento

~~TestAmerica - Honolulu~~  
 99-193 Aiea Heights Drive Suite 121 • Aiea, HI 96701-3900  
 808-486-LABS (5227) • Fax 808-486-2456

1747/6071C

LABORATORY USE ONLY	
LAB JOB NO.	_____
LOCATION	_____
CONTAINERS	_____

## Chain of Custody / Analysis Request Form

Report to <b>Eric De Carlo</b>		Project identification	
Company name <b>University of Hawaii</b>		Job name <b>Ordnance Reef</b>	
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>	
City State ZIP <b>Honolulu HI 96822</b>		PO number	
Phone <b>808-956-5924</b>	Fax	Contact email address <b>edecarlo@soest.hawaii.edu</b>	Date results needed <b>Standard TAT</b>
Sampler <b>UH</b>	# samples in shipment <b>1025</b>		

Indicate analyses requested

*5330 Energetics*  
*6020 Metals*  
*Arsenic Speciation (Brooks Panel)*

TestAmerica West Sacramento (916) 373-5600

no.	mail	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Laboratory ID no.									
					Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date			Time								
1		ORD3130		X											7/16/12	12:45	1	X	X							
2		ORD3140		X											7/16/12	12:15	1	X	X							
3		ORD3150 dup		X											7/16/12	13:17	1	X	X							
4		ORD3160		X											7/16/12	10:50	1	X	X							
5		ORD301L dup		X											7/17/12	12:50	1	X	X	X						
6		ORD302L		X											7/18/12	9:55	1	X	X	X						
7		ORD303L		X											7/17/12	13:25	1	X	X	X						
8		ORD304L		X											7/18/12	10:30	1	X	X	X						
9		ORD305L MS/MSD		X											7/18/12	10:50	1	X	X	X						
10		ORD306L dup		X											7/16/12	10:50	1	X	X	X						

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
DECLARCO / [Signature]	8/15/2012	FedEX	Nick Barnett / Nick Barnett	TAL-WS	8/16/12 / 1300	-5.0° TB:0°
	/				/	
	/				/	

Comments: please prepare duplicates and MS/MSD for samples identified with "dup" and "MS/MSD", respectively. send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

1211 of 1214

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LABORATORY USE ONLY

LAB JOB NO. \_\_\_\_\_  
LOCATION \_\_\_\_\_  
CONTAINERS \_\_\_\_\_

**Chain of Custody / Analysis Request Form**

Report to: Eric DeCarlo  
Company name: Environment Inc University of Hawaii  
Address: 1000 Pope Road MSB 510  
650 Iwili Rd, Suite 204  
City: Honolulu State: HI ZIP: 96817  
Phone: 808-956-5924 Fax: 808-833-2225  
Sampler: UH # samples in shipment: 10  
Job name: Post ROTUMBS Ordnance Reef  
Job number: 1108  
Contact email address: edecarlo@soest.hawaii.edu  
Standard: TAT  
Indicate analyses requested: 8330 Energetics  
6020 metals

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling			No of containers	Laboratory ID no.	
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date	Time			
ORD301S	X	X									none	7-17-12	0930	1	X	X	
ORD302S	X	X									none	7-17-12	1050	1	X	X	
ORD303S	X	X									none	7-17-12	1230	1	X	X	
ORD304S	X	X									none	7-17-12	1305	1	X	X	
ORD305S	X	X									none	7-18-12	0925	1	X	X	
ORD306S	X	X									none	7-18-12	1005	1	X	X	
ORD307S	X	X									none	7-18-12	1005	1	X	X	
ORD308S	X	X									none	7-18-12	1040	1	X	X	
ORD309S	X	X									none	7-18-12	1150	1	X	X	
ORD310S MS/MSD	X	X									none	7-18-12	1157	1	X	X	

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<u>E. DeCarlo</u>	<u>7/23/2012</u>	<u>FedEX</u>	<u>Cady Sed</u>	<u>TAT w-SPE</u>	<u>7-24/1000</u>	<u>C.I.C</u>
	<u>1</u>				<u>1</u>	
	<u>1</u>				<u>1</u>	

Comments: \_\_\_\_\_

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 LOCATION \_\_\_\_\_  
 CONTAINERS \_\_\_\_\_

625240418

## Chain of Custody / Analysis Request Form

Report to <b>Eric De Carlo</b>		Project identification				Indicate analyses requested			
Company name <b>University of Hawaii</b>		Job name <b>Ordnance Reef</b>				8330 Energetics 6020 metals			
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>							
City <b>Honolulu</b>	State <b>HI</b>	ZIP <b>96822</b>	P O Number						
Phone <b>808-956-5924</b>	Fax	Contact email address <b>edecarlo@soest.hawaii.edu</b>		Date Results Needed <b>Standard TAT</b>					
Sampler <b>UH</b>	# samples in shipment <b>9</b>								

Client sample ID	COMP	GRAB	Matrix								Sampling		No of containers	Laboratory ID no.			
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method			Date	Time	
1 ORD 311S	X	X									none	7-18-12	12:09	1	X	X	
2 ORD 312S	X	X									none	7-18-12	12:14	1	X	X	
3 ORD 313S	X	X									none	7-18-12	12:14	1	X	X	
4 ORD 314S	X	X									none	7-18-12	12:34	1	X	X	
5 ORD 315S	X	X									none	7-17-12	10:40	1	X	X	
6 ORD 316S	X	X									none	7-17-12	10:55	1	X	X	
7 ORD 317S	X	X									none	7-17-12	10:55	1	X	X	
8 ORD 318S	X	X									none	7-17-12	11:00	1	X	X	
<del>9 ORD 319S</del>	<del>X</del>	<del>X</del>									<del>none</del>	<del>7-17-12</del>					
10 ORD 319S	X	X									none	7-16-12	0930	1	X	X	

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>E. De Carlo</i>	7/23/2012	FedEx	<i>Cathy</i>	TAL W-SAC	7-24 / 1000	0.1 °C
	/				/	
	/				/	

Comments: \_\_\_\_\_

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LOCATION \_\_\_\_\_

CONTAINERS \_\_\_\_\_

G2G240418

## Chain of Custody / Analysis Request Form

Report to <b>Eric Decarto</b>		Project Identification		Indicate analyses requested	
Company name <b>University of Hawaii</b>		Job name <b>ordnance Reef</b>			
Address <b>1000 Pipe Road MSB 570</b>		Job number <b>1108</b>			
City <b>Honolulu</b>	State <b>HI</b>	ZIP <b>96822</b>	P O Number		
Phone <b>808-956-5924</b>	Fax	Contact email address <b>edecarto@ccwest.hawaii.edu</b>	Date Results Needed <b>standard TAT</b>		
Sampler <b>UH</b>	# samples in shipment <b>3</b>				

TestAmerica West, Sacramento (916) 373-5600

Client sample ID	COMP	GRAB	Matrix									Sampling		No of containers	Laboratory ID no.		
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method	Date			Time	
1 <b>ORD320S</b>		X	X								none	7-16-12	0930	1	X	X	
2 <b>ORD321S</b>		X	X								none	7-16-12	0930	1	X	X	
3 <b>ORD322S</b>		X	X								none	7-16-12	0930	1	X	X	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

8330 Energetics  
6020 metals

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<b>E. DeLano, EDD</b>	<b>7/23/12</b>	<b>FedEX</b>	<b>Casey Duke</b>	<b>TATL W-SAC</b>	<b>7-24 / 10000</b>	<b>0.1°C</b>
	/				/	
	/				/	

Comments: \_\_\_\_\_

Please check one:

- Dispose by lab
- Return to client
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*West-Sacramento 267260 422*

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LOCATION \_\_\_\_\_

CONTAINERS \_\_\_\_\_

## Chain of Custody / Analysis Request Form

Report to: <b>Eric DeCarlo</b>		Project identification				Indicate analyses requested					
Company name <b>University of Hawaii</b>		Job name <b>Ordnance Reef</b>				8330 Energetics 6020 metals					
Address <b>1000 Pope Road MSB 510</b>		Job number <b>1108</b>									
City <b>Honolulu</b>		P.O. Number									
State <b>HI</b>		ZIP <b>96822</b>									
Phone <b>808-956-5124</b>		Contact email address <b>edecarlo@soest.hawaii.edu</b>		Date Results Needed <b>Standard TAT</b>							
Fax		# samples in shipment <b>10</b>									
Sampler <b>UH</b>											

Client sample ID	COMP	GRAB	Matrix									Preservation method		Sampling		No of containers	Laboratory ID no.
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Date	Time				
ORD3235		X	X								none	7-16-12	11:00	1	X	X	
ORD3245		X	X								none	7-16-12	11:00	1	X	X	
ORD3255		X	X								none	7-16-12	11:00	1	X	X	
ORD3265		X	X								none	7-16-12	1140	1	X	X	
ORD3275		X	X								none	7-16-12	1140	1	X	X	
ORD3285		X	X								none	7-16-12	1140	1	X	X	
ORD3295		X	X								none	7-16-12	1140	1	X	X	
ORD3305		X	X								none	7-16-12	1230	1	X	X	
ORD3315		X	X								none	7-16-12	1230	1	X	X	
ORD3325		X	X								none	7-16-12	12:30	1	X	X	

Released by (print/sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>Shelby Kade</i>	7-25-12 1200	Fed Ex	Nick Barnett	TAL-WS	7-26-12/1000	1-8'
	/				/	
	/				/	

Comments: \_\_\_\_\_

Please check one:  
 Dispose by lab  
 Return to client  
 Archive

LABORATORY USE ONLY	
LAB JOB NO.	_____
LOCATION	_____
CONTAINERS	_____

**Chain of Custody / Analysis Request Form**

Report to: <i>Eric de Carlo</i>	Project identification		Indicate analyses requested	
Company name: <i>University of Hawaii</i>	Job name: <i>Ordnance Reef</i>			
Address: <i>1000 Pope Road MCB 5D</i>	Job number: <i>1108</i>			
City: <i>Honolulu</i> State: <i>HI</i> ZIP: <i>96822</i>	P.O. Number:			
Phone: <i>808-956-5924</i>	Contact email address: <i>edecarlo@soest.hawaii.edu</i>	Date Results Needed: <i>Standard TAT</i>		
Sampler: <i>UH</i>	# samples in shipment: <i>8</i>			

TestAmerica West Sacramento (916) 379-9600	Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	8330 energetics	6020 metals							Laboratory ID no.													
				Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date											Time												
✓	ORD333S		X	X								none	7-16-12	1300	1	X	X																				
✓	ORD334S MS/MSD		X	X								none	7-16-12	1300	1	X	X																				
✓	ORD335S		X	X								none	7-16-12	1300	1	X	X																				
✓	ORD336S		X	X								none	7-16-12	1335	1	X	X																				
✓	ORD337S		X	X								none	7-16-12	1335	1	X	X																				
✓	ORD338S		X	X								none	7-16-12	1335	1	X	X																				
✓	ORD339S		X	X								none	7-17-12	0930	1	X	X																				
8	ORD340S		X	X								none	7-17-12	0930	1	X	X																				
9																																					
10																																					

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
<i>Shelby Koide / Shelby Koide</i>	<i>7-25-12 1200</i>	<i>FedEx</i>	<i>Nick Barnett / Nick Barnett</i>	<i>TAL-WS</i>	<i>7-26-12 / 1000</i>	<i>1.8'</i>
	<i>/</i>				<i>/</i>	
	<i>/</i>				<i>/</i>	

Comments: \_\_\_\_\_

- Please check one:**  
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LABOR/	
LAB JOB NO. _____	
LOCATION _____	
CONTAINERS _____	320-2258 COC

## Chain of Custody / Analysis Request Form

Report to: <b>Eric DeCarlo</b>	Project identification		Indicate analyses requested	
Company name: <b>University of Hawaii</b>	Job name: <b>Ordnance Reef</b>			
Address: <b>1000 Pope Road MSB 510</b>	Job number: <b>1108</b>			
City: <b>Honolulu</b>	State: <b>HI</b>	ZIP: <b>96822</b>		
Phone: <b>808-956-5224</b>	Fax:	Contact email address: <b>edecarlo@socent.hawaii.edu</b>	Date Results Needed: <b>Standard TAT</b>	
Sampler: <b>UH</b>	# samples in shipment: <b>10</b>			

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	8330 Engrgetres	6020 metals	Laboratory ID no.
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date				
ORD323S		X	X								none	7-16-12	11:00	1	X	X	
ORD324S		X	X								none	7-16-12	11:00	1	X	X	
ORD325S		X	X								none	7-16-12	11:00	1	X	X	
ORD326S		X	X								none	7-16-12	1140	1	X	X	
ORD327S		X	X								none	7-16-12	1140	1	X	X	
ORD328S		X	X								none	7-16-12	1140	1	X	X	
ORD329S		X	X								none	7-16-12	1140	1	X	X	
ORD330S		X	X								none	7-16-12	1230	1	X	X	
ORD331S		X	X								none	7-16-12	1230	1	X	X	
ORD332S		X	X								none	7-16-12	12:30	1	X	X	

Released by (print/sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
Shelby Kade / <i>[Signature]</i>	7-25-12 1200	Fed Ex	Nick Barnett / <i>[Signature]</i>	TAL-WS	7-26-12/1000	1-8'
	/				/	
	/				/	

Comments: \_\_\_\_\_

**Please check one:**  
 Dispose by lab  
 Return to client  
 Archive

TestAmerica West-Sacramento 295 of 297

04/30/2013 12:13 of 12:17

LABORATORY USE ONLY	
LAB JOB NO.	_____
LOCATION	_____
CONTAINERS	_____

**Chain of Custody / Analysis Request Form**

Report to <b>Eric de Carlo</b>	Project identification		Indicate analyses requested	
Company name <b>University of Hawaii</b>	Job name <b>Ordnance Reef</b>	Job number <b>1108</b>		
Address <b>1000 Popo Road MSB 5D</b>	P.O. Number	Contact email address <b>edecarlo@saest.hawaii.edu</b>		
City <b>Honolulu</b>	State <b>HI</b>	ZIP <b>96822</b>	Date Results Needed <b>Standard TAT</b>	
Phone <b>808-956-5924</b>	Fax	# samples in shipment <b>8</b>		

Client sample ID	COMP	GRAB	Matrix								Preservation method	Sampling		No of containers	Laboratory ID no.
			Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil		Other	Date		
ORD3335	X	X									none	7-16-12	1300	1	X X
ORD3345 MS/MSD	X	X									none	7-16-12	1300	1	X X
ORD3355	X	X									none	7-16-12	1300	1	X X
ORD3365	X	X									none	7-16-12	1335	1	X X
ORD3375	X	X									none	7-16-12	1335	1	X X
ORD3385	X	X									none	7-16-12	1335	1	X X
ORD3395	X	X									none	7-17-12	0930	1	X X
ORD3405	X	X									none	7-17-12	0930	1	X X

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
Shelby Korde / <i>[Signature]</i>	7-25-12 1200	FedEx	Nick Barnett / <i>[Signature]</i>	TAL-WS	7-26-12 / 1000	1-8
	/				/	
	/				/	

Comments: \_\_\_\_\_

- Please check one:**
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  - Return to client
  - Archive

TestAmerica West Sacramento 916-379-6607  
 Page 2969067297

# Chain of Custody Record

Temperature on Receipt \_\_\_\_\_

Drinking Water? Yes  No

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



320-2277 COC

TAL-4124 (1007)

Client: Eric DeCarlo - University of Hawaii Project Manager: Eric DeCarlo Date: 4-9-13 Chain of Custody Number: 148522

Address: HAT 1000 Pope Road MSB 510 Telephone Number (Area Code)/Fax Number: (808) 956-5924 Lab Number: \_\_\_\_\_

City: Honolulu State: HI Zip Code: 96822 Site Contact: \_\_\_\_\_ Lab Contact: \_\_\_\_\_

Project Name and Location (State): ordnance Reef Carrier/Waybill Number: \_\_\_\_\_

Contract/Purchase Order/Quote No. \_\_\_\_\_

Page 1 of 2

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix				Containers & Preservatives							Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt		
			Air	Aqueous	Sed.	Soil	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc2/NaOH	None				
✓ ORD301S-2	7-17-12	0930			X		X										
✓ ORD302S-2	7-17-12	1050			X		X										
Page 508 of 610 ORD303S-2 MS/MSD	7-17-12	1230			X		X										MS/MSD
ORD304S-2	7-17-12	1305			X		X										
ORD305S-2	7-18-12	0925			X		X										
ORD306S-2	7-18-12	1005			X		X										
ORD307S-2	7-18-12	1005			X		X										
ORD308S-2	7-18-12	1040			X		X										
ORD309S-2	7-18-12	1150			X		X										
ORD310S-2	7-18-12	1157			X		X										
ORD311S-2	7-18-12	1209			X		X										
ORD312S-2	7-18-12	1214			X		X										

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard FAT

QC Requirements (Specify): \_\_\_\_\_

1. Relinquished By: <u>[Signature]</u>	Date: <u>4/9/2013</u>	Time: <u>15:00</u>	1. Received By: <u>[Signature]</u>	Date: <u>4-11-13</u>	Time: <u>0915</u>
2. Relinquished By: _____	Date: _____	Time: _____	2. Received By: _____	Date: _____	Time: _____
3. Relinquished By: _____	Date: _____	Time: _____	3. Received By: _____	Date: _____	Time: _____

Comments: \_\_\_\_\_

05/06/2013

**Chain of Custody Record**

Temperature on Receipt \_\_\_\_\_

Drinking Water? Yes  No

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>4-9-13</b>	Chain of Custody Number <b>148521</b>
Address <b>1000 Pope Road MSB 510</b>		Telephone Number (Area Code)/Fax Number <b>(808) 956-5924</b>		Lab Number	

City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact	Analysis (Attach list if more space is needed)
Project Name and Location (State) <b>Ordinance Reef</b>			Carrier/Waybill Number		

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix				Containers & Preservatives						6020 Metals	Special Instructions/Conditions of Receipt	
			Air	Aqueous	Sed	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc2/NaOH			
✓ ORD313S-2	7-18-12	12:14			X			X							
✓ ORD314S-2	7-18-12	12:34			X			X							
✓ ORD315S-2	7-17-12	10:40			X			X							
✓ ORD316S-2	7-17-12	10:55			X			X							
✓ ORD317S-2	7-17-12	10:55			X			X							
✓ ORD318S-2	7-17-12	11:00			X			X							
✓ ORD319S-2	7-16-12	09:30			X			X							
✓ ORD320S-2 MS/MSD	7-16-12	09:30			X			X						MS/MSD	
✓ ORD321S-2	7-16-12	09:30			X			X							
✓ ORD322S-2	7-16-12	09:30			X			X							

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown	Sample Disposal <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	(A fee may be assessed if samples are retained longer than 1 month)
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Turn Around Time Required <input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input checked="" type="checkbox"/> Other <b>Standard TAT</b>	QC Requirements (Specify)
--	---------------------------

1. Relinquished By 	Date <b>4/9/2013</b>	Time <b>15:00</b>	Received By 	Date <b>4-11-13</b>	Time <b>09:15</b>
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

05/06/2013

# Chain of Custody Record

Temperature on Receipt 0.4

# TestAmer



THE LEADER IN ENVIRONMENTAL

320-2922 Chain of

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>06/10/13</b>	Chain of Custody number <b>148520</b>
Address <b>1000 Kape Road MSB 510</b>		Telephone Number (Area Code)/Fax Number <b>(808) 956-5924</b>		Lab Number	
City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact	Page <u>1</u> of <u>2</u>

Project Name and Location (State) <b>Ordnance Reef, Hawaii</b>		Carrier/Waybill Number <b>8737 7574 9612</b>		Analysis (Attach list if more space is needed)	
Contract/Purchase Order/Quote No. <b>1108</b>				Special Instructions/Conditions of Receipt	

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix				Containers & Preservatives						8330 Energetics	6020 Metals
			Air	Aqueous	Sed.	Soil	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc2/NaOH		
ORD401S	6/3/13	9:12		X			X						X	X
ORD402S	6/3/13	9:12		X			X						X	X
ORD403S	6/3/13	10:35		X			X						X	X
ORD404S	6/3/13	10:35		X			X						X	X
ORD405S	6/3/13	10:35		X			X						X	X
ORD406S	6/3/13	11:16		X			X						X	X
ORD407S	6/3/13	12:03		X			X						X	X
ORD408S	6/3/13	12:03		X			X						X	X
ORD409S	6/3/13	12:03		X			X						X	X
ORD410S	6/3/13	13:25		X			X						X	X
ORD411S	6/3/13	9:12		X			X						X	X
ORD412S	6/3/13	9:12		X			X						X	X

Possible Hazard Identification			Sample Disposal			(A fee may be assessed if samples are retained longer than 1 month)		
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client	<input checked="" type="checkbox"/> Disposal By Lab	<input type="checkbox"/> Archive For _____ Months	

Turn Around Time Required	QC Requirements (Specify)
<input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input checked="" type="checkbox"/> Other <u>standard IAT</u>	

1. Relinquished By <i>[Signature]</i>	Date <b>6/10/13</b>	Time <b>11:45</b>	1. Received By <i>[Signature]</i>	Date <b>6-11-13</b>	Time <b>8:55</b>
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments



# Chain of Custody Record

Temperature on Receipt \_\_\_\_\_

Drinking Water? Yes  No

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>06/13/12</b>	Chain of Custody Number <b>206825</b>
Address <b>1000 Pope Road MSB510</b>		Telephone Number (Area Code)/Fax Number <b>(808) 956-5924</b>		Lab Number	Page <b>1</b> of <b>1</b>

City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact	Analysis (Attach list if more space is needed)
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Project Name and Location (State) <b>Ordnance Reef, Hawaii</b>	Carrier/Waybill Number <b>8010 3206 1326</b>	Special Instructions/ Conditions of Receipt
Contract/Purchase Order/Quote No. <b>1108</b>		

Sample ID No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives						8200 Engritics	6020 Metals
			Air	Aqueous	Soil	Slur	Slur	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc		
ORD417S	6/7/2013	9:55		X				X						X	X
ORD418S	6/7/2013	9:55		X				X						X	X
ORD419S	6/7/2013	12:20		X				X						X	X
ORD420S	6/7/2013	12:35		X				X						X	X
ORD421S	6/7/2013	12:45		X				X						X	X
ORD422S	6/7/2013	13:05		X				X						X	X
ORD423S	6/7/2013	13:45		X				X						X	X
ORD424S MS/MSD	6/7/2013	14:15		X				X						X	X
ORD425S	6/7/2013	9:15		X				X						X	X
ORD426S	6/7/2013	9:15		X				X						X	X
ORD427S	6/7/2013	9:15		X				X						X	X
ORD428S	6/7/2013	9:55		X				X						X	X



Possible Hazard Identification

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

24 Hours  48 Hours  7 Days  14 Days  21 Days  Other standard TAT

1 Relinquished By <i>[Signature]</i>	Date <b>6/13/12</b>	Time <b>11:50</b>	1 Received By <i>Cheng Jue</i>	Date <b>06/14/13</b>	Time <b>0900</b>	<b>5.4</b>
2 Relinquished By	Date	Time	2 Received By	Date	Time	
3 Relinquished By	Date	Time	3 Received By	Date	Time	

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

# Chain of Custody Record

0.2, -1.8  
Temperature on Receipt \_\_\_\_\_

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: University of Hawaii Project Manager: Eric DeCarlo Date: 7/11/13 Chain of Custody Number: 206827

Address: 1000 Pope Road, MSB 510 Telephone Number (Area Code)/Fax Number: 808-956-5924 Lab Number: \_\_\_\_\_

City: Honolulu State: HI Zip Code: 96822 Site Contact: \_\_\_\_\_ Lab Contact: Robert Weidufeld

Project Name and Location (State): Ordnance Reef Carrier/Waybill Number: \_\_\_\_\_ Analysis (Attach list if more space is needed): \_\_\_\_\_

Contract/Purchase Order/Quote No: 1108



Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix										Containers & Preservatives			8330 Enogebics	6020 Metals	Arsenic Speciation (Brooks Lab)		
			Air	Aqueous	Sed	Soil	Tissue	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH						
<del>ORD4080</del> <u>CS 7.11.13</u>	<u>6/7/13</u>	<u>1400</u>					X	X										X	X	X
<u>ORD4090</u>	<u>6/11/13</u>	<u>1045</u>					X	X										X	X	X
<u>ORD4100</u>	<u>6/11/13</u>	<u>1210</u>					X	X										X	X	
<u>ORD4012</u>	<u>6/13/13</u>	<u>1025</u>					X	X										X	X	X
<u>ORD402L</u>	<u>6/13/13</u>	<u>1105</u>					X	X										X	X	X
<u>ORD403L</u>	<u>6/13/13</u>	<u>1155</u>					X	X										X	X	X
<u>ORD404L DUP</u>	<u>6/13/13</u>	<u>1306</u>					X	X										X	X	X
<u>ORD405L</u>	<u>6/13/13</u>	<u>1850</u>					X	X										X	X	X
<u>ORD412L</u>	<u>6/7/13</u>	<u>0942</u>					X	X										X	X	X
<u>ORD413L</u>	<u>6/7/13</u>	<u>1025</u>					X	X										X	X	X
<u>ORD406L</u>	<u>6/7/13</u>	<u>1140</u>					X	X										X	X	X
<u>ORD407L</u>	<u>6/7/13</u>	<u>1253</u>					X	X										X	X	X

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

QC Requirements (Specify): \_\_\_\_\_

1. Relinquished By: <u>Unitee B...</u>	Date: <u>7/11/13</u>	Time: <u>1330</u>	1. Received By: <u>Kim Nelson</u>	Date: <u>7-12-13</u>	Time: <u>0905</u>
2. Relinquished By: _____	Date: _____	Time: _____	2. Received By: _____	Date: _____	Time: _____
3. Relinquished By: _____	Date: _____	Time: _____	3. Received By: _____	Date: _____	Time: _____

Comments: Please prepare duplicates <sup>CS 7.11.13</sup> and ~~MS/MSD~~ for samples identified with "DUP" and <sup>CS 7.11.13</sup> "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Lab in Seattle, WA for analysis.

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy



**Chain of Custody Record**

0.2, -1.8  
Temperature on Receipt \_\_\_\_\_

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: University of Hawaii Project Manager: Eric DeCarlo Date: 7/11/13 Chain of Custody Number: 206826  
 Address: 1000 Pope Rd. Telephone Number (Area Code)/Fax Number: 808-956-5924 Lab Number: \_\_\_\_\_  
 City: Honolulu State: HI Zip Code: 96822 Site Contact: \_\_\_\_\_ Lab Contact: Robert Weidenfeld  
 Project Name and Location (State): Ordnance Reef Carrier/Waybill Number: \_\_\_\_\_  
 Contract/Purchase Order/Quote No.: 1108

Page 5 of 5

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix										Containers & Preservatives			Analysis (Attach list if more space is needed)	Special Instructions/Conditions of Receipt				
			Air	Aqueous	Sed	Soil	Tissue	Uppies	#250M	#M03	HCl	NaOH	ZnAc/NaOH	8330 Enrichers	6020 Metals			Arsenic Speciation (Brooks Rand)			
✓ ORD4092 MS/MSD	6/7/13	1410						X	X								X	X	X		
✓ ORD4102 DUP	6/7/13	1437						X	X								X	X	X		
✓ ORD4112	6/11/13	1045						X	X								X	X	X		

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  
 Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT  
 QC Requirements (Specify): \_\_\_\_\_

1. Relinquished By: <u>Unita Briggs</u>	Date: <u>7/11/13</u>	Time: <u>1330</u>	1. Received By: <u>Kim Nelson</u>	Date: <u>7-12-13</u>	Time: <u>0905</u>
2. Relinquished By: _____	Date: _____	Time: _____	2. Received By: _____	Date: _____	Time: _____
3. Relinquished By: _____	Date: _____	Time: _____	3. Received By: _____	Date: _____	Time: _____

Comments: Please prepare duplicates and MS/MSDs for samples identified w/ 'DUP' and 'MS/MSD', respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

# Chain of Custody Record

0.2 - 1.8  
Temperature on Receipt

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: **University of Hawaii**  
Address: **1000 Pope Road, MSB 510**  
City: **Honolulu** State: **HI** Zip Code: **96822**

Project Manager: **Eric DeCarlo**  
Telephone Number (Area Code)/Fax Number: **808-956-5924**

Date: **7/11/13**  
Chain of Custody Number: **206846**

Lab Number: \_\_\_\_\_  
Page **3** of **5**

Project Name and Location (State): **Ordinance Reef**  
Contract/Purchase Order/Quote No.: **1108**

Site Contact: \_\_\_\_\_ Lab Contact: **Robert Weidenfeld**

Carrier/Waybill Number: \_\_\_\_\_

Analysis (Attach list if more space is needed): \_\_\_\_\_



Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix							Containers & Preservatives									
			Air	Aqueous	Sed.	Soil	Tissue	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc2/NaOH	8230 Energetics	6020 Metals	Arsenic Speciation (Brooks Road)			
ORD436F	6/19/13	2120			X		X	X								X	X	X	X
ORD437E	6/19/13	2120					X	X								X	X	X	
ORD4010	6/3/13	1025		X			X	X								X	X		
ORD4020 DUP	6/3/13	1105		X			X	X								X	X	X	
ORD4030	6/3/13	1155					X	X								X	X		
ORD4040	6/3/13	1240					X	X								X	X		
ORD4050	6/3/13	1350					X	X								X	X	X	
ORD4110 MS/MSD	6/7/13	0942					X	X								X	X		
ORD4120	6/7/13	1025					X	X								X	X		
ORD4060	6/7/13	1217					X	X								X	X		
ORD4070 DUP	6/7/13	1253					X	X								X	X		
ORD4080	6/7/13	1400					X	X								X	X	X	

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other **Standard TAT**

QC Requirements (Specify): \_\_\_\_\_

1 Relinquished By: <b>Unite Bugg</b>	Date: <b>7/11/13</b>	Time: <b>1330</b>	1 Received By: <b>Kim Nelson</b>	Date: <b>7-11-13</b>	Time: <b>0905</b>
2 Relinquished By: _____	Date: _____	Time: _____	2 Received By: _____	Date: _____	Time: _____
3 Relinquished By: _____	Date: _____	Time: _____	3 Received By: _____	Date: _____	Time: _____

Comments: **Please prepare duplicates and MS/MSDs for samples identified with 'DUP' and 'MS/MSD', respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Road Lab in Seattle, WA for analysis.**

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy

# Chain of Custody Record

0.2, -1.8  
Temperature on Receipt \_\_\_\_\_  
Drinking Water? Yes  No

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)			Client			Project Manager			Date			Chain of Custody Number			
University of Hawaii			Eric DeCarlo			7/11/13			206827			Page 4 of 5			
Address			Telephone Number (Area Code)/Fax Number			Lab Number									
1000 Pope Road, MSB 510			808-956-5924												
City		State	Zip Code	Site Contact			Lab Contact			Analysis (Attach list if more space is needed)			Special Instructions/ Conditions of Receipt		
Honolulu		HI	96822				Robert Weidenfeld								
Project Name and Location (State)				Carrier/Waybill Number											
Ordinance Reef															
Contract/Purchase Order/Quote No.				Matrix			Containers & Preservatives								
1108															

Sample ID No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives					8350 Engrichs	6020 Metals	Arsenic Speciation (Brooks Row)	
			Air	Aqueous	Soil	Seal	Tissue	MSO4	HNO3	HCl	NaOH	ZnAc				NaOH
<del>ORD4080</del> CB 7.11.13	07/11/13	1400							X	X				X	X	X
✓ ORD4090	6/11/13	1045							X	X				X	X	X
✓ ORD4100	6/11/13	1210							X	X				X	X	X
✓ ORD4012L	6/13/13	1025							X	X				X	X	X
✓ ORD402L	6/13/13	1105							X	X				X	X	X
✓ ORD403L	6/13/13	1155							X	X				X	X	X
✓ ORD404L DUP	6/13/13	1306							X	X				X	X	X
✓ ORD405L	6/13/13	1350							X	X				X	X	X
✓ ORD412L	6/7/13	0942							X	X				X	X	X
✓ ORD413L	6/7/13	1025							X	X				X	X	X
✓ ORD406L	6/7/13	1140							X	X				X	X	X
✓ ORD407L	6/7/13	1253							X	X				X	X	X

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

QC Requirements (Specify):

1. Relinquished By: <u>Umut Beyaz</u>	Date: 7/11/13	Time: 1330	1. Received By: <u>Kim Nelson</u>	Date: 7-12-13	Time: 0905
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments: Please prepare duplicates <sup>CB 7.11.13</sup> and ~~MS/MSD~~ for samples identified with "DUP", and <sup>CB 7.11.13</sup> ~~MS/MSD~~, respectively. <sup>CB 7.11.13</sup> Send aliquots of tissue specification to Brooks Row Lab in Seattle, WA for analysis.

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy

**Chain of Custody Record**

0.2. -1.8  
 Temperature on Receipt \_\_\_\_\_  
 Drinking Water? Yes  No

**TestAmerica**  
 THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: **Eric DeCarlo** Project Manager: **Eric DeCarlo; edecarlo@soest.hawaii.edu** Date: **7/11/13** Chain of Custody Number: **206824**

Address: **University of Hawaii, 1000 Pope Road MSBS10** Telephone Number (Area Code)/Fax Number: **808-956-5924** Lab Number: \_\_\_\_\_

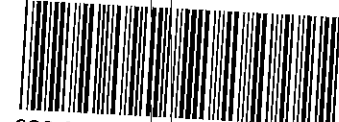
City: **Honolulu** State: **HI** Zip Code: **96822** Site Contact: \_\_\_\_\_ Lab Contact: **Robert Weidenfeld**

Project Name and Location (State): **Ordnance Reef** Carrier/Waybill Number: \_\_\_\_\_

Contract/Purchase Order/Quote No: **1108**

Page **1** of **5**

Analysis (Attach list if more space is needed)



320-3331 Chain of Custody

itions/  
receipt

Sample I D No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix										Containers & Preservatives			8330 Enogelids	6020 Metals	Arsenic Speciation (Brooks Rand)	
			Air	Aqueous	Sed	Soil	Tissue	Ungrouped	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH	8330 Enogelids				6020 Metals
✓ ORD401F	6/11/13	1325					X	X									X	X	X
✓ ORD403F MS/MSD	6/11/13	1325					X	X									X	X	
✓ ORD405F DUP	6/11/13	1325					X	X									X	X	
✓ ORD412F	6/11/13	1300					X	X									X	X	
✓ ORD415F DUP	6/11/13	1300					X	X									X	X	
✓ ORD417F	6/11/13	1300					X	X									X	X	X
✓ ORD418F	6/19/13	2045					X	X									X	X	
✓ ORD424F	6/19/13	2047					X	X									X	X	
✓ ORD419F	6/19/13	2050					X	X									X	X	
✓ ORD420F	6/19/13	2051					X	X									X	X	X
✓ ORD421F	6/19/13	2053					X	X									X	X	
✓ ORD422F MS/MSD	6/19/13	2054					X	X									X	X	

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other **Standard TAT**

QC Requirements (Specify)

1 Relinquished By: <b>Christy Briggs</b>	Date: <b>7/11/13</b>	Time: <b>1330</b>	1 Received By: <b>Kim Nelson</b>	Date: <b>7-12-13</b>	Time: <b>0905</b>
2 Relinquished By:	Date:	Time:	2 Received By:	Date:	Time:
3 Relinquished By:	Date:	Time:	3 Received By:	Date:	Time:

Comments: Please prepare duplicates and MS/MSDs for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy

**Chain of Custody Record**

Temperature on Receipt 0.2, - 1.8

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

Drinking Water? Yes  No

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>7/11/13</b>	Chain of Custody Number <b>206823</b>
Address <b>1000 Pope Road, MSB 510</b>		Telephone Number (Area Code)/Fax Number <b>808-956-5924</b>		Lab Number	Page <b>2</b> of <b>5</b>

City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact <b>Robert Weidenfeld</b>	Analysis (Attach list if more space is needed)
Project Name and Location (State) <b>Ordnance Reef</b>			Carrier/Waybill Number		

Contract/Purchase Order/Quote No. <b>1108</b>	Matrix	Containers & Preservatives	8330 Energetics 6020 Metals Arsenic Speciation (Brooks Rand)	Special Instructions/ Conditions of Receipt
--	--------	----------------------------	--	--

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives						8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)	
			Air	Aqueous	Soil	Spill	Tissue	LiOH	H2SO4	HNO3	HCl	NaOH	ZnAc2				NaOH
✓ ORD423F	6/19/13	2055					X	X							X	X	
✓ ORD425F	6/19/13	2057					X	X							X	X	X
✓ ORD426F	6/19/13	2059					X	X							X	X	
✓ ORD427F	6/19/13	2100					X	X							X	X	X
✓ ORD428F	6/19/13	2101					X	X							X	X	
✓ ORD429F DUP	6/19/13	2103					X	X							X	X	
✓ ORD430F	6/19/13	2105					X	X							X	X	
✓ ORD431F	6/19/13	2109					X	X							X	X	
✓ ORD432F	6/19/13	2110					X	X							X	X	
✓ ORD433F DUP	6/19/13	2113					X	X							X	X	
✓ ORD434F	6/19/13	2114					X	X							X	X	
✓ ORD435F	6/19/13	2116					X	X							X	X	

Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown	Sample Disposal <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	(A fee may be assessed if samples are retained longer than 1 month)
---	--	---

Turn Around Time Required <input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input checked="" type="checkbox"/> Other <b>Standard TAT</b>	QC Requirements (Specify)
--	---------------------------

1 Relinquished By <b>Uniko B...</b>	Date <b>7/11/13</b>	Time <b>1330</b>	1. Received By <b>Kim Nelson</b>	Date <b>7-12-13</b>	Time <b>0905</b>
2 Relinquished By	Date	Time	2. Received By	Date	Time
3 Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Please prepare duplicates and Ms/MSDs for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

**Chain of Custody Record**

0.2, - 1.8  
Temperature on Receipt \_\_\_\_\_

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: University of Hawaii  
Address: 1000 Pope Road, MSB 510  
City: Honolulu State: HI Zip Code: 96822

Project Manager: Eric DeCarlo  
Telephone Number (Area Code)/Fax Number: 808-956-5924

Date: 7/11/13  
Chain of Custody Number: 206846

Lab Number: \_\_\_\_\_  
Page 3 of 5

Project Name and Location (State): Ordnance Reef  
Contract/Purchase Order/Quote No.: 1108

Site Contact: \_\_\_\_\_ Lab Contact: Robert Weidenfeld

Carrier/Waybill Number: \_\_\_\_\_

Analysis (Attach list if more space is needed)

Special Instructions/Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix						Containers & Preservatives						8330 Enegethis	6020 Metals	Arsenic Speciation (Brooks Rand)	
			Air	Aqueous	Sed	Soil	Tissue	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH				
✓ ORD436F	6/19/13	2120					X	X								X	X	X
✓ ORD437F	6/19/13	2120					X	X								X	X	
✓ ORD4010	6/3/13	1025					X	X								X	X	
✓ ORD4020 DUP	6/3/13	1105					X	X								X	X	X
✓ ORD4030	6/3/13	1155					X	X								X	X	
✓ ORD4040	6/3/13	1240					X	X								X	X	
✓ ORD4050	6/3/13	1350					X	X								X	X	X
✓ ORD4110 MS/MSD	6/7/13	0942					X	X								X	X	
✓ ORD4120	6/7/13	1025					X	X								X	X	
✓ ORD4060	6/7/13	1217					X	X								X	X	
✓ ORD4070 DUP	6/7/13	1253					X	X								X	X	
✓ ORD4080	6/7/13	1400					X	X								X	X	X

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

QC Requirements (Specify)

1 Relinquished By: <u>White Buga</u>	Date: 7/11/13	Time: 1330	1 Received By: <u>Kim Nelson</u>	Date: 7-12-13	Time: 0905
2 Relinquished By:	Date:	Time:	2 Received By:	Date:	Time:
3 Relinquished By:	Date:	Time:	3 Received By:	Date:	Time:

Comments: Please prepare duplicates and MS/MSDs for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

# Chain of Custody Record

U.2. - 1.8  
 Temperature on Receipt \_\_\_\_\_  
 Drinking Water? Yes  No

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

BRL Report 1331032

TAL-4124 (1007)

Client: **Eric DeCarlo**  
 Project Manager: **Eric DeCarlo; edecarlo@soest.hawaii.edu**  
 Date: **7/11/13**  
 Chain of Custody Number: **206824**

Address: **University of Hawaii, 1000 Pope Road MSBS10**  
 Telephone Number (Area Code)/Fax Number: **808-956-5924**  
 Lab Number: \_\_\_\_\_  
 Page **1** of **5**

City: **Honolulu** State: **HI** Zip Code: **96822**  
 Site Contact: \_\_\_\_\_ Lab Contact: **Robert Weidenfeld**  
 Project Name and Location (State): **Ordnance Reef**  
 Carrier/Waybill Number: \_\_\_\_\_



320-3331 Chain of Custody

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix						Containers & Preservatives						8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)	Analysis (Attach list if more space is needed)	
			Air	Aqueous	Soil	Sludge	Impres.	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH						
✓ ORD401F	6/11/13	1325					X	X								X	X	X	Samples sent from TestAmerica to Brooks Rand for Arsenic speciation.
✓ ORD403F MS/MSD	6/11/13	1325					X	X								X	X		
✓ ORD406F DUP	6/11/13	1325					X	X								X	X		
✓ ORD412F	6/11/13	1300					X	X								X	X		
✓ ORD415F DUP	6/11/13	1300					X	X								X	X		
✓ ORD417F	6/11/13	1300					X	X								X	X	X	
✓ ORD418F	6/19/13	2045					X	X								X	X		
✓ ORD424F	6/19/13	2047					X	X								X	X		
✓ ORD419F	6/19/13	2050					X	X								X	X		
✓ ORD420F	6/19/13	2051					X	X								X	X	X	
✓ ORD421F	6/19/13	2053					X	X								X	X		
✓ ORD422F MS/MSD	6/19/13	2054					X	X								X	X		

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other **Standard TAT**

Relinquished By	Date	Time	Received By	Date	Time
<i>Christy Briggs</i>	7/11/13	1330	<i>Kim Nelson</i>	7-12-13	0905
<i>[Signature]</i>	7/29/13	1600	<i>[Signature]</i>	7/30/13	9:45
3. Relinquished By:			3. Received By:		

Comments: Please prepare duplicates and MS/MSDs for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy

# Chain of Custody Record

Temperature on Receipt 0.2 - 18

# TestAmerica

BRL Report 1331032

THE LEADER IN ENVIRONMENTAL TESTING

Drinking Water? Yes  No

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>7/11/13</b>	Chain of Custody Number <b>206823</b>
Address <b>1000 Pope Road, MSB 510</b>		Telephone Number (Area Code)/Fax Number <b>808-956-5924</b>		Lab Number	Page <b>2</b> of <b>5</b>
City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact <b>Robert Weidenfeld</b>	Analysis (Attach list if more space is needed)
Project Name and Location (State) <b>Ordnance Reef</b>			Carrier/Waybill Number		

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix							Containers & Preservatives							8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)	Special Instructions/ Conditions of Receipt			
			Air	Aqueous	Sed	Soil	Tissue	Uppers	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH										
✓ ORD423F	6/19/13	2055					X	X									X	X				Samples sent from TestAmerica to Brooks Rand for Arsenic Speciation	
✓ ORD425F	6/19/13	2057					X	X									X	X	X				
✓ ORD426F	6/19/13	2059					X	X									X	X					
✓ ORD427F	6/19/13	2100					X	X									X	X	X				
✓ ORD428F	6/19/13	2101					X	X									X	X					
✓ ORD429F DUP	6/19/13	2103					X	X									X	X					
✓ ORD430F	6/19/13	2105					X	X									X	X					
✓ ORD431F	6/19/13	2109					X	X									X	X					
✓ ORD432F	6/19/13	2110					X	X									X	X					
✓ ORD433F DUP	6/19/13	2113					X	X									X	X					
✓ ORD434F	6/19/13	2114					X	X									X	X					
✓ ORD435F	6/19/13	2116					X	X									X	X					

Possible Hazard Identification

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

1. Relinquished By <i>Unik Bays</i>	Date <b>7/11/13</b>	Time <b>1330</b>	1. Received By <i>Kim Nelson</i>	Date <b>7-12-13</b>	Time <b>0905</b>
2. Relinquished By <i>[Signature]</i>	Date <b>7/29/13</b>	Time <b>1600</b>	2. Received By <i>[Signature]</i>	Date <b>7/30/13</b>	Time <b>9:45</b>
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Please prepare duplicates and Ms/MsDs for samples identified with "DUP" and "Ms/MsD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.



**Chain of Custody Record**

0.2, - 1.8  
Temperature on Receipt \_\_\_\_\_

**TestAmerica**

BRL Report 1331032

THE LEADER IN ENVIRONMENTAL TESTING

Drinking Water? Yes  No

TAL-4124 (1007)  
Client: University of Hawaii  
Address: 1000 Pope Road, MSB 510  
City: Honolulu, State: HI, Zip Code: 96822  
Project Name and Location (State): Ordnance Reef  
Contract/Purchase Order/Quote No.: 1108

Project Manager: Eric DeCarlo  
Telephone Number (Area Code)/Fax Number: 808-956-5924  
Date: 7/11/13  
Chain of Custody Number: 206846  
Page 3 of 5

Site Contact: \_\_\_\_\_  
Lab Contact: Robert Weidenfeld  
Carrier/Waybill Number: \_\_\_\_\_  
Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix							Containers & Preservatives						8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)	Special Instructions/ Conditions of Receipt
			Air	Aqueous	Sed.	Soil	Tissue	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH						
✓ ORD436F	6/19/13	2120					X	X								X	X	X	Samples sent from TestAmerica to Brooks Rand for Arsenic speciation.
✓ ORD437F	6/19/13	2120					X	X								X	X		
✓ ORD4010	6/3/13	1025					X	X								X	X		
✓ ORD4020 DUP	6/3/13	1105					X	X								X	X		
✓ ORD4030	6/3/13	1155					X	X								X	X		
✓ ORD4040	6/3/13	1240					X	X								X	X		
✓ ORD4050	6/3/13	1350					X	X								X	X		
✓ ORD4110 MS/MSD	6/7/13	0942					X	X								X	X		
✓ ORD4120	6/7/13	1025					X	X								X	X		
✓ ORD4060	6/7/13	1217					X	X								X	X		
✓ ORD4070 DUP	6/7/13	1253					X	X								X	X		
✓ ORD4080	6/7/13	1400					X	X								X	X		

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

Relinquished By:	Date	Time	Received By:	Date	Time
Unato Buys	7/11/13	1330	Kim Nelson	7-12-13	0905
[Signature]	7/29/13	1600	[Signature]	7/30/13	9:45

Comments: Please prepare duplicates and MS/MSDs for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

# Chain of Custody Record

0.2, -1.8  
Temperature on Receipt \_\_\_\_\_

# TestAmerica

BRL Report 1331032

THE LEADER IN ENVIRONMENTAL TESTING

Drinking Water? Yes  No

TAL-4124 (1007)

Client: University of Hawaii  
 Project Manager: Eric DeCarlo  
 Date: 7/11/13  
 Chain of Custody Number: 206827  
 Address: 1000 Pope Road, MSB 510  
 Telephone Number (Area Code)/Fax Number: 808-956-5924  
 Lab Number: \_\_\_\_\_  
 Page 4 of 5

City: Honolulu State: HI Zip Code: 96822  
 Site Contact: \_\_\_\_\_ Lab Contact: Robert Weidusfeld  
 Project Name and Location (State): Ordnance Reef  
 Analysis (Attach list if more space is needed): \_\_\_\_\_  
 Contract/Purchase Order/Quote No.: 1108  
 Carrier/Waybill Number: \_\_\_\_\_

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives							8330 Energetics	6020 Metals	Arsenic Speciation (Brooks Rand)	Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt		
			Air	Aqueous	Sed.	Soil	Teste	Ungrease	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH							
ORD4080 <sup>CB</sup> US 7.11.13	6/7/13	1400					X	X									X	X	X	US 7.11.13	Samples sent from TestAmerica + Brook Rand for Arsenic Speciation  Samples ORD412L and ORD411L not sent due to insufficient volume.
ORD4090	6/11/13	1045					X	X									X	X	X		
ORD4100	6/11/13	1210					X	X									X	X	X		
ORD4012	6/13/13	1025					X	X									X	X	X		
ORD402L	6/13/13	1105					X	X									X	X	X		
ORD403L	6/13/13	1155					X	X									X	X	X		
ORD404L DUP	6/13/13	1306					X	X									X	X	X		
ORD405L	6/13/13	1350					X	X									X	X	X		
ORD412L	6/7/13	0942					X	X									X	X	X		
ORD413L	6/7/13	1025					X	X									X	X	X		
ORD406L	6/7/13	1140					X	X									X	X	X		
ORD407L	6/7/13	1253					X	X									X	X	X		

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other Standard TAT

Relinquished By	Date	Time	Received By	Date	Time
Unite Buggs	7/11/13	1330	Kim Nelson	7-12-13	0905
[Signature]	7/29/13	1600	[Signature]	7/30/13	9:45
3 Relinquished By					

Comments: Please prepare duplicates <sup>CB 7.11.13</sup> and <sup>CB 7.11.13</sup> for samples identified with "DUP" and "MS/MSD", respectively. Send aliquots of tissue selected for arsenic speciation to Brooks Rand Lab in Seattle, WA for analysis.

0.2, -1.8

# TestAmerica

BRL Report 1331032

## Chain of Custody Record

Temperature on Receipt \_\_\_\_\_

Drinking Water? Yes  No

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client <b>University of Hawaii</b>		Project Manager <b>Eric DeCarlo</b>		Date <b>7/11/13</b>	Chain of Custody Number <b>206826</b>
Address <b>1000 Pope Rd.</b>		Telephone Number (Area Code)/Fax Number <b>808-956-5924</b>		Lab Number	Page <b>5</b> of <b>5</b>
City <b>Honolulu</b>	State <b>HI</b>	Zip Code <b>96822</b>	Site Contact	Lab Contact <b>Robert Weidenfeld</b>	Analysis (Attach list if more space is needed)
Project Name and Location (State) <b>Ordnance Reef</b>			Carrier/Waybill Number		

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives						8330 Engrais	6020 Metals	Arsenic Speciation (Brooks Rand)	Special Instructions/ Conditions of Receipt	
			Air	Aqueous	Sed.	Soil	Tissue	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc					NaOH
✓ ORD4092 MS/MSD	6/7/13	1410					X	X							X	X	X	Samples sent from Test America to Brooks Rand for Arsenic Speciation
✓ ORD4102 PUP	6/7/13	1437					X	X							X	X	X	
✓ ORD4112	6/11/13	1045					X	X							X	X	X	

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal:  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required:  24 Hours  48 Hours  7 Days  14 Days  21 Days  Other **Standard TAT**

QC Requirements (Specify)

1. Relinquished By <b>Uniko Bagg</b>	Date <b>7/11/13</b>	Time <b>1330</b>	1. Received By <b>Kim Nelson</b>	Date <b>7-12-13</b>	Time <b>0905</b>
2. Relinquished By <i>[Signature]</i>	Date <b>7/29/13</b>	Time <b>1600</b>	2. Received By <b>Am... [Signature]</b>	Date <b>7/30/13</b>	Time <b>9:45</b>
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Please prepare duplicates and MS/MSDs for samples identified w/ 'PUP' and 'MS/MSD', respectively. Send aliquots of tissue selected for arsenic speciation 31 of 319 Brooks Rand Lab in Seattle, WA for analysis.

DISTRIBUTION: WHITE - Returned to Client with Report. CANARY - Stays with the Sample. PINK - Field Copy

*Appendix F*  
*Data Summary Tables*



TABLE F-1: ENERGETICS IN SEDIMENT

Sample ID No.	Location <sup>1</sup>	Date	Picric Acid	Nitroglycerin	PETN	2-Am-4,6-DNT	4-Am-2,6-DNT	1,3-DNB	2,4-DNT	2, 6-DNT	HMX	Nitrobenzene	2-NT	3-NT	4-NT	RDX	Tetryl	1,3,5-TNB	2,4,6-TNT	2,4-Dinitrophenol	Picramic Acid	3,5 Dinitroaniline	2-Nitrophenol	4-Nitrophenol
Units:			(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)
Analytical Method:			EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330
Range of Reporting Limits (RLs):			0.94-1.0	0.47-0.51	0.47-0.51	0.24-0.26	0.24-2.5	0.24-0.26	0.24-2.5	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.47-0.51	0.47-0.51	0.47-0.51	0.47-0.51
Screening Level <sup>2</sup> :			N/A	6.1	120	150	150	6.1	1.6	61	3800	4.8	2.9	6.1	30	5.6	240	2200	19	120	6.1	N/A	N/A	N/A
Eco Tox Number <sup>3</sup> :			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
ORD336S	DMM-67	7/16/2012	ND <sup>U</sup>	0.98	1.7	0.49	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.49
ORD337S	DMM-67	7/16/2012	ND <sup>U</sup>	0.97	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48
ORD338S	DMM-67	7/16/2012	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50
ORD339S	DMM-70	7/17/2012	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50
ORD340S	DMM-70	7/17/2012	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50
ORD401S <sup>5</sup>	DMM-73	6/3/2013	ND	0.99	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD402S <sup>6</sup>	DMM-73	6/3/2013	ND	0.97	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.48
ORD403S <sup>6</sup>	DMM-76	6/3/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD404S <sup>6*</sup>	DMM-76	6/3/2013	ND	0.97	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.48
ORD405S <sup>6</sup>	DMM-76	6/3/2013	ND	1.0	ND	0.51	ND <sup>**</sup>	0.51	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.51	ND	0.51
ORD406S <sup>6</sup>	DMM-79	6/3/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD407S <sup>6</sup>	DMM-82	6/3/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD408S <sup>6</sup>	DMM-82	6/3/2013	ND	0.99	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD409S <sup>6</sup>	DMM-82	6/3/2013	ND	0.95	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.48
ORD410S <sup>6</sup>	DMM-85	6/3/2013	ND	0.96	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.48
ORD411S <sup>6</sup>	DMM-73	6/3/2013	ND	0.97	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.48
ORD412S <sup>6*</sup>	DMM-73	6/3/2013	ND	0.97	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD413S <sup>6</sup>	DMM-76	6/3/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.49	ND	0.49
ORD414S <sup>6</sup>	DMM-79	6/3/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD415S <sup>6</sup>	DMM-85	6/3/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD416S <sup>6</sup>	DMM-85	6/3/2013	ND	0.97	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD417S <sup>6</sup>	DMM-91	6/7/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.49	ND	0.49
ORD418S <sup>6</sup>	DMM-91	6/7/2013	ND	1.0	ND	0.51	ND <sup>**</sup>	0.51	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.26	ND	0.51	ND	0.51
ORD419S <sup>6</sup>	CON-52	6/7/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD420S <sup>6</sup>	CON-53	6/7/2013	ND	0.97	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD421S <sup>6*</sup>	CON-53	6/7/2013	ND	0.99	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD422S <sup>6</sup>	CON-55	6/7/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD423S <sup>6</sup>	CON-56	6/7/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.49	ND	0.49
ORD424S <sup>6</sup>	CON-57	6/7/2013	ND	0.99	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50
ORD425S <sup>6</sup>	DMM-88	6/7/2013	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49	ND	0.49
ORD426S <sup>6</sup>	DMM-88	6/7/2013	ND	0.99	ND	0.49	ND <sup>**</sup>	0.49	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.49	ND	0.49
ORD427S <sup>6</sup>	DMM-88	6/7/2013	ND	1.0	ND	0.51	ND <sup>**</sup>	0.51	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.51	ND	0.51
ORD428S <sup>6</sup>	DMM-91	6/7/2013	ND	1.0	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50	ND	0.50

NOTES:

PETN = pentaerythritol tetranitrate; Am = amino; DNT = dinitrotoluene; DNB = dinitrobenzene; HMX = high melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); NT = nitrotoluene;

RDX = royal demolition explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine); Tetryl = methyl-2,4,6-trinitrophenylnitramine; TNB = trinitrobenzene; TNT = trinitrotoluene

<sup>1</sup>Sample locations were designated by the sample field identification (ID) number of the first sediment sample collected at a study site.

<sup>2</sup>Environmental Protection Agency (EPA) Regional Screening Level (RSL) Summary Table June 2011

<sup>3</sup>National Oceanic and Atmospheric Administration (NOAA's) Office of Response and Restoration (OR&R) Screening Quick Reference Tables (SQIRTS)

<sup>4</sup>Result with a dilution factor of 1.01

<sup>5</sup>Result with a dilution factor of 10.1

<sup>6</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

\* = duplicate sample (ORD202S is a duplicate of sample ORD201S, ORD218S is a duplicate sample of ORD217S, ORD224S is a duplicate sample of ORD223S, ORD231S is a duplicate sample of ORD230S although it was given a different field ID;

ORD307S is duplicate sample of ORD306S, ORD313S is duplicate sample of ORD312S, ORD317S is duplicate sample of ORD316S, ORD322S is duplicate sample of ORD319S, ORD329S is a duplicate sample of ORD328S;

ORD404S is a duplicate of ORD403S, ORD412S is a duplicate for ORD411S, and ORD421S is a duplicate of ORD420S although it was given a different field ID).

\*\* = Results indicated that laboratory control samples (LCS) or laboratory control sample duplicates (LCSD ) exceeded the control limits.

\ = Result was qualified by validator as "Do Not Use;" or the result was provided by the analytical laboratory as "ND" or "NR" (not reportable) and was deemed by the validator as not usable (R).

During the 2013 sampling event, sediment from the 3-foot distance at site DMM-79 (field ID DMM-80) was unable to be collected due to the lack of available sediment.

**bold** = result is above the project screening level or the Eco Tox Number

mg/kg-dry = milligrams per kilogram-dry weight

N/A = not applicable

ND = not detected at or above the method detection limit (MDL)

<sup>J</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.

<sup>R</sup> = Quality control indicates that the data is not usable

<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.

<sup>UJ</sup> = The analytical result is qualified as not detected, but the MDL is an estimated value.



TABLE F-2: ENERGETICS IN BIOTA

Sample ID No.	Sample Location	Date	Picric Acid		Nitroglycerin		PETN		2-Am-4,6-DNT		4-Am-2,6-DNT		1,3-DNB		2,4-DNT		2,6-DNT		HMX		Nitrobenzene		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT		2,4-Dinitrophenol		Picramic Acid		3,5-Dinitroaniline		2-Nitrophenol		4-Nitrophenol			
			Units:		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)		(mg/kg-wet)					
			Analytical Method:		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330		EPA 8330			
<b>Project Screening Level:</b>			N/A		N/A		N/A		N/A		N/A		0.0492		0.983		0.007		N/A		0.25		4.92		N/A		4.92		N/A		N/A		14.75		0.164		N/A		N/A		N/A		N/A					
<b>OCTOPUS (HE'E)</b>			<b>Range of Reporting Limits:</b>		0.92-1.0		0.92-1.0		0.92-1.0		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.23-0.26		0.46-0.51		0.46-0.51		0.46-0.51		0.46-0.51					
			<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>						
ORD4010 <sup>2</sup>	DMM-73	3-Jun-13	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25				
<b>FISH (WEKE)</b>			<b>Range of Reporting Limits:</b>		0.93-1.0		0.93-1.0		0.93-1.0		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.23-0.25		0.47-0.51		0.23-0.25		0.23-0.25		0.47-0.51		0.47-0.51		0.47-0.51		0.23-0.25		0.23-0.25	
ORD401F <sup>2</sup>	CON	11-Jun-13	ND	0.96	ND	0.96	ND	0.96	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48	ND	0.24	ND	0.24	ND	0.48	ND	0.48	ND	0.24	ND	0.24		
<b>SEAWEED (LIMU)</b>			<b>Range of Reporting Limits:</b>		1.9-2.0		1.9-2.0		N/A		N/A		0.93-1.0		0.93-1.0		N/A		N/A		0.93-1.0		0.93-1.0		0.93-1.0		0.93-1.0		0.93-1.0		0.93-1.0		0.93-1.0		N/A		N/A		0.93-1.0		0.93-1.0		0.93-1.0					
			<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>	<i>Result</i>	<i>RL</i>						
ORD401L <sup>2</sup>	DMM-73	3-Jun-13	ND	2.0	ND	2.0	--	--	--	ND	0.99	ND	0.99	--	--	--	ND	0.99	ND	0.99	ND	0.99	--	--	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99	ND	0.99				

**NOTES:**  
 PETN = pentaerythritol tetranitrate; Am = amino; DNT = dinitrotoluene; DNB = dinitrobenzene; HMX = high melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); NT = nitrotoluene; RDX = royal demolition explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine); Tetryl = methyl-2,4,6-trinitrophenylamine; TNB = trinitrobenzene; TNT = trinitrotoluene  
 -- = not analyzed  
 mg/kg-wet = milligrams per kilogram-wet weight  
 DUP = duplicate sample  
 N/A = not applicable  
 ND = not detected at or above the method detection limit (MDL)  
 RL = reporting limit  
 \* = According to the case narrative (320-3338-1), for the 2013 limu samples, the 2,4-dinitrophenol results could not be reported by the laboratory due to there being no reportable recoveries in either the laboratory control sample or the matrix spikes. The loss of this analyte is most likely due to the special cleanup procedures utilized in the processing of the limu extracts.  
<sup>1</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.  
<sup>2</sup>Refer to Ordinance Reef (HI-06) Follow-Up Investigation Final Sample Analysis Plan for project screening levels.  
<sup>3</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.  
<sup>4</sup> = Result was qualified by validator as "Do Not Use;" or the result was provided by the analytical laboratory as "ND" or "NR" (not reportable) and was deemed by the validator as not usable (B).  
<sup>R</sup> = Quality control indicates that data is not usable  
<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.  
 Biota sample identification (ID) numbers are not always consecutive due to the archiving of extra samples.



TABLE F-3: ELEMENTS IN SEDIMENT

Sample ID No.	Sample Location <sup>1</sup>	Date	Antimony		Arsenic		Barium		Cadmium		Chromium		Cobalt		Copper		Lead		Nickel		Selenium		Strontium		Thallium		Uranium		Vanadium		Zinc	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
<b>Units:</b>			(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)	
<b>Analytical Method:</b>			EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020	
<b>Range of Reporting Limits (RLs):</b>			0.15-6.8		0.16-6.8		0.076-3.4		0.076-3.4		0.15-6.8		0.076-3.4		0.15-6.8		0.073-3.4		0.15-7.2		0.15-6.8		1.8-16.9		0.073-3.4		0.073-3.4		0.076-33.8		0.76-33.8	
<b>Project Screening Level<sup>2</sup>:</b>			N/A		7.24		N/A		N/A		N/A		N/A		18.7		30.2		N/A		N/A		N/A		N/A		N/A		N/A		124	
ORD201S	DMM-31	8/6/2011	ND <sup>U</sup>	1.3	1.9	1.3	3.9	0.64	ND <sup>U</sup>	0.64	8.2	1.3	0.58 <sup>J</sup>	0.64	8.5 <sup>J</sup>	1.3	3.1	0.64	ND <sup>U</sup>	6.4	0.87 <sup>J</sup>	1.3	2790	3.2	ND <sup>U</sup>	0.64	0.61 <sup>J</sup>	0.64	3.2 <sup>J</sup>	6.4	18.6 <sup>J</sup>	6.4
ORD202S*	DMM-31	8/6/2011	ND <sup>U</sup>	1.3	1.8	1.3	3.8	0.64	ND <sup>U</sup>	0.64	10.8	1.3	0.61 <sup>J</sup>	0.64	8.3 <sup>J</sup>	1.3	2.2	0.64	ND <sup>U</sup>	6.4	1.0 <sup>J</sup>	1.3	2820	3.2	ND <sup>U</sup>	0.64	0.58 <sup>J</sup>	0.64	4.8 <sup>J</sup>	6.4	14.1 <sup>J</sup>	6.4
ORD203S	DMM-34	8/6/2011	ND <sup>U</sup>	1.3	2.8	1.3	4.3	0.66	ND <sup>U</sup>	0.66	11.8	1.3	0.72	0.66	12.4 <sup>J</sup>	1.3	2.5	0.66	ND <sup>U</sup>	6.6	1.0 <sup>J</sup>	1.3	3430	3.3	ND <sup>U</sup>	0.66	0.73	0.66	6.6	6.6	37.7 <sup>J</sup>	6.6
ORD204S	DMM-37	8/6/2011	ND <sup>U</sup>	1.4	2.5	1.4	4.3	0.68	ND <sup>U</sup>	0.68	10.4	1.4	0.74	0.68	9.1 <sup>J</sup>	1.4	5.3	0.68	ND <sup>U</sup>	1.4	1.7	1.4	3150	3.4	ND <sup>U</sup>	0.68	0.71	0.68	5.3 <sup>J</sup>	6.8	20.5 <sup>J</sup>	6.8
ORD205S	DMM-37	8/6/2011	ND <sup>U</sup>	1.4	2.1	1.4	4.2	0.69	ND <sup>U</sup>	0.69	10.0	1.4	0.60 <sup>J</sup>	0.69	9.0 <sup>J</sup>	1.4	11.2	0.69	ND <sup>U</sup>	5.5	1.1 <sup>J</sup>	1.4	2990	3.4	ND <sup>U</sup>	0.69	0.60 <sup>J</sup>	0.69	4.4 <sup>J</sup>	6.9	26.1 <sup>J</sup>	6.9
ORD206S	DMM-37	8/6/2011	ND <sup>U</sup>	1.4	1.3 <sup>J</sup>	1.4	4.2	0.69	ND <sup>U</sup>	0.69	10.1	1.4	0.65 <sup>J</sup>	0.69	8.6 <sup>J</sup>	1.4	2.8	0.69	ND <sup>U</sup>	1.4	1.7	1.4	3100	3.5	ND <sup>U</sup>	0.69	0.60 <sup>J</sup>	0.69	4.3 <sup>J</sup>	6.9	24.2 <sup>J</sup>	6.9
ORD207S	DMM-40	8/6/2011	ND <sup>U</sup>	1.4	ND <sup>U</sup>	1.4	3.7	0.72	ND <sup>U</sup>	0.72	7.2	1.4	0.50 <sup>J</sup>	0.72	80.0 <sup>J</sup>	1.4	11.3	0.72	ND <sup>U</sup>	7.2	1.9	1.4	2760	3.6	ND <sup>U</sup>	0.72	0.48 <sup>J</sup>	0.72	3.1 <sup>J</sup>	7.2	70.5 <sup>J</sup>	7.2
ORD208S	DMM-40	8/6/2011	ND <sup>U</sup>	1.5	2.7	1.5	3.9	0.74	ND <sup>U</sup>	0.74	9.9	1.5	0.57 <sup>J</sup>	0.74	77.3 <sup>J</sup>	1.5	8.7	0.74	ND <sup>U</sup>	5.9	2.4	1.5	2930	3.7	ND <sup>U</sup>	0.74	0.58 <sup>J</sup>	0.74	5.3 <sup>J</sup>	7.4	88.7 <sup>J</sup>	7.4
ORD209S	DMM-40	8/6/2011	ND <sup>U</sup>	1.5	2.1	1.5	3.9	0.76	ND <sup>U</sup>	0.76	10.3	1.5	0.63 <sup>J</sup>	0.76	48.9 <sup>J</sup>	1.5	7.8	0.76	ND <sup>U</sup>	6.1	2.2	1.5	3100	3.8	ND <sup>U</sup>	0.76	0.57 <sup>J</sup>	0.76	5.2 <sup>J</sup>	7.6	47.6 <sup>J</sup>	7.6
ORD210S	DMM-43	8/6/2011	ND <sup>U</sup>	1.3	1.8	1.3	3.8	0.66	ND <sup>U</sup>	0.66	8.9	1.3	0.58 <sup>J</sup>	0.66	16.2 <sup>J</sup>	1.3	3.4	0.66	ND <sup>U</sup>	6.6	0.74 <sup>J</sup>	1.3	2880	3.3	ND <sup>U</sup>	0.66	0.63 <sup>J</sup>	0.66	3.4 <sup>J</sup>	6.6	24.5 <sup>J</sup>	6.6
ORD211S	DMM-46	8/6/2011	ND <sup>U</sup>	1.4	ND <sup>U</sup>	1.4	3.6	0.68	ND <sup>U</sup>	0.68	8.6 <sup>J</sup>	1.4	0.61 <sup>J</sup>	0.68	2.1 <sup>J</sup>	1.4	1.8	0.68	ND <sup>U</sup>	6.8	1.7	1.4	2980	3.4	ND <sup>U</sup>	0.68	0.58 <sup>J</sup>	0.68	4.4 <sup>J</sup>	6.8	4.7 <sup>J</sup>	6.8
ORD212S	DMM-46	8/6/2011	ND <sup>U</sup>	1.5	ND <sup>U</sup>	1.5	4.4	0.76	ND <sup>U</sup>	0.76	10.1	1.5	0.65 <sup>J</sup>	0.76	3.6 <sup>J</sup>	1.5	3.1	0.76	ND <sup>U</sup>	1.5	1.4 <sup>J</sup>	1.5	3070	3.8	ND <sup>U</sup>	0.76	0.58 <sup>J</sup>	0.76	6.8 <sup>J</sup>	7.6	7.5 <sup>J</sup>	7.6
ORD213S	DMM-46	8/6/2011	ND <sup>U</sup>	1.5	ND <sup>U</sup>	1.5	4.3	0.73	ND <sup>U</sup>	0.73	8.3	1.5	0.62 <sup>J</sup>	0.73	1.9 <sup>J</sup>	1.5	2.1	0.73	ND <sup>U</sup>	1.5	0.76 <sup>J</sup>	1.5	2770	3.6	ND <sup>U</sup>	0.73	0.45 <sup>J</sup>	0.73	5.7 <sup>J</sup>	7.3	5.0 <sup>J</sup>	7.3
ORD214S	DMM-49	8/6/2011	ND <sup>U</sup>	1.4	2.0	1.4	3.6	0.68	ND <sup>U</sup>	0.68	10.2	1.4	0.62 <sup>J</sup>	0.68	590 <sup>J</sup>	1.4	7.7	0.68	ND <sup>U</sup>	1.4	1.2 <sup>J</sup>	1.4	2470	3.4	ND <sup>U</sup>	0.68	0.53 <sup>J</sup>	0.68	5.9 <sup>J</sup>	6.8	188 <sup>J</sup>	6.8
ORD215S	DMM-49	8/6/2011	ND <sup>U</sup>	1.3	1.2 <sup>J</sup>	1.3	3.5	0.63	ND <sup>U</sup>	0.63	9.1	1.3	0.56 <sup>J</sup>	0.63	123 <sup>J</sup>	1.3	7.1	0.63	ND <sup>U</sup>	6.3	1.4	1.3	2380	3.1	ND <sup>U</sup>	0.63	0.43 <sup>J</sup>	0.63	4.2 <sup>J</sup>	6.3	124 <sup>J</sup>	6.3
ORD216S	DMM-49	8/6/2011	ND <sup>U</sup>	1.3	3.0	1.3	3.6	0.67	ND <sup>U</sup>	0.67	11.4	1.3	0.71	0.67	4100 <sup>J</sup>	1.3	32.7	0.67	ND <sup>U</sup>	1.3	0.95 <sup>J</sup>	1.3	2520	3.3	ND <sup>U</sup>	0.67	0.55 <sup>J</sup>	0.67	7.2	6.7	676 <sup>J</sup>	6.7
ORD217S	WWT-31	8/6/2011	ND <sup>U</sup>	1.3	1.9	1.3	4.6	0.67	ND <sup>U</sup>	0.67	23.6	1.3	3.3	0.67	10.7 <sup>J</sup>	1.3	1.4	0.67	20.1	1.3	1.0 <sup>J</sup>	1.3	3070	3.4	ND <sup>U</sup>	0.67	0.83	0.67	13.0	6.7	7.6 <sup>J</sup>	6.7
ORD218S*	WWT-31	8/6/2011	ND <sup>U</sup>	1.3	3.0	1.3	4.6	0.66	ND <sup>U</sup>	0.66	21.1	1.3	2.3	0.66	5.0 <sup>J</sup>	1.3	1.9	0.66	9.0	1.3	1.1 <sup>J</sup>	1.3	3310	3.3	ND <sup>U</sup>	0.66	0.92	0.66	12.0	6.6	7.2 <sup>J</sup>	6.6
ORD219S	WWT-32	8/6/2011	ND <sup>U</sup>	1.4	1.8	1.4	3.7	0.70	ND <sup>U</sup>	0.70	8.8	1.4	1.0	0.70	1.8 <sup>J</sup>	1.4	1.5	0.70	1.6	1.4	1.9	1.4	3190	3.5	ND <sup>U</sup>	0.70	0.70	0.70	6.8 <sup>J</sup>	7.0	ND <sup>U</sup>	7.0
ORD220S	WWT-33	8/6/2011	ND <sup>U</sup>	1.4	1.3 <sup>J</sup>	1.4	6.9	0.68	ND <sup>U</sup>	0.68	12.1	1.4	1.8	0.68	3.2 <sup>J</sup>	1.4	1.1	0.68	4.5	1.4	1.3 <sup>J</sup>	1.4	4440	3.4	ND <sup>U</sup>	0.68	1.1	0.68	8.0	6.8	4.7 <sup>J</sup>	6.8
ORD221S	WWT-34	8/6/2011	ND <sup>U</sup>	1.3	ND <sup>U</sup>	1.3	4.9	0.65	ND <sup>U</sup>	0.65	12.5 <sup>J</sup>	1.3	1.6	0.65	4.3 <sup>J</sup>	1.3	1.3 <sup>J</sup>	0.65	7.4 <sup>J</sup>	1.3	0.77 <sup>J</sup>	1.3	3970	3.3	ND <sup>U</sup>	0.65	0.92 <sup>J</sup>	0.65	9.3 <sup>J</sup>	6.5	4.5 <sup>J</sup>	6.5
ORD222S	CON-42	8/6/2011	ND <sup>U</sup>	1.5	ND <sup>U</sup>	1.5	4.5	0.75	ND <sup>U</sup>	0.75	8.8 <sup>J</sup>	1.5	1.4	0.75	1.8 <sup>J</sup>	1.5	1.6 <sup>J</sup>	0.75	2.9 <sup>J</sup>	1.5	0.88 <sup>J</sup>	1.5	3030	3.7	ND <sup>U</sup>	0.75	0.47 <sup>J</sup>	0.75	9.2 <sup>J</sup>	7.5	4.9 <sup>J</sup>	7.5
ORD223S	CON-43	8/6/2011	ND <sup>U</sup>	1.4	17.8	1.4	6.5	0.71	ND <sup>U</sup>	0.71	30.3 <sup>J</sup>	1.4	6.6	0.71	7.4 <sup>J</sup>	1.4	4.6 <sup>J</sup>	0.71	30.8 <sup>J</sup>	1.4	1.7	1.4	3470	3.6	ND <sup>U</sup>	0.71	0.80 <sup>J</sup>	0.71	41.5 <sup>J</sup>	7.1	15.4 <sup>J</sup>	7.1
ORD224S*	CON-43	8/6/2011	ND <sup>U</sup>	1.5	17.0	1.5	6.7	0.75	ND <sup>U</sup>	0.75	32.4 <sup>J</sup>	1.5	6.6	0.75	7.2 <sup>J</sup>	1.5	4.8 <sup>J</sup>	0.75	32.2 <sup>J</sup>	1.5	1.8	1.5	3290	3.7	ND <sup>U</sup>	0.75	0.79 <sup>J</sup>	0.75	40.3 <sup>J</sup>	7.5	16.2 <sup>J</sup>	7.5
ORD225S	CON-44	8/6/2011	ND <sup>U</sup>	1.4	5.7	1.4	5.1	0.69	ND <sup>U</sup>	0.69	18.8 <sup>J</sup>	1.4	3.7	0.69	4.1 <sup>J</sup>	1.4	2.8 <sup>J</sup>	0.69	18.4 <sup>J</sup>	1.4	0.91 <sup>J</sup>	1.4	3560	3.4	ND <sup>U</sup>	0.69	0.66 <sup>J</sup>	0.69	21.3 <sup>J</sup>	6.9	8.8 <sup>J</sup>	6.9
ORD226S	CON-45	8/6/2011	ND <sup>U</sup>	1.4	10.6	1.4	4.4	0.72	ND <sup>U</sup>	0.72	15.1 <sup>J</sup>	1.4	3.4	0.72	2.8 <sup>J</sup>	1.4	2.5 <sup>J</sup>	0.72	15.7 <sup>J</sup>	1.4	0.95 <sup>J</sup>	1.4	3060	3.6	ND <sup>U</sup>	0.72	0.59 <sup>J</sup>	0.72	21.9 <sup>J</sup>	7.2	7.8 <sup>J</sup>	7.2
ORD227S	NPS-40	8/7/2011	ND <sup>U</sup>	1.4	1.2 <sup>J</sup>	1.4	4.3	0.69	ND <sup>U</sup>	0.69	10.3 <sup>J</sup>	1.4	0.79	0.69	1.0 <sup>J</sup>	1.4	1.4 <sup>J</sup>	0.69	ND <sup>U</sup>	6.9	1.0 <sup>J</sup>	1.4	3280	3.5	ND <sup>U</sup>	0.69	0.88 <sup>J</sup>	0.69	6.5 <sup>J</sup>	6.9	ND <sup>U</sup>	6.9
ORD228S	NPS-41	8/7/2011	ND <sup>U</sup>	1.4	1.5	1.4	4.4	0.70	ND <sup>U</sup>	0.70	10.4 <sup>J</sup>	1.4	0.74	0.70	0.86 <sup>J</sup>	1.4	1.2 <sup>J</sup>	0.70	ND <sup>U</sup>	7.0	1.1 <sup>J</sup>	1.4	3420	3.5	ND <sup>U</sup>	0.70	0.95 <sup>J</sup>	0.70	5.8 <sup>J</sup>	7.0	ND <sup>U</sup>	7.0
ORD229S	NPS-42	8/7/2011	ND <sup>U</sup>	1.4	5.6	1.4	4.7	0.72	ND <sup>U</sup>	0.72	13.3 <sup>J</sup>	1.4	1.0	0.72	1.2 <sup>J</sup>	1.4	2.3 <sup>J</sup>	0.72	ND <sup>U</sup>	1.4	1.5	1.4	3450	3.6	ND <sup>U</sup>	0.72	0.89 <sup>J</sup>	0.72	9.3 <sup>J</sup>	7.2	5.8 <sup>J</sup>	7.2
ORD230S	NPS-43	8/7/2011	ND <sup>U</sup>	1.4	3.6	1.4	5.1	0.72	ND <sup>U</sup>	0.72	13.0 <sup>J</sup>	1.4	1.4	0.72	1.5 <sup>J</sup>	1.4	3.2 <sup>J</sup>	0.72	ND <sup>U</sup>	1.4	1.0											

TABLE F-3: ELEMENTS IN SEDIMENT

Sample ID No.	Sample Location <sup>1</sup>	Date	Antimony		Arsenic		Barium		Cadmium		Chromium		Cobalt		Copper		Lead		Nickel		Selenium		Strontium		Thallium		Uranium		Vanadium		Zinc	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
<b>Units:</b>			(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)	
<b>Analytical Method:</b>			EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020	
<b>Range of Reporting Limits (RLs):</b>			0.15-6.8		0.16-6.8		0.076-3.4		0.076-3.4		0.15-6.8		0.076-3.4		0.15-6.8		0.073-3.4		0.15-7.2		0.15-6.8		1.8-16.9		0.073-3.4		0.073-3.4		0.076-33.8		0.76-33.8	
<b>Project Screening Level<sup>2</sup>:</b>			N/A		7.24		N/A		N/A		N/A		N/A		18.7		30.2		N/A		N/A		N/A		N/A		N/A		N/A		124	
ORD312S-2 <sup>3</sup>	NPS-49	7/18/2012	ND <sup>H</sup>	1.0	3.1 <sup>H</sup>	1.0	3.9 <sup>H</sup>	0.50	ND <sup>H</sup>	0.50	8.1 <sup>H</sup>	1.0	1.1 <sup>H</sup>	0.50	3.5 <sup>H</sup>	1.0	2.9 <sup>H</sup>	0.50	ND <sup>H</sup>	1.0	1.2 <sup>H</sup>	1.0	2000 <sup>H</sup>	2.5	ND <sup>H</sup>	0.50	0.93 <sup>H</sup>	0.50	5.6 <sup>H</sup>	5.0	11 <sup>H</sup>	5.0
ORD313S*	NPS-49	7/18/2012	ND <sup>U</sup>	6.0	ND <sup>U</sup>	6.0	3.7	3.0	ND <sup>U</sup>	3.0	7.6	6.0	1.5 <sup>J</sup>	3.0	3.5 <sup>J</sup>	6.0	2.1 <sup>J</sup>	3.0	6.8 <sup>J</sup>	6.0	ND <sup>U</sup>	6.0	2510	15.0	ND <sup>U</sup>	3.0	0.97 <sup>J</sup>	3.0	ND <sup>U</sup>	29.9	ND <sup>UJ</sup>	29.9
ORD313S-2 <sup>3</sup>	NPS-49	7/18/2012	ND <sup>H</sup>	1.0	3.2 <sup>H</sup>	1.0	4.0 <sup>H</sup>	0.51	ND <sup>H</sup>	0.51	9.9 <sup>H</sup>	1.0	1.3 <sup>H</sup>	0.51	3.8 <sup>H</sup>	1.0	2.3 <sup>H</sup>	0.51	2.4 <sup>H</sup>	1.0	1.3 <sup>H</sup>	1.0	2000 <sup>H</sup>	2.6	ND <sup>H</sup>	0.51	0.94 <sup>H</sup>	0.51	6.3 <sup>H</sup>	5.1	12 <sup>H</sup>	5.1
ORD314S	NPS-51	7/18/2012	ND <sup>U</sup>	5.5	8.1 <sup>J</sup>	5.5	4.8	2.7	ND <sup>U</sup>	2.7	11.0	5.5	1.4 <sup>J</sup>	2.7	ND <sup>UJ</sup>	5.5	3.0	2.7	9.6 <sup>J</sup>	5.5	ND <sup>U</sup>	5.5	3100	13.6	ND <sup>U</sup>	2.7	1.4 <sup>J</sup>	2.7	ND <sup>U</sup>	27.3	ND <sup>UJ</sup>	27.3
ORD314S-2 <sup>3</sup>	NPS-51	7/18/2012	ND <sup>H</sup>	0.98	6.2 <sup>H</sup>	0.98	4.8 <sup>H</sup>	0.49	ND <sup>H</sup>	0.49	12 <sup>H</sup>	0.98	1.2 <sup>H</sup>	0.49	1.3 <sup>H</sup>	0.98	2.9 <sup>H</sup>	0.49	ND <sup>H</sup>	0.98	ND <sup>H</sup>	0.98	2800 <sup>H</sup>	2.5	ND <sup>H</sup>	0.49	1.5 <sup>H</sup>	0.49	9.2 <sup>H</sup>	4.9	3.9 <sup>HJ</sup>	4.9
ORD315S	WWT-35	7/17/2012	ND <sup>U</sup>	6.2	ND <sup>U</sup>	6.2	5.6	3.1	ND <sup>U</sup>	3.1	17.5	6.2	4.0	3.1	11.5 <sup>J</sup>	6.2	2.0 <sup>J</sup>	3.1	32.9 <sup>J</sup>	6.2	ND <sup>U</sup>	6.2	2960	15.5	ND <sup>U</sup>	3.1	1.5 <sup>J</sup>	3.1	13.7 <sup>J</sup>	31.0	ND <sup>UJ</sup>	31.0
ORD315S-2 <sup>3</sup>	WWT-35	7/17/2012	ND <sup>H</sup>	0.96	2.6 <sup>H</sup>	0.96	6.3 <sup>H</sup>	0.48	ND <sup>H</sup>	0.48	23 <sup>H</sup>	0.96	4.2 <sup>H</sup>	0.48	12 <sup>H</sup>	0.96	2.2 <sup>H</sup>	0.48	30 <sup>H</sup>	0.96	ND <sup>H</sup>	0.96	3200 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	1.8 <sup>H</sup>	0.48	14 <sup>H</sup>	4.8	10 <sup>H</sup>	4.8
ORD316S	WWT-37	7/17/2012	ND <sup>U</sup>	5.7	4.9 <sup>J</sup>	5.7	5.3	2.9	ND <sup>U</sup>	2.9	15.9	5.7	3.7	2.9	7.1 <sup>J</sup>	5.7	4.5	2.9	24.4 <sup>J</sup>	5.7	ND <sup>U</sup>	5.7	2590	14.4	ND <sup>U</sup>	2.9	1.2 <sup>J</sup>	2.9	19.2 <sup>J</sup>	28.7	ND <sup>UJ</sup>	28.7
ORD316S-2 <sup>3</sup>	WWT-37	7/17/2012	ND <sup>H</sup>	0.95	4.5 <sup>H</sup>	0.95	5.2 <sup>H</sup>	0.48	ND <sup>H</sup>	0.48	18 <sup>H</sup>	0.95	3.4 <sup>H</sup>	0.48	7.8 <sup>H</sup>	0.95	3.2 <sup>H</sup>	0.48	19 <sup>H</sup>	0.95	ND <sup>H</sup>	0.95	2500 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	1.2 <sup>H</sup>	0.48	13 <sup>H</sup>	4.8	8.7 <sup>H</sup>	4.8
ORD317S*	WWT-37	7/17/2012	ND <sup>U</sup>	5.8	4.5 <sup>J</sup>	5.8	5.1	2.9	ND <sup>U</sup>	2.9	14.8	5.8	3.6	2.9	6.8 <sup>J</sup>	5.8	5.0	2.9	22.5 <sup>J</sup>	5.8	ND <sup>U4</sup>	5.8	2540	14.5	ND <sup>U</sup>	2.9	1.1 <sup>J</sup>	2.9	16.4 <sup>J</sup>	29.0	ND <sup>UJ</sup>	29.0
ORD317S-2 <sup>3</sup>	WWT-37	7/17/2012	ND <sup>H</sup>	0.96	3.8 <sup>H</sup>	0.96	5.7 <sup>H</sup>	0.48	0.25 <sup>HJ</sup>	0.48	18 <sup>H</sup>	0.96	3.6 <sup>H</sup>	0.48	4.9 <sup>H</sup>	0.96	4.4 <sup>H</sup>	0.48	14 <sup>H</sup>	0.96	0.51 <sup>HJ</sup>	0.96	2600 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	1.3 <sup>H</sup>	0.48	22 <sup>H</sup>	4.8	11 <sup>H</sup>	4.8
ORD318S	WWT-38	7/17/2012	ND <sup>U</sup>	5.6	4.5 <sup>J</sup>	5.6	4.6	2.8	ND <sup>U</sup>	2.8	17.0	5.6	3.2	2.8	8.0 <sup>J</sup>	5.6	1.9 <sup>J</sup>	2.8	20.8 <sup>J</sup>	5.6	ND <sup>U</sup>	5.6	2590	14.0	ND <sup>U</sup>	2.8	1.3 <sup>J</sup>	2.8	14.9 <sup>J</sup>	27.9	ND <sup>UJ</sup>	27.9
ORD318S-2 <sup>3</sup>	WWT-38	7/17/2012	ND <sup>H</sup>	0.98	3.8 <sup>H</sup>	0.98	4.8 <sup>H</sup>	0.49	ND <sup>H</sup>	0.49	21 <sup>H</sup>	0.98	3.1 <sup>H</sup>	0.49	8.0 <sup>H</sup>	0.98	5.6 <sup>H</sup>	0.49	18 <sup>H</sup>	0.98	0.69 <sup>HJ</sup>	0.98	2500 <sup>H</sup>	2.5	ND <sup>H</sup>	0.49	1.4 <sup>H</sup>	0.49	14 <sup>H</sup>	4.9	84 <sup>H</sup>	4.9
ORD319S	DMM-52	7/16/2012	ND <sup>U</sup>	6.0	ND <sup>U</sup>	6.0	3.5	3.0	ND <sup>U</sup>	3.0	9.0	6.0	1.1 <sup>J</sup>	3.0	7.0 <sup>J</sup>	6.0	4.0	3.0	4.6 <sup>J</sup>	6.0	ND <sup>U</sup>	6.0	2080	15.0	ND <sup>U</sup>	3.0	0.76 <sup>J</sup>	3.0	ND <sup>U</sup>	30.0	ND <sup>UJ</sup>	30.0
ORD319S-2 <sup>3</sup>	DMM-52	7/16/2012	ND <sup>H</sup>	0.95	1.1 <sup>H</sup>	0.95	3.9 <sup>H</sup>	0.48	ND <sup>H</sup>	0.48	9.1 <sup>H</sup>	0.95	0.67 <sup>H</sup>	0.48	5.5 <sup>H</sup>	0.95	4.8 <sup>H</sup>	0.48	1.3 <sup>H</sup>	0.95	1.3 <sup>H</sup>	0.95	2300 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	0.93 <sup>H</sup>	0.48	4.2 <sup>HJ</sup>	4.8	11 <sup>H</sup>	4.8
ORD320S	DMM-52	7/16/2012	ND <sup>U</sup>	5.6	ND <sup>U</sup>	5.6	3.6	2.8	ND <sup>U</sup>	2.8	9.6	5.6	1.2 <sup>J</sup>	2.8	16.7 <sup>J</sup>	5.6	3.9	2.8	5.5 <sup>J</sup>	5.6	ND <sup>U</sup>	5.6	2090	14.0	ND <sup>U</sup>	2.8	0.83 <sup>J</sup>	2.8	ND <sup>U</sup>	28.1	19.9 <sup>J</sup>	28.1
ORD320S-2 <sup>3</sup>	DMM-52	7/16/2012	ND <sup>H</sup>	1.0	2.6 <sup>H</sup>	1.0	3.7 <sup>H</sup>	0.50	ND <sup>H</sup>	0.50	10 <sup>H</sup>	1.0	1.3 <sup>H</sup>	0.50	16 <sup>H</sup>	1.0	2.7 <sup>H</sup>	0.50	1.5 <sup>H</sup>	1.0	ND <sup>H</sup>	1.0	2100 <sup>H</sup>	2.5	ND <sup>H</sup>	0.50	0.92 <sup>H</sup>	0.50	5.8 <sup>H</sup>	5.0	18 <sup>H</sup>	5.0
ORD321S	DMM-52	7/16/2012	ND <sup>U</sup>	5.7	ND <sup>U</sup>	5.7	3.6	2.8	ND <sup>U</sup>	2.8	9.8	5.7	1.1 <sup>J</sup>	2.8	7.0 <sup>J</sup>	5.7	6.8	2.8	6.5 <sup>J</sup>	5.7	ND <sup>U</sup>	5.7	2060	14.2	ND <sup>U</sup>	2.8	0.84 <sup>J</sup>	2.8	ND <sup>U</sup>	28.5	17.9 <sup>J</sup>	28.5
ORD321S-2 <sup>3</sup>	DMM-52	7/16/2012	ND <sup>H</sup>	1.0	3.2 <sup>H</sup>	1.0	3.7 <sup>H</sup>	0.51	ND <sup>H</sup>	0.51	12 <sup>H</sup>	1.0	0.79 <sup>H</sup>	0.51	9.4 <sup>H</sup>	1.0	5.5 <sup>H</sup>	0.51	2.3 <sup>H</sup>	1.0	0.62 <sup>HJ</sup>	1.0	2100 <sup>H</sup>	2.5	ND <sup>H</sup>	0.51	0.91 <sup>H</sup>	0.51	6.9 <sup>H</sup>	5.1	12 <sup>H</sup>	5.1
ORD322S*	DMM-52	7/16/2012	ND <sup>U</sup>	6.2	ND <sup>U</sup>	6.2	3.8	3.1	ND <sup>U</sup>	3.1	10	6.2	1.1 <sup>J</sup>	3.1	7.0 <sup>J</sup>	6.2	5.1	3.1	7.5 <sup>J</sup>	6.2	ND <sup>U</sup>	6.2	2120	15.4	ND <sup>U</sup>	3.1	0.79 <sup>J</sup>	3.1	ND <sup>U</sup>	30.8	ND <sup>UJ</sup>	30.8
ORD322S-2 <sup>3</sup>	DMM-52	7/16/2012	ND <sup>H</sup>	1.0	1.4 <sup>H</sup>	1.0	3.6 <sup>H</sup>	0.52	ND <sup>H</sup>	0.52	9.6 <sup>H</sup>	1.0	0.69 <sup>H</sup>	0.52	5.9 <sup>H</sup>	1.0	4.8 <sup>H</sup>	0.52	1.4 <sup>H</sup>	1.0	0.67 <sup>HJ</sup>	1.0	2200 <sup>H</sup>	2.6	ND <sup>H</sup>	0.52	0.95 <sup>H</sup>	0.52	4.7 <sup>HJ</sup>	5.2	10 <sup>H</sup>	5.2
ORD323S	DMM-55	7/16/2012	ND <sup>U</sup>	5.6	ND <sup>U</sup>	5.6	3.8	2.8	ND <sup>U</sup>	2.8	7.1	5.6	1.1 <sup>J</sup>	2.8	192	5.6	12.7	2.8	7.2	5.6	ND <sup>U</sup>	5.6	2430	13.9	ND <sup>U</sup>	2.8	0.85 <sup>J</sup>	2.8	ND <sup>U</sup>	27.9	105	27.9
ORD323S <sup>3</sup>	DMM-55	7/16/2012	ND	0.73	1.6	0.73	3.6	0.37	ND	0.37	8.5	0.73	1.3	0.37	180	0.73	10	0.37	7.9	0.73	ND	0.73	2500	1.8	ND	0.37	0.77	0.37	5.1	3.7	100	3.7
ORD324S	DMM-55	7/16/2012	ND <sup>U</sup>	5.7	ND <sup>U</sup>	5.7	3.6	2.9	ND <sup>U</sup>	2.9	7.5	5.7	1.1 <sup>J</sup>	2.9	190	5.7	8.3	2.9	6.9	5.7	ND <sup>U</sup>	5.7	2480	14.3	ND <sup>U</sup>	2.9	0.81 <sup>J</sup>	2.9	ND <sup>U</sup>	28.6	78.7	28.6
ORD324S <sup>3</sup>	DMM-55	7/16/2012	ND	0.74	1.8	0.74	3.5	0.37	ND	0.37	8.1	0.74	1.3	0.37	190	0.74	7.0	0.37	7.9	0.74	0.65 <sup>J</sup>	0.74	2600	1.8	ND	0.37	0.81	0.37	5.5	3.7	75	3.7
ORD325S	DMM-55	7/16/2012	ND <sup>U</sup>	5.5	ND <sup>U</sup>	5.5	4.0	2.7	ND <sup>U</sup>	2.7	9.8	5.5	1.2 <sup>J</sup>	2.7	1490	5.5	7.1	2.7	8.4	5.5	ND <sup>U</sup>	5.5	2640	13.7	ND <sup>U</sup>	2.7	0.90 <sup>J</sup>	2.7	ND <sup>U</sup>	27.4	431	27.4
ORD325S <sup>3</sup>	DMM-55	7/16/2012	ND	0.99	1.5	0.99	3.8	0.49	ND	0.49	9.7	0.99	1.4	0.49	1500	0.99	5.9	0.49	8.9	0.99	0.73 <sup>J</sup>	0.99	2700	2.5	ND	0.49	0.90	0.49	5.9	4.9	400	4.9
ORD326S	DMM-58	7/16/2012	ND <sup>U</sup>	5.3	ND <sup>U</sup>	5.3	3.9	2.7	ND <sup>U</sup>	2.7	11.9	5.3	1.3 <sup>J</sup>	2.7	12.3	5.3	6.0	2.7	8.0	5.3	ND <sup>U</sup>	5.3	2480	13.3	ND <sup>U</sup>	2.7	0.85 <sup>J</sup>	2.7	ND <sup>U</sup>	26.6	53.6	26.6
ORD326S <sup>3</sup>	DMM-58	7/16/2012	ND	0.98	3.1	0.98	3.7	0.49	ND	0.49	12	0.98	1.4	0.49	12	0.98	4.8	0.49	8.7	0.98	0.66 <sup>J</sup>	0.98	2600	2.5	ND	0.49	0.83	0.49	7.5	4.9	49	4.9
ORD327S	DMM-58	7/16/2012	ND <sup>U</sup>	5.5																												

TABLE F-3: ELEMENTS IN SEDIMENT

Sample ID No.	Sample Location <sup>1</sup>	Date	Antimony		Arsenic		Barium		Cadmium		Chromium		Cobalt		Copper		Lead		Nickel		Selenium		Strontium		Thallium		Uranium		Vanadium		Zinc	
Units:			(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)		(mg/kg-dry)			
Analytical Method:			EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020			
Range of Reporting Limits (RLs):			0.15-6.8		0.16-6.8		0.076-3.4		0.076-3.4		0.15-6.8		0.076-3.4		0.15-6.8		0.073-3.4		0.15-7.2		0.15-6.8		1.8-16.9		0.073-3.4		0.073-3.4		0.076-33.8		0.76-33.8	
Project Screening Level <sup>2</sup> :			N/A		7.24		N/A		N/A		N/A		N/A		18.7		30.2		N/A		N/A		N/A		N/A		N/A		124			
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL		
ORD340S	DMM-70	7/17/2012	ND <sup>U</sup>	6.1	ND <sup>U</sup>	6.1	3.4	3.0	ND <sup>U</sup>	3.0	9.3	6.1	1.1 <sup>J</sup>	3.0	<b>80.3</b>	6.1	15.1	3.0	7.9	6.1	ND <sup>U</sup>	6.1	2460	15.1	ND <sup>U</sup>	3.0	0.71 <sup>J</sup>	3.0	ND <sup>U</sup>	30.3	29.0 <sup>J</sup>	30.3
ORD340S <sup>3</sup>	DMM-70	7/17/2012	0.50 <sup>J</sup>	0.78	1.0	0.78	3.0	0.39	ND	0.39	8.5	0.78	1.2	0.39	<b>73</b>	0.78	11	0.39	7.3	0.78	ND	0.78	2400	2.0	ND	0.39	0.61	0.39	4.7	3.9	25	3.9
ORD401S <sup>5</sup>	DMM-73	6/3/2013	0.10 <sup>J</sup>	0.18	3.1	0.88	4.4	0.088	0.094	0.088	12	0.18	1.3	0.088	<b>110</b>	0.18	5.6	0.088	12	0.18	2.6	0.18	2500	2.2	ND	0.088	0.98	0.088	8.7	0.88	56	0.88
ORD402S <sup>5</sup>	DMM-73	6/3/2013	0.092 <sup>J</sup>	0.18	3.2	0.92	4.8	0.092	0.085 <sup>J</sup>	0.092	12	0.18	1.6	0.092	<b>1200</b>	0.18	12	0.092	14	0.18	1.8	0.18	2400	2.3	ND	0.092	1.1	0.092	8.8	0.92	40	0.92
ORD403S <sup>5</sup>	DMM-76	6/3/2013	0.095 <sup>J</sup>	0.17	1.9	0.85	4.4	0.085	0.096	0.085	12	0.17	1.5	0.085	7.2	0.17	3.7	0.085	15	0.17	1.9	0.17	2400	2.1	ND	0.085	0.87	0.085	7.3	0.85	22	0.85
ORD404S <sup>5*</sup>	DMM-76	6/3/2013	0.11 <sup>J</sup>	0.16	1.3	0.80	4.4	0.080	0.089	0.080	14	0.16	1.6	0.080	11	0.16	3.5	0.080	16	0.16	1.8	0.16	2500	2.0	ND	0.080	0.96	0.080	7.6	0.80	16	0.80
ORD405S <sup>5</sup>	DMM-76	6/3/2013	0.10 <sup>J</sup>	0.15	2.6	0.76	4.3	0.076	0.089	0.076	15	0.15	1.2	0.076	6.6	0.15	2.0	0.076	15	0.15	0.58	0.15	2700	1.9	ND	0.076	1.0	0.076	7.6	0.076	16	0.76
ORD406S <sup>5</sup>	DMM-79	6/3/2013	0.095 <sup>J</sup>	0.18	2.2	0.91	4.7	0.091	0.10	0.091	14	0.91	1.0	0.45	<b>51</b>	0.91	3.4	0.091	8.7	0.91	0.66 <sup>J</sup>	0.91	2800	2.3	ND	0.091	1.2	0.091	7.4	4.5	<b>200</b>	4.5
ORD407S <sup>5</sup>	DMM-82	6/3/2013	ND	0.18	1.5	0.90	4.0	0.090	0.12	0.090	11	0.90	1.0	0.45	9.1	0.90	2.8	0.090	7.7	0.90	0.58 <sup>J</sup>	0.90	2500	2.3	ND	0.090	1.1	0.090	6.3	4.5	35	4.5
ORD408S <sup>5</sup>	DMM-82	6/3/2013	0.099 <sup>J</sup>	0.18	1.8	0.92	4.2	0.092	0.13	0.092	12	0.92	1.1	0.46	15	0.92	2.5	0.092	8.8	0.92	0.47 <sup>J</sup>	0.92	2600	2.3	ND	0.092	1.1	0.092	7.6	4.6	37	4.6
ORD409S <sup>5</sup>	DMM-82	6/3/2013	ND	0.19	2.4	0.95	3.9	0.095	0.75	0.095	12	0.95	1.0	0.48	12	0.95	2.8	0.095	7.5	0.95	0.69 <sup>J</sup>	0.95	2400	2.4	ND	0.095	0.98	0.095	6.5	4.8	32	4.8
ORD410S <sup>5</sup>	DMM-85	6/3/2013	ND	0.73	1.9	0.73	8.4	0.36	ND	0.36	12	0.73	0.87	0.36	10	0.73	2.7	0.073	6.8	0.73	0.57 <sup>J</sup>	0.73	2200	1.8	ND	0.073	0.92	0.073	4.8	3.6	14	3.6
ORD411S <sup>5</sup>	DMM-73	6/3/2013	0.27	0.18	2.8	0.92	4.3	0.092	0.10	0.092	13	0.18	1.2	0.092	<b>320</b>	0.18	<b>450</b>	0.092	9.2	0.18	1.3	0.18	2500	2.3	ND	0.092	1.1	0.092	9.1	0.92	47	0.92
ORD412S <sup>5*</sup>	DMM-73	6/3/2013	0.10 <sup>J</sup>	0.17	2.5	0.86	6.0	0.086	0.095	0.086	12	0.86	0.96	0.43	<b>390</b>	0.86	5.1	0.086	7.4	0.86	0.68 <sup>J</sup>	0.86	2500	2.1	ND	0.086	1.2	0.086	7.1	4.3	55	4.3
ORD413S <sup>5</sup>	DMM-76	6/3/2013	0.10 <sup>J</sup>	0.17	2.0	0.87	4.5	0.087	0.10	0.087	12	0.17	1.1	0.087	7.1	0.17	3.4	0.087	7.2	0.17	0.99	0.17	2600	2.2	ND	0.087	1.1	0.087	6.8	0.87	21	0.87
ORD414S <sup>5</sup>	DMM-79	6/3/2013	0.15 <sup>J</sup>	0.17	1.1	0.17	4.9	0.084	0.12	0.084	15	0.17	1.2	0.084	6.6	0.17	4.5	0.084	8.6	0.17	0.99	0.17	2500	2.1	ND	0.084	1.2	0.084	9.9	0.84	<b>150</b>	0.84
ORD415S <sup>5</sup>	DMM-85	6/3/2013	0.13 <sup>J</sup>	0.15	1.7	0.77	4.4	0.077	0.11	0.077	15	0.15	1.3	0.077	14	0.15	3.1	0.077	9.4	0.15	0.87	0.15	2400	1.9	ND	0.077	1.1	0.077	7.5	0.77	14	0.77
ORD416S <sup>5</sup>	DMM-85	6/3/2013	0.13 <sup>J</sup>	0.16	ND	0.81	3.9	0.081	0.098	0.081	12	0.16	1.1	0.081	12	0.16	5.9	0.081	9.4	0.16	1.1	0.16	2300	2.0	ND	0.081	0.89	0.081	5.7	0.81	13	0.81
ORD417S <sup>5</sup>	DMM-91	6/7/2013	0.15 <sup>J</sup>	0.18	ND	0.18	4.3	0.091	0.097	0.091	13	0.18	1.2	0.091	<b>23</b>	0.18	<b>49</b>	0.091	10	0.18	1.5	0.18	2600	2.3	ND	0.091	0.86	0.091	8.6	0.91	25	0.91
ORD418S <sup>5</sup>	DMM-91	6/7/2013	0.11 <sup>J</sup>	0.18	0.28	0.18	4.4	0.088	0.088	0.088	12	0.18	1.1	0.088	<b>21</b>	0.18	3.9	0.088	7.2	0.18	1.0	0.18	2700	2.2	ND	0.088	0.86	0.088	7.9	0.88	25	0.88
ORD419S <sup>5</sup>	CON-52	6/7/2013	0.13 <sup>J</sup>	0.18	<b>17</b>	0.18	6.7	0.092	0.62	0.092	31	0.18	7.6	0.092	6.0	0.18	4.0	0.092	49	0.18	1.3	0.18	3100	2.3	ND	0.092	1.2	0.092	43	0.92	16	0.92
ORD420S <sup>5</sup>	CON-53	6/7/2013	0.093 <sup>J</sup>	0.16	ND	0.79	3.5	0.079	0.11	0.079	6.9	0.16	1.4	0.079	1.5	0.16	1.5	0.079	11	0.16	1.4	0.16	2500	2.0	ND	0.079	0.69	0.079	5.3	0.79	3.2	0.79
ORD421S <sup>5*</sup>	CON-53	6/7/2013	ND	0.19	ND	0.93	3.6	0.093	0.12	0.093	6.5	0.19	1.3	0.093	1.6	0.19	1.2	0.093	9.6	0.19	1.2	0.19	2400	2.3	ND	0.093	0.70	0.093	6.0	0.93	3.2	0.93
ORD422S <sup>5</sup>	CON-55	6/7/2013	0.16	0.16	3.5	0.16	5.4	0.082	0.17	0.082	18	0.16	1.8	0.082	1.5	0.16	1.2	0.082	15	0.16	1.6	0.16	2600	2.0	ND	0.082	1.1	0.082	15	0.82	3.2	0.82
ORD423S <sup>5</sup>	CON-56	6/7/2013	0.13 <sup>J</sup>	0.16	<b>17</b>	0.16	6.1	0.080	0.59	0.080	26	0.16	6.2	0.080	4.9	0.16	3.3	0.080	35	0.16	1.4	0.16	3000	2.0	ND	0.080	1.2	0.080	38	0.80	14	0.80
ORD424S <sup>5</sup>	CON-57	6/7/2013	0.10 <sup>J</sup>	0.18	<b>14</b>	0.18	8.8	0.089	0.47	0.089	30	0.18	9.9	0.089	4.6	0.18	3.6	0.089	84	0.18	1.5	0.18	2700	2.2	ND	0.089	1.0	0.089	37	0.89	15	0.89
ORD425S <sup>5</sup>	DMM-88	6/7/2013	ND	0.17	ND	0.85	3.7	0.085	0.074 <sup>J</sup>	0.085	8.7	0.17	1.1	0.085	13	0.17	2.5	0.085	9.9	0.17	1.5	0.17	2500	2.1	ND	0.085	0.63	0.085	4.5	0.85	7.9	0.85
ORD426S <sup>5</sup>	DMM-88	6/7/2013	ND	0.18	ND	0.90	3.9	0.090	0.089 <sup>J</sup>	0.090	9.8	0.18	1.2	0.090	<b>40</b>	0.18	2.5	0.090	12	0.18	1.8	0.18	2600	2.3	ND	0.090	0.64	0.090	6.4	0.90	12	0.90
ORD427S <sup>5</sup>	DMM-88	6/7/2013	ND	0.17	ND	0.86	4.0	0.086	0.079 <sup>J</sup>	0.086	10	0.17	1.2	0.086	<b>40</b>	0.17	2.7	0.086	13	0.17	1.6	0.17	2900	2.2	ND	0.086	0.73	0.086	6.2	0.86	68	0.86
ORD428S <sup>5</sup>	DMM-91	6/7/2013	0.094 <sup>J</sup>	0.18	0.88 <sup>J</sup>	0.89	4.3	0.089	0.077 <sup>J</sup>	0.089	11	0.18	1.3	0.089	<b>22</b>	0.18	4.9	0.089	13	0.18	1.7	0.18	2900	2.2	ND	0.089	0.86	0.089	6.5	0.89	32	0.89

NOTES:

<sup>1</sup>Sample locations were designated by the sample field identification (ID) number of the first sediment sample collected at a location.

<sup>2</sup>Project Sediment Screening Level. Only chemicals of potential concern (COPCs) (i.e., arsenic, copper, lead, and zinc) were examined.

<sup>3</sup>Re-reported/re-do results. Samples ORD301S-2 through ORD322S-2 were originally analyzed and reported under TestAmerica project G2G240418. The results in G2G240418 were reported from 20X dilutions. In order to meet the program requirements, a second aliquot of all samples analyzed in the original report was provided to the laboratory. These aliquots were digested, analyzed, and reported from a 5X dilution. Samples ORD323S through ORD340S were initially reported from a 20X dilution in the analytical laboratory (TestAmerica) project G2G260422. In order to meet the program requirements, the data was re-reported by the laboratory from a 5X dilution that was also acquired at the time of analysis (320-2258-1). Data has not been validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

<sup>4</sup>For sample ORD317S, the laboratory estimated detection of selenium (3.4 mg/kg) was qualified by the validator as "U" due to method blank contamination. For consistency, the result is presented in this table as "ND."

<sup>5</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

TABLE F-4: ELEMENTS IN BIOTA

Sample ID No.	Sample Location	Date	Antimony	Arsenic Total	Arsenic Total*	Arsenic Inorg*	Arsenic Org*	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc	
			Units: (mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	
			Analytical Method:	EPA 6020	EPA 6020	EPA 1638 mod.	EPA 1632 mod.	EPA 1632 mod.	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	
			Project Screening Level <sup>1</sup> :	0.2	0.00327	0.00327	N/A	N/A	34.4	0.25	1.47	9.83	0.17	1.5	9.83	2.457	N/A	0.032	N/A	0.492	2.8
<b>OCTOPUS (HE/E)</b>																					
			Range of Reporting Limits:		0.20	0.20	0.14-0.16	0.008-0.010	0.138-0.156	0.10	0.10	0.20	0.10	0.20	0.20	0.50	0.10	0.50	1.0	1.0	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	
ORD301O	CON-49	18-Jul-12	ND <sup>U</sup>	0.20	25.2	0.20	--	--	--	0.22	0.10	ND <sup>U</sup>	0.10	0.62	0.20	0.010 <sup>J</sup>	0.10	6.0	0.20	ND <sup>U</sup>	0.10
ORD302O	CON-46	17-Jul-12	ND <sup>U</sup>	0.20	24.6	0.20	--	--	--	0.15	0.10	ND <sup>U</sup>	0.10	0.58	0.20	ND <sup>U</sup>	0.10	6.3	0.20	ND <sup>U</sup>	0.10
ORD302O DUP	CON-46	17-Jul-12	ND <sup>U</sup>	0.20	23.3	0.20	--	--	--	0.17	0.10	ND <sup>U</sup>	0.10	0.63	0.20	ND <sup>U</sup>	0.10	5.5	0.20	ND <sup>U</sup>	0.10
ORD303O	CON-48	18-Jul-12	ND <sup>U</sup>	0.20	27.7	0.20	29.2	0.16	0.004 <sup>U</sup>	0.009	29.2	0.156	0.13	0.10	ND <sup>U</sup>	0.10	5.4	0.20	ND <sup>U</sup>	0.10	0.19 <sup>J</sup>
ORD304O	CON-51	18-Jul-12	ND <sup>U</sup>	0.20	26.5	0.20	27.8	0.14	0.004 <sup>J2</sup>	0.008	27.8	0.141	0.11	0.10	ND <sup>U</sup>	0.10	5.5	0.20	ND <sup>U</sup>	0.10	0.16 <sup>J</sup>
ORD305O	CON-47	17-Jul-12	ND <sup>U</sup>	0.20	21.6	0.20	--	--	--	0.27	0.10	ND <sup>U</sup>	0.10	0.64	0.20	ND <sup>U</sup>	0.10	3.6	0.20	ND <sup>U</sup>	0.10
ORD307O	NPS	17-Jul-12	ND <sup>U</sup>	0.20	16.9	0.20	18.3	0.14	0.004 <sup>U</sup>	0.009	18.3	0.139	0.091 <sup>J</sup>	0.10	ND <sup>U</sup>	0.10	3.8	0.20	ND <sup>U</sup>	0.10	0.19 <sup>J</sup>
ORD308O	NPS	17-Jul-12	ND <sup>U</sup>	0.20	17.2	0.20	--	--	--	0.12	0.10	ND <sup>U</sup>	0.10	0.68	0.20	ND <sup>U</sup>	0.10	3.4	0.20	ND <sup>U</sup>	0.10
ORD309O	WWT	17-Jul-12	ND <sup>U</sup>	0.20	24.9	0.20	31.1	0.14	0.003 <sup>U</sup>	0.009	31.1	0.142	0.35	0.10	ND <sup>U</sup>	0.10	3.9	0.20	ND <sup>U</sup>	0.10	0.15 <sup>J</sup>
ORD310O	DMM-67	16-Jul-12	ND <sup>U</sup>	0.20	20.9	0.20	26.4	0.14	0.004 <sup>U</sup>	0.009	26.4	0.138	0.12	0.10	ND <sup>U</sup>	0.10	5.0	0.20	ND <sup>U</sup>	0.10	0.18 <sup>J</sup>
ORD311O	DMM-55	16-Jul-12	ND <sup>U</sup>	0.20	20.7	0.20	25.5	0.15	0.004 <sup>U</sup>	0.010	25.5	0.152	0.12	0.10	ND <sup>U</sup>	0.10	3.4	0.20	ND <sup>U</sup>	0.10	0.17 <sup>J</sup>
ORD313O	DMM-61	16-Jul-12	ND <sup>U</sup>	0.20	23.1	0.20	--	--	--	0.11	0.10	ND <sup>U</sup>	0.10	0.76	0.20	ND <sup>U</sup>	0.10	3.8	0.20	ND <sup>U</sup>	0.10
ORD314O	DMM-58	16-Jul-12	ND <sup>U</sup>	0.20	24.5	0.20	--	--	--	0.14	0.10	ND <sup>U</sup>	0.10	0.99	0.20	ND <sup>U</sup>	0.10	5.2	0.20	ND <sup>U</sup>	0.10
ORD315O	DMM-64	16-Jul-12	ND <sup>U</sup>	0.20	21.4	0.20	--	--	--	0.099 <sup>J</sup>	0.10	ND <sup>U</sup>	0.10	0.74	0.20	ND <sup>U</sup>	0.10	4.5	0.20	ND <sup>U</sup>	0.10
ORD315O DUP	DMM-64	16-Jul-12	ND <sup>U</sup>	0.20	22.7	0.20	--	--	--	0.14	0.10	ND <sup>U</sup>	0.10	0.72	0.20	ND <sup>U</sup>	0.10	7.5	0.20	ND <sup>U</sup>	0.10
ORD316O	DMM-52	16-Jul-12	ND <sup>U</sup>	0.20	21.9	0.20	--	--	--	0.17	0.10	ND <sup>U</sup>	0.10	0.72	0.20	ND <sup>U</sup>	0.10	7.5	0.20	ND <sup>U</sup>	0.10
<b>FISH (WEKE)</b>																					
			Range of Reporting Limits:		0.20	0.20	0.14-0.16	0.009-0.010	0.139-0.161	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.50	0.10	0.50	1.0	1.0
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	
ORD303F	CON	18-Jul-12	ND <sup>U</sup>	0.20	10.5	0.20	--	--	--	0.11	0.10	ND <sup>U</sup>	0.10	0.66	0.20	ND <sup>U</sup>	0.10	0.23	0.20	ND <sup>U</sup>	0.10
ORD303F DUP	CON	18-Jul-12	ND <sup>U</sup>	0.20	10.4	0.20	--	--	--	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.10	0.68	0.20	ND <sup>U</sup>	0.10	0.23	0.20	ND <sup>U</sup>	0.10
ORD305F	CON	18-Jul-12	ND <sup>U</sup>	0.20	19.1	0.20	21.6	0.15	0.004 <sup>U</sup>	0.009	21.6	0.153	0.10	0.10	ND <sup>U</sup>	0.10	0.32	0.20	ND <sup>U</sup>	0.10	0.15 <sup>J</sup>
ORD307F	CON	18-Jul-12	ND <sup>U</sup>	0.20	17.5	0.20	--	--	--	0.20	0.10	ND <sup>U</sup>	0.10	0.72	0.20	0.017 <sup>J</sup>	0.10	0.31	0.20	0.18	0.10
ORD308F	CON	18-Jul-12	ND <sup>U</sup>	0.20	16.1	0.20	--	--	--	0.11	0.10	ND <sup>U</sup>	0.10	0.82	0.20	0.029 <sup>J</sup>	0.10	0.46	0.20	ND <sup>U</sup>	0.10
ORD312F	CON	18-Jul-12	ND <sup>U</sup>	0.20	11.8	0.20	13.5	0.14	0.004 <sup>U</sup>	0.009	13.5	0.139	ND <sup>U</sup>	0.10	1.1	0.20	0.013 <sup>J</sup>	0.10	0.64	0.20	0.34
ORD313F	WWT	19-Jul-12	ND <sup>U</sup>	0.20	13.5	0.20	--	--	--	0.53	0.10	ND <sup>U</sup>	0.10	0.70	0.20	ND <sup>U</sup>	0.10	0.31	0.20	ND <sup>U</sup>	0.10
ORD314F	WWT	19-Jul-12	ND <sup>U</sup>	0.20	4.4	0.20	--	--	--	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.10	0.17 <sup>J</sup>	0.20	ND <sup>U</sup>	0.10	0.13 <sup>J</sup>	0.20	ND <sup>U</sup>	0.10
ORD315F	WWT	19-Jul-12	ND <sup>U</sup>	0.20	10.4	0.20	12.5	0.14	0.004 <sup>U</sup>	0.010	12.5	0.140	0.24	0.10	ND <sup>U</sup>	0.10	0.41	0.20	ND <sup>U</sup>	0.10	0.19 <sup>J</sup>
ORD316F	WWT	19-Jul-12	ND <sup>U</sup>	0.20	9.7	0.20	--	--	--	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.10	0.63	0.20	ND <sup>U</sup>	0.10	0.26	0.20	ND <sup>U</sup>	0.10
ORD317F	WWT	19-Jul-12	ND <sup>U</sup>	0.20	5.4	0.20	5.91	0.16	0.004 <sup>U</sup>	0.009	5.91	0.161	0.13	0.10	ND <sup>U</sup>	0.10	0.37	0.20	ND <sup>U</sup>	0.10	0.28
ORD318F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	16.6	0.20	--	--	--	0.093 <sup>J</sup>	0.10	ND <sup>U</sup>	0.10	0.61	0.20	ND <sup>U</sup>	0.10	0.30	0.20	ND <sup>U</sup>	0.10
ORD319F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	9.0	0.20	--	--	--	0.16	0.10	ND <sup>U</sup>	0.10	0.59	0.20	ND <sup>U</sup>	0.10	0.27	0.20	0.088 <sup>J</sup>	0.10
ORD320F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	18.3	0.20	--	--	--	0.092 <sup>J</sup>	0.10	ND <sup>U</sup>	0.10	0.71	0.20	ND <sup>U</sup>	0.10	0.27	0.20	ND <sup>U</sup>	0.10
ORD323F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	21.8	0.20	24.5	0.16	0.004 <sup>U</sup>	0.009	24.5	0.155	0.14	0.10	ND <sup>U</sup>	0.10	0.25	0.20	ND <sup>U</sup>	0.10	0.19 <sup>J</sup>
ORD325F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	5.0	0.20	--	--	--	0.14	0.10	ND <sup>U</sup>	0.10	0.83	0.20	ND <sup>U</sup>	0.10	0.37	0.20	0.090 <sup>J</sup>	0.10
ORD326F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	8.5	0.20	8.54	0.16	0.004 <sup>U</sup>	0.009	8.53	0.157	0.17	0.10	ND <sup>U</sup>	0.10	0.44	0.20	0.27	0.10	0.37
ORD327F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	16.1	0.20	--	--	--	0.11	0.10	ND <sup>U</sup>	0.10	0.60	0.20	ND <sup>U</sup>	0.10	0.28	0.20	0.095 <sup>J</sup>	0.10
ORD327F DUP	DMM	19-Jul-12	ND <sup>U</sup>	0.20	17.8	0.20	--	--	--	0.12	0.10	ND <sup>U</sup>	0.10	0.70	0.20	ND <sup>U</sup>	0.10	0.29	0.20	0.15	0.10
ORD329F	DMM	19-Jul-12	ND <sup>U</sup>	0.20	15.4	0.20	--	--	--	0.097 <sup>J</sup>	0.10	ND <sup>U</sup>	0.10	0.68	0.20	ND <sup>U</sup>	0.10	0.31	0.20	0.086 <sup>J</sup>	0.10
<b>CRAB</b>																					
			Range of Reporting Limits:		0.20	0.20	0.14-0.16	0.009	0.142-0.158	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.50	0.10	0.50	1.0	1.0
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	
ORD301C	WWT	31-Jul-12	ND <sup>U</sup>	0.20	28.2	0.20	--	--	--	0.17	0.10	ND <sup>U</sup>	0.10	0.55	0.20	0.012 <sup>J</sup>	0.10	2.6	0.20	ND <sup>U</sup>	0.10
ORD302C	WWT	31-Jul-12	ND <sup>U</sup>	0.20	33.2	0.20	38.4	0.14	0.004 <sup>U</sup>	0.009	38.4	0.142	0.19	0.10	ND <sup>U</sup>	0.10	0.57	0.20	0.010 <sup>J</sup>	0.10	5.8
ORD303C	WWT	31-Jul-12	ND <sup>U</sup>	0.20	28.7	0.20	--	--	--	0.17	0.10	ND <sup>U</sup>	0.10	0.74	0.20	ND <sup>U</sup>	0.10	7.4	0.20	ND <sup>U</sup>	0.10
ORD304C	WWT	31-Jul-12	ND <sup>U</sup>	0.20	43.6	0.20	--	--	--	0.12	0.10	0.091 <sup>J</sup>	0.10	0.62	0.20	0.017 <sup>J</sup>	0.10	7.4	0.20	ND <sup>U</sup>	0.10
ORD305C	DMM	31-Jul-12	ND <sup>U</sup>	0.20	28.5	0.20	32.0	0.14	0.005 <sup>J2</sup>	0.009	32.0	0.145	0.14	0.10	0.15	0.10	0.69	0.20	0.025 <sup>J</sup>	0.10	11.1
ORD306C	DMM	31-Jul-12	ND <sup>U</sup>	0.20	56.7	0.20	--	--	--	0.16	0.10	0.13	0.10	0.58	0.20	0.075 <sup>J</sup>	0.10	8.7	0.20	ND <sup>U</sup>	0.10
ORD307C	DMM	31-Jul-12	ND <sup>U</sup>	0.20	57.0	0.20	--	--	--	0.14	0.10	0.060 <sup>J</sup>	0.10	0.66	0.20	0.018 <sup>J</sup>	0.10	9.8	0.20	ND <sup>U</sup>	0.10
ORD307C DUP	DMM	31-Jul-12	ND <sup>U</sup>	0.20	59.4	0.20	--	--	--	0.12	0.10	0.067 <sup>J</sup> </									

TABLE F-4: ELEMENTS IN BIOTA

Sample ID No.	Sample Location	Date	Antimony	Arsenic Total	Arsenic Total*	Arsenic Inorg*	Arsenic Org*	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc																			
			Units:	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)																		
Analytical Method:			EPA 6020	EPA 6020	EPA 1638 mod.	EPA 1632 mod.	EPA 1632 mod.	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020																		
Project Screening Level <sup>1</sup> :			0.2	0.00327	0.00327	N/A	N/A	34.4	0.25	1.47	9.83	0.17	1.5	9.83	2.457	N/A	0.032	N/A	0.492	2.8																			
<b>SEAWEED (LIMU)</b>																																							
Range of Reporting Limits:			0.20		0.20		0.14-0.17		0.009-0.096		0.141-0.168		0.10		0.10		0.20		0.10		0.20		0.10		0.50		0.10		0.50		1.0		1.0						
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL							
ORD301L	CON-46	17-Jul-12	ND <sup>U</sup>	0.20	<b>0.86</b>	0.20	<b>1.06</b>	0.17	0.220	0.036	0.844	0.168	1.0	0.10	ND <sup>U</sup>	0.10	0.84	0.20	0.13	0.10	<b>0.48</b>	0.20	0.26	0.10	0.80	0.20	ND <sup>U</sup>	0.30	76.5	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>1.9</b>	1.0	2.7	1.0	
ORD301LDUP	CON-46	17-Jul-12	ND <sup>U</sup>	0.20	<b>0.75</b>	0.20	--	--	--	--	--	--	0.99	0.10	ND <sup>U</sup>	0.10	0.87	0.20	0.14	0.10	<b>0.50</b>	0.20	0.29	0.10	1.0	0.20	ND <sup>U</sup>	0.30	79.0	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>2.0</b>	1.0	1.2	1.0	
ORD302L	CON-48	18-Jul-12	ND <sup>U</sup>	0.20	<b>0.65</b>	0.20	<b>0.80</b>	0.15	0.154	0.009	0.650	0.147	2.4	0.10	ND <sup>U</sup>	0.10	0.53	0.20	0.049 <sup>J</sup>	0.10	<b>0.25</b>	0.20	0.15	0.10	0.39	0.20	ND <sup>U</sup>	0.30	73.3	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>1.2</b>	1.0	ND <sup>U</sup>	1.0	
ORD303L	CON-47	17-Jul-12	ND <sup>U</sup>	0.20	<b>1.0</b>	0.20	<b>1.56</b>	0.15	0.498	0.040	1.06	0.152	1.6	0.10	ND <sup>U</sup>	0.10	1.2	0.20	0.15	0.10	<b>0.42</b>	0.20	0.36	0.10	1.1	0.20	ND <sup>U</sup>	0.30	127	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>1.9</b>	1.0	1.1	1.0	
ORD304L	CON-49	18-Jul-12	ND <sup>U</sup>	0.20	<b>0.93</b>	0.20	<b>1.37</b>	0.14	0.581	0.039	0.787	0.145	0.69	0.10	ND <sup>U</sup>	0.10	1.0	0.20	0.16	0.10	<b>0.39</b>	0.20	0.29	0.10	1.1	0.20	ND <sup>U</sup>	0.30	86.9	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>1.2</b>	1.0	1.2	1.0	
ORD305L	CON-51	18-Jul-12	ND <sup>U</sup>	0.20	<b>1.2</b>	0.20	<b>1.31</b>	0.16	0.339	0.084	0.969	0.160	1.5	0.10	ND <sup>U</sup>	0.10	1.0	0.20	0.16	0.10	<b>0.40</b>	0.20	0.34	0.10	1.2	0.20	ND <sup>U</sup>	0.30	128	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>1.2</b>	1.0	1.2	1.0	
ORD306L	DMM-52	16-Jul-12	ND <sup>U</sup>	0.20	<b>1.0</b>	0.20	<b>1.32</b>	0.15	0.357	0.096	0.966	0.152	1.2	0.10	ND <sup>U</sup>	0.10	0.95	0.20	0.11	0.10	<b>1.2</b>	0.20	0.55	0.10	1.6	0.20	ND <sup>U</sup>	0.30	343	0.50	ND <sup>U</sup>	0.10	0.16 <sup>J</sup>	0.50	<b>1.8</b>	1.0	1.9	1.0	
ORD306L DUP	DMM-52	16-Jul-12	ND <sup>U</sup>	0.20	<b>1.1</b>	0.20	--	--	--	--	--	--	1.4	0.10	ND <sup>U</sup>	0.10	1.0	0.20	0.13	0.10	<b>1.2</b>	0.20	0.55	0.10	1.7	0.20	ND <sup>U</sup>	0.30	298	0.50	ND <sup>U</sup>	0.10	0.13 <sup>J</sup>	0.50	<b>1.7</b>	1.0	1.9	1.0	
ORD307L	DMM-55	16-Jul-12	ND <sup>U</sup>	0.20	<b>0.80</b>	0.20	<b>1.12</b>	0.15	0.122	0.036	0.996	0.146	0.98	0.10	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.20	0.074 <sup>J</sup>	0.10	<b>2.5</b>	0.20	0.31	0.10	1.1	0.20	ND <sup>U</sup>	0.30	383	0.50	ND <sup>U</sup>	0.10	0.11 <sup>J</sup>	0.50	0.48 <sup>J</sup>	1.0	2.2	1.0	
ORD308L	DMM-61	16-Jul-12	ND <sup>U</sup>	0.20	<b>0.75</b>	0.20	<b>0.92</b>	0.14	0.154	0.035	0.768	0.145	1.1	0.10	ND <sup>U</sup>	0.10	0.73	0.20	0.068 <sup>J</sup>	0.10	<b>1.8</b>	0.20	0.38	0.10	1.0	0.20	ND <sup>U</sup>	0.30	161	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>0.59<sup>J</sup></b>	1.0	<b>3.5</b>	1.0	
ORD309L	DMM-64	16-Jul-12	ND <sup>U</sup>	0.20	<b>0.58</b>	0.20	<b>0.74</b>	0.14	0.182	0.036	0.562	0.141	0.57	0.10	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.20	0.029 <sup>J</sup>	0.10	<b>0.30</b>	0.20	0.14	0.10	0.36	0.20	ND <sup>U</sup>	0.30	67.5	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>0.79<sup>J</sup></b>	1.0	0.72 <sup>J</sup>	1.0	
ORD310L	DMM-67	16-Jul-12	ND <sup>U</sup>	0.20	<b>0.80</b>	0.20	<b>0.97</b>	0.16	0.192	0.040	0.780	0.159	1.5	0.10	ND <sup>U</sup>	0.10	0.74	0.20	0.065 <sup>J</sup>	0.10	<b>1.5</b>	0.20	0.40	0.10	0.99	0.20	ND <sup>U</sup>	0.30	140	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>0.79<sup>J</sup></b>	1.0	1.5	1.0	
ORD311L	DMM-70	17-Jul-12	ND <sup>U</sup>	0.20	<b>0.59</b>	0.20	<b>0.67</b>	0.15	0.149	0.040	0.526	0.149	2.2	0.10	ND <sup>U</sup>	0.10	0.71	0.20	0.043 <sup>J</sup>	0.10	<b>0.87</b>	0.20	0.22	0.10	0.40	0.20	ND <sup>U</sup>	0.30	108	0.50	ND <sup>U</sup>	0.10	ND <sup>U</sup>	0.50	<b>2.7</b>	1.0	2.1	1.0	
<b>OCTOPUS (HE'E)</b>																																							
Range of Reporting Limits:			0.19-0.21		0.19-0.21		0.27-0.30		0.008-0.010		0.269-0.297		0.095-0.10		0.095-0.10		0.19-0.21		0.095-0.10		0.19-0.21		0.095-0.10		0.19-0.21		0.19-0.21		0.48-0.51		0.095-0.10		0.48-0.52		0.95-1.0		0.95-1.0		
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL			
ORD401O <sup>6</sup>	DMM-73	3-Jun-13	ND	0.20	<b>26</b>	0.20	--	--	--	--	--	--	ND	0.099	ND	0.099	0.54	0.20	ND	0.099	<b>3.5</b>	0.20	ND	0.099	ND	0.20	0.17 <sup>J</sup>	0.20	3.6	0.50	ND	0.099	ND	0.50	ND	0.99	<b>13</b>	0.99	
ORD402O <sup>3,6</sup>	DMM-76	3-Jun-13	ND	0.19	<b>23</b>	0.19	<b>23.1</b>	0.30	0.004 <sup>U</sup>	0.010	23.1	0.297	ND	0.096	ND	0.096	0.49	0.19	ND	0.096	<b>5.6</b>	0.19	ND	0.096	ND	0.19	0.16 <sup>J</sup>	0.19	4.0	0.48	ND	0.096	ND	0.48	ND	0.96	<b>11</b>	0.96	
ORD402O DUP <sup>6</sup>	DMM-76	3-Jun-13	ND	0.20	<b>24.3</b>	0.20	--	--	--	--	--	--	ND	0.10	ND	0.10	0.597	0.20	ND	0.10	<b>6.56</b>	0.20	ND	0.10	0.104 <sup>J</sup>	0.20	0.179 <sup>J</sup>	0.20	4.26	0.51	ND	0.10	ND	0.51	ND	1.0	<b>11.3</b>	1.0	
ORD403O <sup>6</sup>	DMM-79	3-Jun-13	ND	0.20	<b>23</b>	0.20	--	--	--	--	--	--	ND	0.099	ND	0.099	0.72	0.20	ND	0.099	<b>3.5</b>	0.20	ND	0.099	ND	0.20	0.19 <sup>J</sup>	0.20	3.9	0.50	ND	0.099	ND	0.50	ND	0.99	<b>13</b>	0.99	
ORD404O <sup>6</sup>	DMM-82	3-Jun-13	ND	0.19	<b>28</b>	0.19	--	--	--	--	--	--	ND	0.097	ND	0.097	0.51	0.19	ND	0.097	<b>4.9</b>	0.19	ND	0.097	ND	0.19	0.16 <sup>J</sup>	0.19	3.7	0.49	ND	0.097	ND	0.49	ND	0.97	<b>13</b>	0.97	
ORD405O <sup>6</sup>	DMM-85	3-Jun-13	ND	0.19	<b>27</b>	0.19	<b>25.4</b>	0.28	0.004 <sup>U</sup>	0.009	25.4	0.279	ND	0.095	ND	0.095	0.58	0.19	ND	0.095	<b>6.0</b>	0.19	ND	0.095	ND	0.19	0.19	0.19	4.1	0.48	ND	0.095	ND	0.48	ND	0.95	<b>13</b>	0.95	
ORD406O <sup>6</sup>	CON-52	7-Jun-13	ND	0.20	<b>25</b>	0.20	--	--	--	--	--	--	ND	0.10	ND	0.10	0.60	0.20	0.011 <sup>J</sup>	0.10	<b>4.8</b>	0.20	ND	0.10	ND	0.20	0.13 <sup>J</sup>	0.20	4.8	0.50	ND	0.10	ND	0.50	ND	1.0	<b>14</b>	1.0	
ORD407O <sup>6</sup>	CON-53	7-Jun-13	ND	0.20	<b>19</b>	0.20	--	--	--	--	--	--	ND	0.10	ND	0.10	0.78	0.20	0.010 <sup>J</sup>	0.10	<b>9.3</b>	0.20	ND	0.10	0.10	0.19 <sup>J</sup>	0.20	ND	0.20	4.1	0.51	ND	0.10	ND	0.51	ND	1.0	<b>12</b>	1.0
ORD407O DUP <sup>6</sup>	CON-53	7-Jun-13	ND	0.20	<b>18.9</b>	0.20	--	--	--	--	--	--	ND	0.099	ND	0.099	0.624	0.20	ND	0.099	<b>8.17</b>	0.2	ND	0.099	ND	0.20	0.185 <sup>J</sup>	0.2	4.03	0.50	ND	0.099	ND	0.50	ND	0.99	<b>13.6</b>	0.99	
ORD408O <sup>6</sup>	CON-56	7-Jun-13	ND	0.20	<b>26</b>	0.20	<b>26.5</b>	0.27	0.003 <sup>U</sup>	0.008	26.5	0.269	ND	0.099	ND	0.099	0.59	0.20	0.012 <sup>J</sup>	0.099	<b>5.4</b>	0.20	ND	0.099	ND	0.20	0.11 <sup>J</sup>	0.20	3.8	0.50	ND	0.099	ND	0.50	ND	0.99	<b>13</b>	0.99	
ORD409O <sup>6</sup>	CON-55	11-Jun-13	ND	0.21	<b>37</b>	0.21	<b>37.7</b>	0.27	0.004 <sup>U</sup>	0.010	37.7	0.270	ND	0.10	ND	0.10	0.55	0.21	ND	0.10	<b>6.3</b>	0.21	ND	0.10	ND	0.21	ND	0.21	3.9	0.52	ND	0.10	ND	0.52	ND	1.0	<b>12</b>	1.0	
ORD410O <sup>6</sup>	CON-57	11-Jun-13	ND	0.20	<b>14</b>	0.20	--	--	--	--	--	--	ND	0.10	ND	0.10	0.61	0.20	0.011 <sup>J</sup>	0.10	<b>6.8</b>	0.20	ND	0.10	ND	0.20	0.23	0.20	3.8	0.51	ND	0.10	ND	0.51	ND	1.0	<b>15</b>	1.0	
ORD411O <sup>6</sup>	DMM-88	7-Jun-13	ND	0.20	<b>28</b>	0.20	--	--	--	--	--	--	ND	0.																									

TABLE F-4: ELEMENTS IN BIOTA

Sample ID No.	Sample Location	Date	Antimony	Arsenic Total	Arsenic Total*	Arsenic Inorg*	Arsenic Org*	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc																		
			Units:	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)																		
			Analytical Method:	EPA 6020	EPA 6020	EPA 1638 mod.	EPA 1632 mod.	EPA 1632 mod.	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020																		
			Project Screening Level <sup>1</sup> :	0.2	0.00327	0.00327	N/A	N/A	34.4	0.25	1.47	9.83	0.17	1.5	9.83	2.457	N/A	0.032	N/A	0.492	2.8																	
SEAWEED (LIMU)																																						
Range of Reporting Limits:			0.19-0.27		0.19-0.27		0.26-0.30		0.035-0.385		0.247-0.385		0.098-0.14		0.095-0.14		0.19-0.27		0.095-0.14		0.19-0.27		0.095-1.0		0.19-0.27		0.19-0.27		0.48-0.68		0.095-0.14		0.48-0.68		0.95-1.4		0.95-1.4	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL		
ORD401L <sup>6</sup>	DMM-73	3-Jun-13	ND	0.20	<b>0.74</b>	0.20	<b>2.34</b>	0.28	0.138	0.037	2.21	0.285	0.44	0.098	ND	0.098	0.48	0.20	0.041 <sup>J</sup>	0.098	<b>16</b>	0.20	0.23	0.098	0.30	0.20	0.18 <sup>J</sup>	0.20	110	0.49	ND	0.098	ND	0.49	<b>0.59<sup>J</sup></b>	0.98	<b>4.5</b>	0.98
ORD402L <sup>6</sup>	DMM-76	3-Jun-13	ND	0.20	<b>0.72</b>	0.20	<b>1.82</b>	0.28	0.452	0.039	1.37	0.283	1.5	0.10	ND	0.10	0.80	0.20	0.069 <sup>J</sup>	0.10	<b>0.41</b>	0.20	0.32	0.10	0.42	0.20	0.13 <sup>J</sup>	0.20	160	0.51	ND	0.10	ND	0.51	<b>2.1</b>	1.0	<b>3.3</b>	1.0
ORD403L <sup>6</sup>	DMM-79	3-Jun-13	ND	0.21	<b>0.85</b>	0.21	<b>2.04</b>	0.29	0.503	0.035	1.54	0.291	1.1	0.10	ND	0.10	<b>1.6</b>	0.21	0.096 <sup>J</sup>	0.10	<b>0.75</b>	0.21	0.56	0.10	0.49	0.21	0.20 <sup>J</sup>	0.21	230	0.52	ND	0.10	ND	0.52	<b>1.7</b>	1.0	<b>3.3</b>	1.0
ORD404L <sup>3,6</sup>	DMM-82	3-Jun-13	ND	0.20	<b>0.89</b>	0.20	<b>2.20</b>	0.26	0.547	0.039	1.65	0.264	0.87	0.099	ND	0.099	0.90	0.20	0.068 <sup>J</sup>	0.099	<b>0.68</b>	0.20	0.45	0.099	0.41	0.20	0.20	0.20	180	0.50	ND	0.099	ND	0.50	<b>3.6</b>	0.99	2.3	0.99
ORD404L DUP <sup>6</sup>	DMM-82	3-Jun-13	ND	0.20	<b>0.930</b>	0.20	--	--	--	--	--	--	1.36	0.10	ND	0.10	0.982	0.20	0.0747 <sup>J</sup>	0.10	<b>0.738</b>	0.20	0.427	0.10	0.461	0.20	0.141 <sup>J</sup>	0.20	198	0.50	ND	0.10	ND	0.50	<b>3.72</b>	1.0	2.36	1.0
ORD405L <sup>6</sup>	DMM-85	3-Jun-13	ND	0.21	<b>0.65</b>	0.21	<b>1.78</b>	0.27	0.275	0.037	0.151	0.268	0.72	0.10	ND	0.10	0.89	0.21	0.064 <sup>J</sup>	0.10	<b>0.74</b>	0.21	0.39	0.10	0.43	0.21	ND	0.21	140	0.52	ND	0.10	ND	0.52	<b>3.5</b>	1.0	1.9	1.0
ORD406L <sup>6</sup>	CON-52	7-Jun-13	ND	0.20	<b>2.3</b>	0.20	<b>6.10</b>	0.30	2.03	0.367	4.06	0.367	1.7	0.10	0.069 <sup>J</sup>	0.10	<b>5.1</b>	0.20	0.83	0.10	<b>1.3</b>	0.20	1.3	0.10	4.9	0.20	0.33	0.20	470	0.51	ND	0.10	0.19 <sup>J</sup>	0.51	<b>7.2</b>	1.0	<b>4.9</b>	1.0
ORD407L <sup>6</sup>	CON-53	7-Jun-13	ND	0.20	<b>1.2</b>	0.20	<b>4.28</b>	0.27	0.634	0.095	3.65	0.247	0.85	0.10	ND	0.10	<b>1.7</b>	0.20	0.23	0.10	<b>0.57</b>	0.20	0.50	0.10	1.6	0.20	ND	0.20	170	0.51	ND	0.10	ND	0.51	<b>3.0</b>	1.0	<b>14</b>	1.0
ORD409L <sup>3,6</sup>	CON-56	7-Jun-13	ND	0.19	<b>2.1</b>	0.19	<b>6.53</b>	0.29	1.61	0.385	4.92	0.385	1.8	0.095	0.066 <sup>J</sup>	0.095	<b>5.2</b>	0.19	0.85	0.095	<b>1.4</b>	0.19	1.4	0.095	5.0	0.19	0.23	0.19	440	0.48	ND	0.095	0.18 <sup>J</sup>	0.48	<b>7.6</b>	0.95	<b>4.3</b>	0.95
ORD410L <sup>3,6</sup>	CON-57	7-Jun-13	ND	0.20	<b>2.7</b>	0.20	<b>6.89</b>	0.29	2.42	0.095	4.47	0.291	1.4	0.099	0.059 <sup>J</sup>	0.099	<b>4.0</b>	0.20	0.80	0.099	<b>0.87</b>	0.20	0.81	0.099	6.3	0.20	0.19 <sup>J</sup>	0.20	350	0.50	ND	0.099	0.16 <sup>J</sup>	0.50	<b>5.0</b>	0.99	<b>4.1</b>	0.99
ORD410L DUP <sup>6</sup>	CON-57	7-Jun-13	ND	0.20	<b>2.63</b>	0.20	--	--	--	--	--	--	1.63	0.10	0.0624 <sup>J</sup>	0.10	<b>3.94</b>	0.20	0.971	0.10	<b>0.807</b>	0.20	0.804	0.1	7.52	0.20	0.228	0.20	472	0.51	ND	0.10	0.181 <sup>J</sup>	0.51	<b>5.28</b>	1.0	<b>3.08</b>	1.0
ORD411L <sup>6</sup>	CON-55	11-Jun-13	ND	0.20	<b>0.89</b>	0.20	--	--	--	--	--	--	1.6	0.10	ND	0.10	1.2	0.20	0.13	0.10	<b>0.47</b>	0.20	0.41	0.10	0.98	0.20	0.14 <sup>J</sup>	0.20	130	0.51	ND	0.10	ND	0.51	<b>2.5</b>	1.0	2.0	1.0
ORD412L <sup>6</sup>	DMM-88	7-Jun-13	ND	0.27	<b>0.52</b>	0.27	--	--	--	--	--	--	1.3	0.14	ND	0.14	0.67	0.27	0.079 <sup>J</sup>	0.14	<b>0.87</b>	0.27	0.26	0.14	0.40	0.27	ND	0.27	460	0.68	ND	0.14	0.15 <sup>J</sup>	0.68	<b>1.5</b>	1.4	<b>4.2</b>	1.4
ORD413L <sup>6</sup>	DMM-91	7-Jun-13	ND	0.21	<b>1.0</b>	0.21	<b>4.51</b>	0.29	0.386	0.038	4.12	0.292	4.5	0.11	0.086 <sup>J</sup>	0.11	1.1	0.21	0.096 <sup>J</sup>	0.11	<b>1.7</b>	0.21	0.53	0.11	0.56	0.21	0.13 <sup>J</sup>	0.21	270	0.53	ND	0.11	0.12 <sup>J</sup>	0.53	<b>3.3</b>	1.1	<b>4.5</b>	1.1

NOTES:

<sup>1</sup>Refer to Ordnance Reef (HI-06) Follow-Up Investigation Final Sample Analysis Plan for project screening levels.

<sup>2</sup>The qualifier is shown as "J" in this table for consistency, although it was presented as "B" in the laboratory report (note: these results were not validated, thus they had not been provided validation qualifiers).

The qualifier "B" is defined by the laboratory as an indication that the result is between the method detection limit (MDL) and the reporting limit (RL), and therefore is an estimated value.

<sup>3</sup>For the arsenic speciation results, sample identification (ID) numbers are presented in the Brooks Rand Lab Report (BRL Report 1331032) as ORD402O DUP, ORD404L DUP, ORD409L MS/MSD, ORD410L DUP.

The results, however, actually correspond with the primary samples as they are presented in this table (i.e., ORD402O, ORD404L, ORD409L, and ORD410L).

<sup>4</sup>For sample ORD307L, the laboratory estimated detection of chromium (0.47 mg/kg) was qualified by the validator as "U" due to method blank contamination. For consistency, the result is presented as "ND," and therefore not presented in this table.

<sup>5</sup>For sample ORD309L, the laboratory estimated detection of chromium (0.46 mg/kg) was qualified by the validator as "U" due to method blank contamination. For consistency, the result is presented as "ND," and therefore not presented in this table.

<sup>6</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

\* The data was analyzed by Brooks Rand Labs; the corresponding qualifiers come from the laboratory (Brooks Rand) rather than the validator.

-- = not analyzed

DUP = duplicate

mg/kg = milligrams per kilogram-wet weight

N/A = not applicable

ND = not detected at or above the MDL

**bold** = result is above the project screening level

<sup>J</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.

<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.

Biota sample ID numbers are not consecutive due to the archiving of extra samples.

Duplicate sample metal results were presented in the laboratory reports on the Sample Duplicate Evaluation Sheets:

Sample ORD302O DUP corresponds with the laboratory Lot-Sample #: G2H160472-002.

Sample ORD315O DUP corresponds with the laboratory Lot-Sample #: G2H160472-013.

Sample ORD402O DUP corresponds with the Lab Sample ID: 320-3334-2 DU.

Sample ORD407O DUP corresponds with the Lab Sample ID: 320-3334-9 DU.

Sample ORD303F DUP corresponds with the laboratory Lot-Sample #: G2H160455-001.

Sample ORD327F DUP corresponds with the laboratory Lot-Sample #: G2H160455-017.

Sample ORD405F DUP corresponds with the Lab Sample ID: 320-3331-3 DU.

Sample ORD415F DUP corresponds with the Lab Sample ID: 320-3331-5 DU.

Sample ORD429F DUP corresponds with the Lab Sample ID: 320-3331-18 DU.

Sample ORD433F DUP corresponds with the Lab Sample ID: 320-3331-22 DU.

Sample ORD307C DUP corresponds with the laboratory Lot-Sample #: G2H160446-007.

Sample ORD311C DUP corresponds with the laboratory Lot-Sample #: G2H160446-011.

Sample ORD301L DUP corresponds with the laboratory Lot-Sample #: G2H160464-001.

Sample ORD306L DUP corresponds with the laboratory Lot-Sample #: G2H160464-006.

Sample ORD404L DUP corresponds with the Lab Sample ID: 320-3338-4 DU.

Sample ORD410L DUP corresponds with the Lab Sample ID: 320-3338-11 DU.

*Appendix G*  
*Data QA/QC*

## APPENDIX G: ANALYTICAL DATA QA/QC SUMMARY

### G.1. INTRODUCTION

The University of Hawai‘i was contracted by the Concurrent Technology Corporation (CTC) to determine the potential effects of activities associated with the Remotely Operated Underwater Munitions Recovery System (ROUMRS) technology demonstration performed at Ordnance Reef (HI-06) in the summer of 2011.

This Appendix is the Data Quality Assurance (QA)/Quality Control (QC), Appendix G of the *Ordnance Reef Follow-Up Investigation Report, Ordnance Reef (HI-06) Wai‘anae, O‘ahu, Hawai‘i*.

#### G.1.1 Project Objectives

The purpose of the Follow-Up Investigation (FUI) was the quantitative determination of changes in munitions constituents of potential concern concentrations caused by the recovery of ocean discarded military munitions during ROUMRS activities and the evaluation of changes over a period of one or more years after the ROUMRS demonstration activities. The ROUMRS investigation follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigation (RI) process outlined in the *Sampling and Analysis Plan, Ordnance Reef (HI-06) Follow-Up Investigation, Wai‘anae, O‘ahu, Hawai‘i* and previously used during other environmental study/RI activities performed at Ordnance Reef (HI-06). Activities performed during the FUI consisted of sediment and biota sample collection and analytical laboratory analyses. The Follow-Up Investigation activities were performed under field sampling procedures detailed in the *Sampling and Analysis Plan Volume I: Field Sampling Plan, Ordnance Reef (HI-06) Follow-Up Investigation, Wai‘anae, O‘ahu, Hawai‘i* (University of Hawai‘i, 2011). Additional details about project objectives are provided in Section 1.0 of the *Ordnance Reef Follow-Up Investigation Report, Ordnance Reef (HI-06) Wai‘anae, O‘ahu, Hawai‘i*.

#### G.1.2 Data Quality Objectives

Data quality objectives (DQOs) were obtained from Section 2 of *Sampling and Analysis Plan Volume II: Quality Assurance Project Plan, Ordnance Reef (HI-06) Follow-Up Investigation, Wai‘anae, O‘ahu, Hawai‘i* and include analytical methods, specific target analytes, QC limits and measurement performance criteria (MPC), and project screening levels.

### G.2. DATA ACQUISITION AND FIELD ACTIVITIES

The Follow-Up Investigation for Ordnance Reef (HI-06) consisted of field sample collection over three years:

- FUI1 (2011) sediment sample collection for energetics and inorganic elements
- FUI2 (2012) sediment and biota sample collection for energetics and inorganic elements
- FUI3 (2013) sediment and biota sample collection for energetics and inorganic elements



Sediment and biota field samples and QC field duplicate samples were collected during August 2011 through June 2013.

TestAmerica West Sacramento, located in Sacramento, California, analyzed sediment samples for energetics (nitroaromatics and nitramines) and inorganic elements (metals) using SW-846 Methods 8330A and 6020A. Biota samples were analyzed for energetics, inorganic elements, and speciated arsenic by a matrix-specific adaptation of SW-846 Method 8330 (TestAmerica West Sacramento), SW-846 Method 6020A (TestAmerica West Sacramento), and EPA Methods 1632 and 1638, Modified (Brooks Rand Labs of Seattle, Washington), respectively. Field duplicate sample pairs were collected at a rate of 10 percent (%), in accordance with project requirements. For biota samples, the analytical laboratory was responsible for preparing the duplicate split samples at a rate of 10% or part thereof.

TestAmerica Sacramento is a National Environmental Laboratory Accreditation Program (NELAP)-and Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) accredited laboratory, with certifications and accreditations in 28 U.S. states and from four federal agencies.

Brooks Rand Labs is NELAP-accredited through the State of Florida Department of Health, Bureau of Laboratories, has a DoD ELAP accreditation, and has certifications and accreditations from nine U.S. states.

A complete listing of certifications, accreditations, and permits for each laboratory can be found on their respective websites at the following URLs:

- TestAmerica - <http://www.testamericainc.com/about/soq/accreditations/>
- Brooks Rand Labs - <http://www.brooksrand.com/AnalyticalServicesHome/DownloadsMoreInfo>

### **G.3. ANALYTICAL RESULTS**

Analytical results tables were generated for all field investigation and QC (field duplicate) samples. Results tables include the date of sample collection, field sample identification (ID) number, sample location, and applicable project screening levels. The analytical results presentation includes the laboratory reporting limit (RL), analytical result, and data validation qualifier and/or laboratory qualifier. All analytical sample non-detects are reported as “ND” (non-detect) at the laboratory method detection limit (MDL). QC sample results tables were generated for all field duplicate pairs. Field duplicate results tables include the date of sample collection, field sample and duplicate IDs, sample location, applicable project screening levels and/or Eco Tox numbers, and the relative percent difference (RPD) between the original and duplicate sample results.

Analytical results are presented in Tables F-1 through F-4 of Appendix F Data Summary Tables, *Ordnance Reef Follow-Up Investigation Report*. Field duplicate sample results and RPDs are presented in Tables G-1 through G-4 of this Appendix.

#### G.4. DATA QUALITY EVALUATION PROCEDURES

Third-party data validation was performed by Laboratory Data Consultants, Inc. (LDC) located in Carlsbad, California. The data quality evaluation (validation) was performed using guidelines cited in the *Sampling and Analysis Plan Volume II: Quality Assurance Project Plan, Ordnance Reef (HI-06) Follow-Up Investigation, Wai‘anae, O‘ahu, Hawai‘i* (University of Hawai‘i, 2011). These guidelines are as follows:

- USEPA-540-R-10-011- *USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Superfund Data Review* [United States Environmental Protection Agency (USEPA), 2010];
- USEPA 9240 1-48 - *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, 2008); and
- SW-846 analytical methods and laboratory-specific standard operating procedures (SOPs).

All analytical results requiring qualification were flagged in accordance with project requirements. Definitions were provided by LDC in the Data Validation Reports included in this Appendix and presented below.

- U = Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J = Indicates an estimated value.
- NJ = Presumptive evidence of presence of the compound at an estimated quantity.
- UJ = Indicates the compounds or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- R = Quality control indicates the data is not usable.
- A = Indicates the finding is based upon technical validation criteria.
- P = Indicates the finding is related to a protocol/contractual deviation.

Approximately 50% of analytical data underwent EPA Level IV third-party data validation. For data that were not validated, the Level IV laboratory data report case narratives were reviewed.

Validated and unvalidated sample data are as follows:

- Validated sample data
  - All FUI1 (2011) samples
  - All FUI2 (2012) samples, with the exception of sediment metals re-reported/re-analyzed sample data in sample delivery groups (SDGs) 320-2258-1 and 320-2277-1
- Unvalidated sample data
  - FUI2 (2012) sediment metals re-reported/re-analyzed SDGs 320-2258-1 and 320-2277-1)
  - All FUI3 (2013) samples

A summary of the data quality evaluation and case narrative review findings is presented in Section G.5 of this Appendix.

## **G.5. DATA QUALITY EVALUATION**

The following subsections present the evaluation of laboratory data with respect to specific QA/QC criteria for the Ordnance Reef (HI-06) FUI field sampling activities. Tables F-1 through F-4 present all analytical sample results. Field duplicate sample results and RPDs are presented in Tables G-1 through G-4 of this Appendix. Tables G-5 and G-6 present the analytical data completeness calculations. The data validation reports and validation qualifiers are presented in this Appendix. An evaluation of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters is presented in Section G.6

### **G.5.1 Review of Quality Control Data**

Analytical laboratory QC is established through the collection of specific samples and data to identify potential problems or complications that may compromise data quality. The types of samples and data collected and the associated qualifiers resulting from the QC process are described below. Third-party data validation was conducted for the individual results, as presented in this Appendix, Data Validation Reports. The data quality indicators (DQIs) and measurement quality objectives presented in the QAPP were used to evaluate analytical data.

PARCC parameters are used to evaluate the usability of all analytical data. This is discussed in greater detail in Section G.6 of this Appendix. Although the paragraphs immediately following describe various anomalies with regard to the analytical data, the PARCC parameters were acceptable. The data are suitable for their intended use in this study and can be used for evaluation of risk, if necessary. See Section G.6 for a detailed discussion of PARCC parameter evaluation.

### **G.5.2 Chain-of-Custody Records**

Chain-of-Custody Records (COCs) were properly signed by field sampling and laboratory personnel for all validated field samples. No problems with sample logging and handling were noted.

### **G.5.3 Holding Time and Sample Temperatures**

Sample temperatures and holding times are compared to the requirements provided in the QAPP and analytical methods. Sample preparations and analyses that are not performed within the method-specific holding times are qualified appropriately. For this Follow-Up Investigation, all validated samples were preserved properly and analyzed within method-specific holding times.

The following metals samples were re-analyzed outside of the applicable method-specific holding time due to elevated quantitation limits in the original analyses.

- Sediment samples in SDG 320-2277-1:
  - ORD301S-2, ORD302S-2, ORD303S-2, ORD304S-2, ORD305S-2, ORD306S-2, ORD307S-2, ORD308S-2, ORD309S-2, ORD310S-2, ORD311S-2, ORD312S-2, ORD313S-2, ORD314S-2, ORD315S-2, ORD316S-2, ORD317S-2, ORD318S-2, ORD319S-2, ORD320S-2, ORD321S-2, ORD322S-2

Quantitation limits for the reanalyses met the project requirements; however, the associated data did not undergo third-party data validation. Original analyses were performed within holding time and validated by LDC. No data were qualified as rejected (R), however reanalyses are recommended for use due to the elevated quantitation limits in the original analyses.

#### **G.5.4 Calibrations**

The following section presents the initial and continuing calibration evaluations.

##### Metals

The instruments were calibrated at the required frequency. The initial calibration correlation coefficient was greater than or equal to 0.998 for all calibration curves. Continuing calibration verifications (CCVs) and continuing calibration blanks (CCBs) were analyzed per SW-846 Method requirements to verify the instrument calibration throughout the analytical sequence. Summary forms and raw data were evaluated.

Sample concentrations were compared to concentrations detected in the initial calibration blanks (ICBs) and CCBs. For all validated data, associated analyte concentrations were either not detected or greater than five times the associated blank concentration. No data required qualification due to ICB or CCB contamination.

##### Energetics

Initial calibration of compounds was performed for the primary quantitation column and confirmation column per analytical method requirements. The % relative standard deviations (%RSDs) were less than or equal to 20% for all compounds. Retention times were within the required limits.

All continuing calibration % differences (%Ds) were within 15% and the % recoveries (%RECs) for the second source calibration standard were between 75% and 125%. No data required qualification based on initial or continuing calibrations.

#### **G.5.5 Inductively Coupled Plasma/Mass Spectroscopy Tune Check**

Inductively Coupled Plasma/Mass Spectroscopy (ICP/MS) performance checks (or tunes) are performed to ensure that instrument mass resolution, identification, and sensitivity can meet method criteria prior to sample analysis. The mass calibration was within 0.1 atomic mass unit (AMU) and the %RSD was less than or equal to 5% for all validated samples.

### **G.5.6 Interference Check Samples**

Interference check samples are analyzed to ensure proper element identification and quantitation for ICP analyses. The frequency and method criteria for the analysis of interference check samples (ICS) were met for all validated data.

### **G.5.7 Internal Standards**

Internal standards are required for each analyte determined by ICP/MS for the evaluation of sample target compound instrument response. For all validated data, all internal standard %RECs were within the method required QC limits.

### **G.5.8 Laboratory Method Blanks**

A laboratory method blank is an analyte-free matrix that is carried through the entire preparation and analysis sequence for the purpose of identifying potential contamination introduced during preparation and analysis. The method blank data is used to evaluate laboratory contamination during analysis. Method blanks were analyzed for each sample batch.

Analyte detections were qualified as non-detect (U) if the concentration in the sample was less than five times the concentration in the associated method blank (corrected for dilutions). Sample results that are either non-detect (U), or greater than five times the method blank result do not require qualification.

#### Metals

For all validated data, associated analyte concentrations were either not detected or greater than five times the associated blank concentration. No data required qualification due to method blank contamination.

#### Energetics

For all validated data, there were no detections of energetics in the method blanks associated with any field samples.

### **G.5.9 Surrogate Recoveries**

Surrogate samples are organic compounds that are not likely to be detected in the field samples, but behave similarly to the target analytes. Surrogate compounds are spiked in each sample within a batch and the recoveries are used to determine the efficiency of sample preparation and analysis. The %REC of each surrogate is used to assess the success of the sample preparation and analysis process for an individual sample.

Surrogate samples were analyzed for energetics. All %RECs for validated data were within laboratory QC limits for all validated data.

FUI3 (2013) tissue samples reported in SDG 320-3334-1 did not undergo third-party data validation. A review of the Level IV laboratory report case narrative indicates that the surrogate

compound 3,4-dinitrotoluene eluted outside of the retention time window on the confirmation column during the analysis of sample ORD411O (320-3334-6). The retention time shift was taken into account during the laboratory target compound sample review, so data were not adversely impacted.

#### **G.5.10 Post Digestion Spike**

Post digestion spikes (PDS) are performed for metals analyses. A PDS is a field sample that is spiked with known concentrations of analytes after sample digestion. The PDS is used to assess matrix interference for total metals analyses. The PDS is prepared and analyzed using the same method as the field samples.

For validated data, PDS analyses were either not performed by the laboratory or not evaluated by the validator. Data were evaluated based on matrix spike (MS)/matrix spike duplicate (MSD) and serial dilution sample results.

According to the Level IV laboratory report case narrative, PDS %REC for unvalidated speciated arsenic SDG 1236006 were within laboratory QC limits.

#### **G.5.11 Serial Dilution**

A serial dilution sample is a dilution test used to determine physical or chemical matrix interferences. For a sample with an analyte concentration of at least a factor of 10 above the lower limit of quantitation after dilution, an analysis of a 1:5 dilution should agree within  $\pm 10\%$  of the original determination. Otherwise, a chemical or physical interference is indicated. Serial dilution results were acceptable for all metals batches and no qualifications were assigned based on serial dilution results.

#### **G.5.12 Laboratory Control Samples**

Laboratory control samples (LCSs) are well-characterized sample MS with compounds representative of the target analytes that are used to document laboratory performance during analysis. LCSs are used to monitor the accuracy of the analytical process independent of project sample matrix and identify potential background interference or contamination of the analytical system. LCSs were analyzed and reported for each analytical batch. The LCS %REC is a measure of method accuracy.

##### Metals

All LCS %RECs were within the applicable QC limits for all validated data.

##### Energetics

All LCS %RECs for validated data were with laboratory QC limits, with the following exception:

LCS MWJT31AC in SDG G2H160464 %RECs were below the lower control limit (25%) for picric acid (7.5%) and 2,4-dinitrophenol (0%). Associated sample detections were qualified as estimated (J) and non-detects were qualified as rejected (R) in the following samples (all samples in SDG G2H160464):

- ORD301L
- ORD302L
- ORD303L
- ORD304L
- ORD305L
- ORD306L
- ORD307L
- ORD308L
- ORD309L
- ORD3010L
- ORD3011L

FUI3 (2013) sediment samples reported in SDGs 320-29922-1 and 320-2994-1 did not undergo third-party data validation. A review of the Level IV laboratory report case narrative indicates slightly low %RECs (82% and 81%, respectively) for PETN in the LCSs associated with the samples in the two SDGs.

#### **G.5.13 Matrix Spike/Matrix Spike Duplicate**

A MS sample is an aliquot of a matrix spiked with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The spiking occurs in the laboratory using a matrix sample from the site prior to sample preparation and analysis. An MS sample is used to document the bias of a method in a given sample matrix. The %REC for the respective analytes is then calculated. The MSD is a second aliquot of the same matrix as the MS, also spiked, in order to determine the precision of the method. The spiking, which is conducted in the laboratory, occurs prior to sample preparation and analysis. The results are used to document the precision and bias of a method in a given sample matrix. MS/MSD samples were collected at a frequency of 5% throughout the project.

#### Metals

Metals MS/MSD samples were evaluated for accuracy/bias (%REC) and precision (RPD). All MS/MSD sample results were within the required %REC and RPD QC limits with the following exceptions:

*Accuracy/Bias Evaluation*

<b>SDG</b>	<b>Affected Samples</b>	<b>Matrix</b>	<b>MS/MSD %REC Outlier</b>	<b>Limits</b>	<b>Qualifiers</b>
G2H160446	All samples in SDG	Tissue	Zinc – MS - 72% ; MSD - 66%	80-120%	J, detects; UJ, non- detects
G2H160446	All samples in SDG	Tissue	Strontium - MS - 123 %; MSD - 145%	80-120%	J, detects
G1H110408	All samples in SDG	Sediment	Copper – MS - 88%; MSD - 422%	89-110%	J, detects; UJ, non-detects
G1H110408	All samples in SDG	Sediment	Zinc – MSD - 159%	79-110%	J, detects
G1H110409	All samples in SDG	Sediment	Chromium – MS – 120% Nickel – MS – 140%; MSD – 133% Vanadium – MS – 125%; MSD – 118% Copper – MS – 87%; MSD – 87% Lead – MS - 83%; MSD - 82% Thallium – MS – 87%; MSD – 86% Uranium – MS - 50%; MSD - 49% Zinc – MSD – 76%	88-113% 90-110% 84-112% 89-110% 87-113% 88-119% 80-120% 79-110%	J, detects J, detects J, detects J, detects; UJ, non-detects J, detects; UJ, non-detects J, detects; UJ, non-detects J, detects; UJ, non-detects J, detects; UJ, non-detects
G2G240418	ORD301S ORD302S ORD303S ORD304S ORD305S ORD306S ORD307S ORD308S ORD309S ORD310S ORD311S	Sediment	Antimony – MS - 78%; MSD - 76% Copper – MS - 88%; MSD - 86%	83-110% 89-110%	J, detects ;UJ non-detects J detects; UJ non-detects
G2G240418	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S	Sediment	Arsenic - MS – 120%; MSD – 119% Copper – MS – 88%; MSD – 128% Nickel – MS – 78%; Zinc – MS – 115%; MSD – 49%	81-110% 89-110% 90-110% 79-110%	J, detects J, detects ;UJ, non-detects J, detects ;UJ, non-detects J, detects ;UJ, non-detects

*Precision Evaluation*

<b>SDG</b>	<b>Affected Samples</b>	<b>Matrix</b>	<b>MS/MSD RPD</b>	<b>Limits</b>	<b>Qualifiers</b>
G1H110408	All samples in SDG	Sediment	Copper –104	20	J, detects; UJ, non-detects
G1H110408	All samples in SDG	Sediment	Zinc – 41	20	J, detects; UJ, non-detects
G2G240418	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S	Sediment	Copper – 34 Zinc - 39	20 20	J, detects; UJ, non-detects J, detects; UJ, non-detects



A data qualification summary table is presented in each data validation report provided by LDC. The data validation reports are presented in this Appendix. Tables F-1 through F-4 present the analytical results, including all final data validation qualifiers.

### Energetics

Energetics MS/MSD samples were evaluated for accuracy/bias (%REC) and precision (RPD). All MS/MSD sample results were within the required %REC and RPD QC limits with the following exceptions:

#### *Accuracy/Bias Evaluation*

SDG	Affected Samples	Matrix	MS/MSD %REC Outlier	Limits	Qualifiers
G2H110408	ORD210S	Sediment	2,4-Dinitrophenol – MS – 29%; MSD – 5.2% Picric acid – MS – 71%; MSD – 67% Picramic acid – MS – 4.5%; MSD – 0% Nitrobenzene – MS – 107%	70-130% 73-103% 50-130% 76-106%	J, detects; UJ, non- detects J, detects; UJ, non-detects J, detects; R, non-detects J, detects
G2H110409	ORD226S	Sediment	Picramic Acid – MS – 19%; MSD – 41% 2,4-Dinitrophenol – MS – 61%	50-130% 71-103%	J, detects; UJ, non- detects J, detects; UJ, non- detects
G2G240418	ORD303S	Sediment	2,4-Dinitrophenol – MS – 65%; MSD – 67% Picramic acid – MS - 20%; MSD – 15%	70-130% 50-130%	J, detects; UJ, non- detects J, detects; UJ, non- detects
G2G260422	ORD334S	Sediment	Picramic acid – MS – 39%	50-130%	J, detects; UJ, non- detects
G2H160446	ORD306C	Tissue	Tetryl – MS – 0%	10-150%	J, detects; R, non-detects
G2H160455	ORD308F	Tissue	Tetryl – MS – 0%; MSD – 0%	10-150%	J, detects; R, non-detects
G2H160464	ORD305L	Tissue	Tetryl – MS – 0%; MSD – 0%	10-150%	J, detects; R, non-detects

#### *Precision Evaluation*

SDG	Affected Samples	Matrix	MS/MSD RPD	Limits	Qualifiers
G2H110408	ORD210S	Sediment	2,4-Dinitrophenol – 140 Picramic acid - 200	25 25	J, detects; UJ, non- detects J detects; R, non-detects (above)
G2H110409	ORD226S	Sediment	Picramic acid - 73	25	J, detects; UJ, non- detects
G2G240418	ORD303S	Sediment	Picramic acid - 29	25	J, detects
G2H160446	ORD306C	Tissue	Tetryl – 200	35	J, detects

FUI2 (2012) sediment metals samples re-reported/re-analyzed in SDGs 320-2258-1 and 320-2277-1 did not undergo third-party data validation. According to the Level IV laboratory reports, the MS and/or MSD sample recoveries for several target analytes were outside the laboratory QC limits as follows:

- SDG 320-2258-1
  - Lead, thallium, and nickel
- SDG 320-2277-1
  - Antimony, copper, and nickel

The FUI2 (2012) biota arsenic speciation data was not third-party validated. According to the Level IV laboratory report, SDG 1236006, MS/MSD sample spike concentrations were slightly less than the native sample concentrations, so MS/MSD recoveries were not adequate indicators of matrix interference. PDS were subsequently prepared and analyzed with associated recoveries within the laboratory QC limits.

The FUI3 (2013) sediment energetics data was not third-party validated. According to the Level IV laboratory reports 320-2922-1 and 320-2994-1, the MS and MSD samples recoveries for several target analytes were outside of the laboratory QC limits, as follows:

- SDG 320-2922-1
  - 2,4-Dinitrophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, nitroglycerin, PETN, picramic acid, and picric acid %RECs were outside the laboratory QC limits as listed in the laboratory data report.
- SDG 320-2994-1
  - HMX, PETN, picramic acid, 2,4-dinitrophenol, tetryl, and 2,4,6-trinitrotoluene %RECs were outside of the laboratory QC limits.

The FUI3 (2013) biota metals data were not third-party validated. According to the Level IV laboratory reports, the MS and/or MSD samples recoveries for several target analytes were outside of the laboratory QC limits, as follows:

- SDG 320-3331-1
  - Copper, strontium, and zinc
- SDG 320-3334-1
  - Copper
- SDG 320-3338-1
  - Strontium

The FUI3 (2013) biota energetics data were not third-party validated. According to the Level IV laboratory reports, the MS and/or MSD samples recoveries for several target analytes were outside of the laboratory QC limits, as follows:

- SDG 320-3331-1
  - Tetryl
- SDG 320-3338-1
  - 4-Nitrophenol and 1,3,5-trinitrotoluene

The FUI3 (2013) biota arsenic speciation data was not third-party validated. According to the Level IV laboratory report, SDG 1331032, MS/MSD recoveries and precision results were within laboratory QC limits according to the QC summary results presented in the Level IV data package.

Appendix E, Laboratory Reports, provides the Level IV laboratory data reports including a listing of MS/MSD QC limits and %RECs for all analytes. The data validation reports are presented in this Appendix. Tables F-1 through F-4 present the analytical results, including all final data validation qualifiers.

#### **G.5.14 Analyte Quantitation**

All SW-846 Method 8330A compound detections must be confirmed by a second column. The RPD between the primary and secondary columns must be less than 40%. All analyte detections were confirmed with the following exceptions:

- RDX in sample ORD214S had a primary and secondary column RPD of 180%.
- 2-Nitrotoluene in sample ORD215S had a primary and secondary column RPD of 63%.
- 2,4-Dinitrotoluene in sample ORD326S had a primary and secondary column RPD of 57%.

Associated analyte detections in both samples were qualified as estimated (J).

2,4-Dinitrotoluene results in sample ORD214S (SDG G1H110408) exceeded the calibration range of the instrument, so the associated sample result was qualified as estimated (J).

According to the Level IV laboratory report case narrative for SDG 320-334-1 (FUI3), energetics sample results were initially processed against an incorrect calibration curve due to analyst error. The data were re-processed using the correct calibration curve, and the laboratory report was re-issued with the revised data.

According to the Level IV laboratory report case narrative for SDG 320-3338-1, 2,4-dinitrophenol was a requested target analyte, but was not reported due to 0% RECs in LCS and MS/MSD samples. Prior rounds of analysis for energetics in limu also yielded no reportable results for this analyte. The loss of this analyte is most likely due to the special cleanup procedures utilized in the processing of the limu extracts.

#### **G.5.15 Quantitation Limits**

Metals sample results for the following field samples did not meet the required project reporting limits:

ORD301S, ORD302S, ORD303S, ORD304S, ORD305S, ORD306S, ORD307S,  
ORD308S, ORD309S, ORD310S, ORD311S, ORD312S, ORD313S, ORD314S,  
ORD315S, ORD316S, ORD317S, ORD318S, ORD319S, ORD320S, ORD321S,  
ORD322S, ORD323S, ORD324S, ORD325S, ORD326S, ORD327S, ORD328S,  
ORD329S, ORD330S, ORD331S, ORD332S, ORD333S, ORD334S, ORD335S,  
ORD336S, ORD337S, ORD338S, ORD339S, ORD340S

Samples ORD301S through ORD322S were originally analyzed and reported in SDG G2G240418 from 20X dilutions which did not meet the required project reporting limits. In order to meet the program requirements, a second aliquot of all samples analyzed in the original

report was provided to the laboratory. These aliquots were digested, analyzed, and reported (outside of the applicable method-specific holding time) from a 5X dilution (i.e., SDG 320-2271-1, ORD301S-2 through ORD322S-2). Samples ORD323S through ORD340S were initially reported in SDG G2G260422 from a 20X dilution which did not meet the required project reporting limits. In order to meet the program requirements, the data was re-reported by the laboratory from a 5X dilution that was also acquired at the time of the original analysis (SDG 320-2258-1).

Reporting limits for the re-reported/re-analyzed samples met the project requirements; however, the associated data did not undergo third-party validation. Original analyses were performed within holding time and validated by LDC. No original sample data were qualified as rejected (R); however, re-reported/re-analyzed data are recommended for use due to the elevated quantitation limits in the original analyses.

#### **G.5.16 Field Duplicates and Laboratory Biota Duplicates**

A field duplicate is a split sample that is collected and analyzed in a manner identical to that of the primary sample. These samples, which were submitted to the primary laboratory (TestAmerica), serve as “blind” duplicates. The results of “blind duplicates” are used to evaluate the sampling procedures and precision of the laboratory analyses. Laboratory duplicates are different aliquots of the same sample prepared in the laboratory. They are analyzed to evaluate the precision of the laboratory’s performance. Results of both field duplicates and laboratory duplicates are expressed as the RPD between analytical results for the duplicate and the original sample. The RPD is affected by the sample matrix homogeneity.

#### Metals

Sediment field duplicate sample pairs were collected by the field sampling team and submitted to the analytical laboratory for metals analyses. All metals RPDs were within the RPD requirements of 50 (or within three times the method reporting limit for results less than five times the method reporting limit) specified in Section 2.2.2, Measurement Performance Criteria, of the QAPP, with the following exceptions:

- The RPD for lead in following field duplicate pairs:
  - ORD411S (450 mg/kg) / ORD412S (5.1 mg/kg) – RPD of 196%
  - ORD328S (7.0 mg/kg) / ORD329S (3.0 mg/kg) – RPD of 80%
  - ORD328S (5.7 mg/kg) / ORD329S (2.2 mg/kg) – RPD of 88.6%
- The RPD for vanadium in field duplicate pair ORD316S-2 (13 mg/kg) / ORD317S-2 (22 mg/kg) was 51.4%
- The RPD for copper in field duplicate pair ORD217S (10.7<sup>J</sup> mg/kg) / ORD218S (5.0<sup>J</sup> mg/kg) was 72.6%.

It was not feasible to collect field duplicate pairs for the biota samples. In lieu of field duplicates, the laboratory prepared laboratory duplicates for analysis. Laboratory QC criteria (RPD of 35) and field duplicate criteria outlined in Section 2.2.2 of the project QAPP were used to evaluate biota laboratory duplicates for the purpose of project precision and representativeness

evaluations. All metals RPDs for biota samples were within laboratory and QAPP criteria with the following exceptions:

- The RPD for zinc in laboratory biota duplicate pair ORD327F (11.5 mg/kg) / ORD327F DUP (6.5 mg/kg) was 55.6%
- The RPD for strontium in the following laboratory biota duplicate pairs:
  - ORD311C (12.7<sup>J</sup> mg/kg) / ORD311C DUP (5.7<sup>J</sup> mg/kg) – RPD of 76.1%
  - ORD405F (12 mg/kg) / ORD405F DUP (1.19 mg/kg) – RPD of 163.9%
  - ORD433F (0.73 mg/kg) / ORD433F DUP (3.43 mg/kg) – RPD of 129.8%
- The RPD for copper in laboratory biota duplicate pair ORD315O (4.5 mg/kg) / ORD315O DUP (7.5 mg/kg) was 50%.

RPD exceedances in sediment and biota samples may be due to the non-homogenous nature of the matrices. No samples were qualified based on field duplicate (or laboratory biota duplicate) results.

### Energetics

Sediment field duplicate sample pairs were collected by the field sampling team and submitted to the analytical laboratory for metals analyses. All energetics compound RPDs were within the RPD requirements specified in QAPP, with the following exception:

- The RPD for 2,4-dinitrotoluene in field duplicate pair ORD403S (0.60 mg/kg) / ORD404S (2.1 mg/kg) was 111%.

It was not feasible to collect field duplicate pairs for the biota samples. In lieu of field duplicates, the laboratory prepared laboratory biota sample duplicates for analysis. Field duplicate criteria outlined in Section 2.2.2 of the project QAPP were also used to evaluate biota laboratory duplicates for the purpose of project precision and representativeness evaluations. All biota sample results for laboratory biota sample duplicate pairs were non-detect, so no RPD evaluations were required.

Tables G-1 through G-4 present the metals and energetics field duplicate results for all sediment and biota samples.

### **G.5.17 Field Completeness**

Field completeness for sample collection was assessed by comparing the number of samples properly collected to the number of samples planned for collection. All samples were collected as planned, and overall field completeness exceeded 100% based on the planned sample collection presented in Table 2-2 of the QAPP. No specific completeness goal percentages were listed in the QAPP.

### **G.5.18 Analytical Completeness**

Analytical completeness was assessed using DQIs. For this report, analytical completeness was measured in terms of laboratory contract and in terms of project usability (data gaps). Analytical completeness definitions and percentages are presented below.

Analytical completeness for this Follow-Up Investigation was calculated for validated data and for data which was not validated by a third-party data validator. Completeness was determined by dividing the total number of records qualified as rejected (R) (or not reportable) for each analytical method and matrix by the total number of records generated. Analytical completeness percentages are presented in Tables G-5 and G-6 and are as follows:

- Sediment:
  - SW-846 Method 8330A – 99.95%
  - SW-846 Method 6020A – 100%
- Biota:
  - SW-846 Method 8330A – 98.3%
  - SW-846 Method 6020A – 100%
  - EPA Method 1632 and 1638, Modified – 100%

### **G.5.19 Data Quality Evaluation Conclusions**

Data are valid for use, as qualified. The project DQOs, as outlined in the QAPP, were met. Section G.6 of this Appendix provides an evaluation of the PARCC parameters for the project. The data are considered suitable for the intended use detailed in the QAPP.

## **G.6. SUMMARY OF PARCC PARAMETERS**

The quality of the field sampling program and laboratory results was evaluated for compliance with project DQOs through a review of overall PARCC. Procedures used to assess PARCC were in accordance with the analytical methods, QAPP requirements, and regulatory standards.

### **G.6.1 Precision**

Precision is a measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. Precision was evaluated using the RPDs of the MS/MSD, field duplicates, or laboratory duplicates. When precision criteria are not met, the bias is indeterminate. However, an RPD outside of established control limits may represent only a slight bias. The precision decreases as the RPD increases.

#### Metals

For sediment samples, no metals data were qualified as rejected due to MS/MSD RPDs, and RPDs for field duplicate pairs were within QAPP requirements for 98% of sample results.

For biota samples, no metals data were qualified as rejected due to MS/MSD RPDs, and RPDs for laboratory duplicate pairs were within QAPP requirements for 98% of sample results.

## Energetics

For sediment samples, no energetics data were qualified as rejected due to MS/MSD RPDs, and RPDs for field duplicate pairs were within QAPP requirements for over 99% of sample results.

For biota samples, no energetics data were qualified as rejected due to MS/MSD RPDs. All sample results were non-detect for energetics analytes, so laboratory duplicate pair RPDs did not require evaluation.

Elevated RPDs for MS/MSD analyses and duplicate pairs could indicate sample matrix non-homogeneity. However, overall precision for energetics and metals in sediment and biota samples meet the requirements of the project DQOs, with over 98% (metals) and 99% (energetics) field or laboratory duplicate pair RPD results within MPC requirements.

### **G.6.2 Accuracy**

Accuracy is a measure of the overall agreement of a measurement to a known value. It includes the combination of random error (precision) and systematic error (bias). The evaluation of random error is described in the precision section above and the systematic error is evaluated by the recoveries of LCS, surrogates, and MS/MSD samples. Instrument calibrations were also reviewed for accuracy assessment.

All LCS and surrogate recoveries were within QC criteria for all analytes, with the exception of LCS MWJT31AC in SDG G2H160464. Low LCS results in SDG G2H160464 resulted in the rejection of 13 sample results for picric acid and 2,4-dinitrophenol. Low MS and/or MSD recoveries resulted in the rejection of three energetic (tetryl) sample results in tissue. These were the only data points qualified as rejected (R) due to QC results for accuracy/bias evaluations.

Low MSD/MSD recoveries could be due to problems with method performance; however, this is unlikely because LCS and surrogate sample results were within the required limits for all validated data. Therefore, low recoveries are likely the result of matrix interference. Low LCS recoveries could indicate problems with method performance. However, overall project accuracy is considered acceptable for all analyte groups in all sample matrices, with over 99% of sample results acceptable (not qualified as rejected [R] by third-party data validation or considered not reportable by the laboratory).

### **G.6.3 Representativeness**

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population. Representativeness can be assessed through evaluation of holding times and method blanks.

The holding time requirements for sediment and biota samples were all met, with the exception of sediment metals sample results for reanalyses performed due to elevated quantitation limits (Section G.5.15).

The 5X (five times) rule (i.e., for positive blank values, if the sample results were less than 5X of the method results, the data were qualified as non-detects [U]). For the negative blanks, if the

sample results were less than 5X of the absolute value of the blank, the data were considered estimates) was applied.

For all validated data, no sample results required qualification due to method blank contamination. Samples were stored and preserved per the site-wide QAPP. Holding times were met for all extractions and analyses. Sample data are representative of the site conditions at the time of sample collection. Overall, the results of all analytical compounds are considered representative for all sample matrices.

#### **G.6.4 Comparability**

Comparability expresses the measure of confidence that one data set can be compared to another and may be combined for the purpose of project decision-making. Comparability can be assessed through the evaluation of sample collection and handling methods, sample preparation, and analytical procedures.

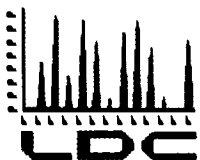
The Follow-Up Investigation field activities were comprised of three field sampling collection events which took place during August 2011, July through August 2012, and June 2013. During the sampling events, sampling methods, sample storage, and biota sample pretreatment were all comparable. The samples were sent to the same laboratories for analysis. The laboratory sample preparation and analysis procedures were the same for the three sampling events. Samples were reported in industry-standard units. Analytical protocols for the methods were followed as stipulated by the QAPP. Therefore, the data are considered comparable and can be combined for decision making.

#### **G.6.5 Completeness**

Completeness is the degree to which the data set provides sufficient number of data points to perform the specified data analyses under the actual condition of sampling and analysis compared to the assumptions of the project planning process. It is evaluated by comparing the number of valid data with those required by the project's quality criteria or total data obtained during the project or study. Rejected data with replacement data points are not counted against the analytical completeness totals.

Approximately 4,557 biota data points were collected, and approximately 4,300 sediment sample points were collected. Of the combined 8,857 data points collected for this Follow-Up Investigation, 44 were qualified as rejected (R) or considered not reportable by the analytical laboratory. The rejected data include three tetryl, 13 picric acid, and 27 2,4-dinitrophenol results for tissues and one picramic acid result results in sediment (Tables F-1 and Table F-2). The overall analytical completeness is 99.5%, which indicates that the completeness requirements for this Follow-Up Investigation were met. The information about the numbers of total data records, rejected data, and completeness in each matrix for each analyte group is presented in Tables G-5 and G-6.





## Laboratory Data Consultants, Inc.

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Environet  
650 Iwilei Road, Suite 204  
Honolulu, HI 96817  
ATTN: Ms. Shelby Koide

January 3, 2013

SUBJECT: Ordnance Reef, Data Validation

Dear Ms. Koide,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 17, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 28934:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
G2H160446	Metals
G2H160472	Energetics

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

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- 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,

Ming-Hwa Hwang  
Project Manager/Senior Chemist

LDC #28934 (Environet-HI / Ordnance Reef)

Project #

LDC	SDG#	DATE REC'D	(3) DATE DUE	Metals (6020A)		Expl. (8330)		W		S		W		S		W		S		W		S		W		S		
				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
Matrix: Water/Soil																												
A	G2H160446	12/17/12	01/10/13	0	17	0	17																					
B	G2H160472	12/17/12	01/10/13	0	16	0	16																					
Total				0	33	0	33																					66

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 31 through August 2, 2012  
**LDC Report Date:** December 28, 2012  
**Matrix:** Tissue  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160446

### Sample Identification

ORD301C  
ORD302C  
ORD303C  
ORD304C  
ORD305C  
ORD306C  
ORD307C  
ORD307C-DUP  
ORD308C  
ORD309C  
ORD310C  
ORD311C  
ORD311C-DUP  
ORD312C  
ORD313C  
ORD314C  
ORD315C  
ORD306CMS  
ORD306CMSD

## Introduction

This data review covers 19 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## 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)	Chromium	0.11 mg/Kg	All samples in SDG G2H160446

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.

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## 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)	Flag	A or P
ORD306CMS/MSD (All samples in SDG G2H160446)	Strontium	123 (80-120)	145 (80-120)	-	J (all detects)	A
ORD306CMS/MSD (All samples in SDG G2H160446)	Zinc	72 (80-120)	66 (80-120)	-	J (all detects) UJ (all non-detects)	A

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards (ICP-MS)

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples ORD307C and ORD307C-DUP and samples ORD311C and ORD311C-DUP were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD307C	ORD307C-DUP	
Arsenic	57.0	59.4	4
Barium	0.14	0.12	15
Cadmium	0.060	0.067	11
Chromium	0.66	0.64	3
Cobalt	0.018	0.018	0
Copper	9.8	10.2	4
Selenium	0.39	0.43	10
Strontium	16.5	14.4	14
Zinc	52.5	50.9	3

Analyte	Concentration (mg/Kg)		RPD
	ORD311C	ORD311C-DUP	
Arsenic	64.9	66.6	3
Barium	0.16	0.11	37
Cadmium	0.050U	0.066	200
Chromium	0.64	0.68	6
Cobalt	0.031	0.048	43
Copper	8.6	10.5	20
Selenium	0.81	0.95	16
Strontium	12.7	5.7	76
Zinc	47.0	52.6	11

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2H160446**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
G2H160446	ORD301C ORD302C ORD303C ORD304C ORD305C ORD306C ORD307C ORD307C-DUP ORD308C ORD309C ORD310C ORD311C ORD311C-DUP ORD312C ORD313C ORD314C ORD315C	Strontium	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2H160446	ORD301C ORD302C ORD303C ORD304C ORD305C ORD306C ORD307C ORD307C-DUP ORD308C ORD309C ORD310C ORD311C ORD311C-DUP ORD312C ORD313C ORD314C ORD315C	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2H160446**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2H160446**

No Sample Data Qualified in this SDG



University of Hawaii at Manoa

Client Sample ID: ORD301C

TOTAL Metals

Lot-Sample #...: G2H160446-001

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING			PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS	METHOD		
Prep Batch #...	2241091					
Arsenic	28.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.17	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.012 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.55 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	2.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.29	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	12.4 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
12/13

University of Hawaii at Manoa

Client Sample ID: ORD301C

TOTAL Metals

Lot-Sample #...: G2H160446-001

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	39.9 J(m)	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6H91AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

J Method blank contamination The associated method blank contains the target analyte at a reportable level

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD302C

TOTAL Metals

Lot-Sample #...: G2H160446-002

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241091					
Arsenic	33.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.19	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.010 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.57 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.30	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	16.8 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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M4  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD302C

TOTAL Metals

Lot-Sample #...: G2H160446-002

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	38.7 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JC1AR

Dilution Factor: 1 MDL.....: 0.60

NOTE(S):

- B Estimated result. Result is less than RL
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD303C

TOTAL Metals

Lot-Sample #...: G2H160446-003

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...:	2241091					
Arsenic	28.7	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.17	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.74 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	7.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.37	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	12.5 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD303C

TOTAL Metals

Lot-Sample #: G2H160446-003

Matrix: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	45.7 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JG1AR

Dilution Factor: 1      MDL: 0.60

NOTE(S):

J Method blank contamination The associated method blank contains the target analyte at a reportable level

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD304C

TOTAL Metals

Lot-Sample #...: G2H160446-004  
 Date Sampled...: 07/31/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #...	2241091					
Arsenic	43.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.12	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.091 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.017 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.62 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	7.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND <sup>U</sup>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.25	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	11.9 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND <sup>U</sup>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD304C

TOTAL Metals

Lot-Sample #....: G2H160446-004

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
Zinc	44.9 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JJ1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result. Result is less than RL
- J Method blank contamination The associated method blank contains the target analyte at a reportable level

*MH*  
*1/2/13*



University of Hawaii at Manoa

Client Sample ID: ORD305C

TOTAL Metals

Lot-Sample #...: G2H160446-005

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241091					
Arsenic	28.5	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.14	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.15	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.025 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.69 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	11.1	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.37	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	12.7 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD305C

TOTAL Metals

Lot-Sample #...: G2H160446-005

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	48.8 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JK1AR

Dilution Factor: 1      MDL.....: 0.60

NOTE(S) :

- B Estimated result. Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD306C

TOTAL Metals

Lot-Sample #...: G2H160446-006  
 Date Sampled...: 07/31/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...:	2241091						
Arsenic	56.7	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AT
		Dilution Factor: 1		MDL.....:	0.15		
Barium	0.16	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AC
		Dilution Factor: 1		MDL.....:	0.090		
Cadmium	0.13	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AD
		Dilution Factor: 1		MDL.....:	0.050		
Cobalt	0.075 B J	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AE
		Dilution Factor: 1		MDL.....:	0.010		
Chromium	0.58 J	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AF
		Dilution Factor: 1		MDL.....:	0.10		
Copper	8.7	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AG
		Dilution Factor: 1		MDL.....:	0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AH
		Dilution Factor: 1		MDL.....:	0.10		
Lead	ND	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AJ
		Dilution Factor: 1		MDL.....:	0.060		
Antimony	ND	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AK
		Dilution Factor: 1		MDL.....:	0.10		
Selenium	0.30	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AL
		Dilution Factor: 1		MDL.....:	0.10		
Strontium	16.2 J(m)	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AM
		Dilution Factor: 1		MDL.....:	0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AN
		Dilution Factor: 1		MDL.....:	0.050		
Uranium	ND	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AP
		Dilution Factor: 1		MDL.....:	0.10		
Vanadium	ND	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6JR1AQ
		Dilution Factor: 1		MDL.....:	0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD306C

TOTAL Metals

Lot-Sample #...: G2H160446-006

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	57.7 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JRLAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result. Result is less than RL
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD307C

TOTAL Metals

Lot-Sample #...: G2H160446-007  
 Date Sampled...: 07/31/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241091					
Arsenic	57.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.14	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.060 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.018 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.66 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	9.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.39	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	16.5 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD307C

TOTAL Metals

Lot-Sample #....: G2H160446-007

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	52.5 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6JX1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level

MH  
11/2/13

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #....: G2H160446      Work Order #....: MV6JX-SMP      Matrix.....: BIOLOGIC  
 MV6JX-DUP  
 Date Sampled....: 07/31/12      Date Received...: 08/16/12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	57.0	59.4	mg/kg	4.1	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Barium	0.14	0.12	mg/kg	17	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Cadmium	0.060 B	0.067 B J	mg/kg	11	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Cobalt	0.018 B	0.018 B J	mg/kg	3.4	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Chromium	0.66 J	0.64	mg/kg	3.5	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Copper	9.8	10.2	mg/kg	4.5	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Nickel	ND	ND U	mg/kg	15	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Lead	ND	ND	mg/kg	28	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Antimony	ND	ND	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Selenium	0.39	0.43	mg/kg	9.5	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					
Strontium	16.5	14.4 J(m)	mg/kg	13	(0-35)	SD Lot-Sample #: G2H160446-007 SW846 6020	08/29-09/24/12	2241091
			Dilution Factor: 1					

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1/2/13





University of Hawaii at Manoa

Client Sample ID: ORD308C

TOTAL Metals

Lot-Sample #...: G2H160446-008

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241091					
Arsenic	46.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.24	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.031 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.64 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	10.7	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.47	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	78.5 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AQ
		Dilution Factor: 1		MDL.....: 0.30		

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1/2/13

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Client Sample ID: ORD308C

TOTAL Metals

Lot-Sample #...: G2H160446-008

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	47.8 J(m)	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J01AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

- B Estimated result Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level

MH  
11/2/13

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Client Sample ID: ORD309C

TOTAL Metals

Lot-Sample #...: G2H160446-009

Matrix.....: BIOLOGIC

Date Sampled...: 07/31/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241091					
Arsenic	42.9	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.13	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.065 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.082 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.62 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.75	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	25.6 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AP
		Dilution Factor: 1		MDL.....: 0.20		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD309C

TOTAL Metals

Lot-Sample #....: G2H160446-009

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	43.4 J(r)	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J21AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

- B Estimated result. Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD310C

TOTAL Metals

Lot-Sample #...: G2H160446-010  
 Date Sampled...: 07/31/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2241091						
Arsenic	53.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.12	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.12	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.020 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.59 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	12.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.41	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	15.3 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD310C

TOTAL Metals

Lot-Sample #...: G2H160446-010

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	46.5 J(m)	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J31AR

Dilution Factor: 1      MDL.....: 0.60

NOTE(S) :

- B Estimated result. Result is less than RL.
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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1/2/13

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Client Sample ID: ORD311C

TOTAL Metals

Lot-Sample #...: G2H160446-011  
 Date Sampled...: 08/02/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241091					
Arsenic	64.9	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.16	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.031 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.64 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	8.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.81	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	12.7 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AQ
		Dilution Factor: 1		MDL.....: 0.30		

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11/2/13

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Client Sample ID: ORD311C

TOTAL Metals

Lot-Sample #...: G2H160446-011

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Zinc	47.0 <i>5(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J51AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

- B Estimated result. Result is less than RL
- J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #...: G2H160446

Work Order #...: MV6J5-SMP  
MV6J5-DUP

Matrix.....: BIOLOGIC

Date Sampled...: 08/02/12

Date Received...: 08/16/12

PARAM RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #	
Arsenic 64.9	66.6	mg/kg	2.6	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Barium 0.16	0.11	mg/kg	37	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Cadmium ND	0.066 B J	mg/kg	62	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Cobalt 0.031 B	0.048 B J	mg/kg	44	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Chromium 0.64 J	0.68	mg/kg	5.6	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Copper 8.6	10.5	mg/kg	20	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Nickel ND	ND U	mg/kg	52	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Lead ND	ND	mg/kg	1.1	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Antimony ND	ND	mg/kg	200	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Selenium 0.81	0.95	mg/kg	16	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					
Strontium 12.7	5.7 J(m)	mg/kg	77	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091	
			Dilution Factor: 1					

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MH  
1/2/13

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Lot-Sample #....: G2H160446-000    Work Order #....: MV6J5-SMP    Matrix.....: BIOLOGIC  
 MV6J5-DUP

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Thallium	ND	ND	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091
		∪	Dilution Factor: 1					
Uranium	ND	ND	mg/kg	200	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091
		↓	Dilution Factor: 1					
Vanadium	ND	ND	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091
		↓	Dilution Factor: 1					
Zinc	47.0	52.6	mg/kg	11	(0-35)	SD Lot-Sample #: G2H160446-011 SW846 6020	08/29-09/24/12	2241091
		J(m)	Dilution Factor: 1					

**NOTE(S) :**

- Calculations are performed before rounding to avoid round-off errors in calculated results
- B Estimated result Result is less than RL
- J Method blank contamination The associated method blank contains the target analyte at a reportable level

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Client Sample ID: ORD312C

TOTAL Metals

Lot-Sample #...: G2H160446-012  
 Date Sampled...: 08/02/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #...: 2241091						
Arsenic	61.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.17	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.016 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.67 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	7.3	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.57	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	21.4 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD312C

TOTAL Metals

Lot-Sample #...: G2H160446-012

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	40.5 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J71AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result Result is less than RL.

J Method blank contamination The associated method blank contains the target analyte at a reportable level.

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD313C

TOTAL Metals

Lot-Sample #...: G2H160446-013  
 Date Sampled...: 08/02/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241091							
Arsenic	48.0	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.12	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND ✓	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	0.081 B J	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.62 J	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	8.4	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND ✓	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	ND	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	1.1	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	13.9 J(m)	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND ✓	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6J81AQ
		Dilution Factor: 1			MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD313C

TOTAL Metals

Lot-Sample #...: G2H160446-013

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	49.1 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J81AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result Result is less than RL
- J Method blank contamination The associated method blank contains the target analyte at a reportable level.

*MH  
1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD314C

TOTAL Metals

Lot-Sample #...: G2H160446-014

Matrix.....: BIOLOGIC

Date Sampled...: 08/02/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #...:	2241091					
Arsenic	54.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.12	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND $\checkmark$	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.019 B $\checkmark$	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.63 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	10.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND $\checkmark$	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND $\checkmark$	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.68	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	13.7 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND $\checkmark$	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND $\checkmark$	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MA  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD314C

TOTAL Metals

Lot-Sample #...: G2H160446-014

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	44.2 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6J91AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result Result is less than RL.

J Method blank contamination The associated method blank contains the target analyte at a reportable level.

*MH  
1/2/13*



University of Hawaii at Manoa

Client Sample ID: ORD315C

TOTAL Metals

Lot-Sample #...: G2H160446-015

Matrix.....: BIOLOGIC

Date Sampled...: 08/02/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...:	2241091					
Arsenic	55.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.18	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	0.084 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.025 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.59 J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	7.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.65	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	12.0 J(m)	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KA1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD315C

TOTAL Metals

Lot-Sample #...: G2H160446-015

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	47.3 <i>J(m)</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result. Result is less than RL.
- J Method blank contamination The associated method blank contains the target analyte at a reportable level

*MH*  
*1/2/13*

LDC #: 28934A4  
 SDG #: G2H160446  
 Laboratory: Test America Inc.

# VALIDATION COMPLETENESS WORKSHEET

## Level IV

Date: 12/18/12  
 Page: 2 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/31-8/2/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(7,8), (12,13)
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 Tissue Biological

1	ORD301C	11	ORD310C	21		31	
2	ORD302C	12	ORD311C	22		32	
3	ORD303C	13	ORD311C-DUP	23		33	
4	ORD304C	14	ORD312C	24		34	
5	ORD305C	15	ORD313C	25		35	
6	ORD306C	16	ORD314C	26		36	
7	ORD307C	17	ORD315C	27		37	
8	ORD307C-DUP	18	ORD306CMS	28		38	
9	ORD308C	19	ORD306CMSD	29		39	
10	ORD309C	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Method: Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $\geq 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $< 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.	/			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			Based on wet wt.
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	



**PB/ICB/CCB QUALIFIED SAMPLES**

**METHOD:** Trace metals (EPA SW 864 Method 6010B/6020/7000)  
 Soil preparation factor applied: NA

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

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/l)	Maximum ICB/CCB <sup>a</sup> (ug/l)	Action Level	No Qualifiers					
Cr	0.11									

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 SW 846 Method 6010/6020/7000)

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

N N/A Was a matrix spike analyzed for each matrix in this SDG?  
 N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~85-125~~ <sup>80-120</sup> if the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

N N/A Were all duplicate sample relative percent differences (RPD)  $\leq$  20% for water samples and  $\leq$  35% for soil samples?

**LEVEL IV ONLY:**  
 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
	18/19	S	Sc	103	145		All	Idet/A (m)
			Zn	72	66		↓	DUJA ↓

Comments: \_\_\_\_\_



## VALIDATION FINDINGS WORKSHEET

### Field Duplicates

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	7	8	
Arsenic	57.0	59.4	4
Barium	0.14	0.12	15
Cadmium	0.060	0.067	11
Chromium	0.66	0.64	3
Cobalt	0.018	0.018	0
Copper	9.8	10.2	4
Selenium	0.39	0.43	10
Strontium	16.5	14.4	14
Zinc	52.5	50.9	3

Analyte	Concentration (mg/Kg)		RPD
	12	13	
Arsenic	64.9	66.6	3
Barium	0.16	0.11	37
Cadmium	0.050U	0.066	200
Chromium	0.64	0.68	6
Cobalt	0.031	0.048	43
Copper	8.6	10.5	20
Selenium	0.81	0.95	16
Strontium	12.7	5.7	76
Zinc	47.0	52.6	11

LDC #: 2893485

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: LL

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found} \times 100}{\text{True}}$  Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R		%R		
1	ICP (Initial calibration)		78.007						
ICV	ICPMS (Initial calibration)	As	1.0858	80	100	97.5	100	97.5	Y
	CVAA (Initial calibration)								
	ICP (Continuing calibration)								
CCV	ICPMS (Continuing calibration)	Ba	915.177	100	95.2		95.2		Y
	CVAA (Continuing calibration)								
	GFAA (Initial calibration)								
	GFAA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).  
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration  
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)  
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D			
TSAB	ICP interference check	Se	99.048	100	99.0	99.0	99.0	99.0	Y
LCS	Laboratory control sample	Cu	20.7	20	104	104	104	104	Y
18	Matrix spike	Pb	17.6 (SSR-SR)	20	88	88	88	88	Y
18/19	Duplicate	As	74.5	76.1	2.1	2.1	2.1	2.1	Y
Q	ICP serial dilution	Sc	145.55	158.59	8.2	8.2	8.2	8.2	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28937A1

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: OR  
 2nd reviewer: W

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Have results been reported and calculated correctly?
- Y  N  N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y  N  N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(\text{RD})(\text{FV})(\text{Dil})}{(\text{In. Vol.})}$$

Recalculation: 
$$\frac{100\text{mL} (3.080583\text{mg/L})}{0.97\text{g} (1000)} = 0.293\text{mg/Kg}$$

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor

ed: 
$$\text{II} = \frac{100\text{mL} (1.285124\text{mg/L})}{1.05\text{g} (1000)} = 0.122\text{mg/Kg}$$

#	Sample ID	Analyte	Reported Concentration (mg/Kg)	Calculated Concentration (mg/Kg)	Acceptable (Y/N)
	I	As	28.2	28.2	Y
		Ba	0.17	0.17	Y
		Co	0.012	0.012	Y
		Cr	0.55	0.55	Y
		Cu	2.6	2.6	Y
		Se	0.29	0.29	Y
		Sr	12.4	12.4	Y
		Zn	39.9	39.9	Y
	II	As	53.6	53.6	Y
		Ba	0.12	0.12	Y
		Cd	0.12	0.12	Y
		Co	0.020	0.020	Y
		Cr	0.59	0.59	Y
		Cu	12.8	12.8	Y
		Se	0.41	0.41	Y
		Sr	15.3	15.3	Y
		Zn	46.5	46.5	Y

Note: \_\_\_\_\_

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 31 through August 2, 2012  
**LDC Report Date:** December 28, 2012  
**Matrix:** Tissue  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160446

**Sample Identification**

ORD301C  
ORD302C  
ORD303C  
ORD304C  
ORD305C  
ORD306C  
ORD307C  
ORD307C-DUP  
ORD308C  
ORD309C  
ORD310C  
ORD311C  
ORD311C-DUP  
ORD312C  
ORD313C  
ORD314C  
ORD315C  
ORD306CMS  
ORD306CMSD

## Introduction

This data review covers 19 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330A for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD306CMS/MSD (ORD306C)	Tetryl	0 (10-150)	-	-	J (all detects) R (all non-detects)	A
ORD306CMS/MSD (ORD306C)	Tetryl	-	-	200 (≤35)	J (all detects)	A

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD307C and ORD307C-DUP and samples ORD311C and ORD311C-DUP were identified as field duplicates. No energetics were detected in any of the samples.



**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2H160446**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G2H160446	ORD306C	Tetryl	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2H160446	ORD306C	Tetryl	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (d)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2H160446**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2H160446**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD301C

HPLC

Lot-Sample #...: G2H160446-001    Work Order #...: MV6H91AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.074
3,5-Dinitroaniline	ND	0.49	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.074
HMX	NC	0.24	mg/kg	0.074
Nitrobenzene	NC	0.49	mg/kg	0.24
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.49	mg/kg	0.078
4-Nitrophenol	ND	0.49	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.074
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND ✓	0.24	mg/kg	0.074

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	85	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD302C

HPLC

Lot-Sample #....: G2H160446-002    Work Order #....: MV6JC1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <i>U</i>	0.24	mg/kg	0.073
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.073
3,5-Dinitroaniline	ND	0.48	mg/kg	0.073
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.073
HMX	ND	0.24	mg/kg	0.073
Nitrobenzene	ND	0.48	mg/kg	0.24
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.073
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.073

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	87	(74 - 117)

*MH*  
*1/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD303C

HPLC

Lot-Sample #...: G2H160446-003    Work Order #...: MV6JG1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.074
3,5-Dinitroaniline	ND	0.49	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.074
HMX	ND	0.24	mg/kg	0.074
Nitrobenzene	ND	0.49	mg/kg	0.24
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.49	mg/kg	0.078
4-Nitrophenol	ND	0.49	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.074
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.074
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	87	(74 - 117)		

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD304C

HPLC

Lot-Sample #...: G2H160446-004    Work Order #...: MV6JJ1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.074
3,5-Dinitroaniline	ND	0.50	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.074
HMX	ND	0.25	mg/kg	0.074
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.079
2-Nitrotoluene	ND	0.25	mg/kg	0.074
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.074
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	86	(74 - 117)		

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD305C

HPLC

Lot-Sample #...: G2H160446-005    Work Order #...: MV6JK1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.075
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.075
3,5-Dinitroaniline	ND	0.50	mg/kg	0.075
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.075
HMX	ND	0.25	mg/kg	0.075
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.080
2-Nitrotoluene	ND	0.25	mg/kg	0.075
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.075
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	86	(74 - 117)		

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD306C

HPLC

Lot-Sample #....: G2H160446-006    Work Order #....: MV6JR1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.074
3,5-Dinitroaniline	ND	0.50	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.074
HMX	ND	0.25	mg/kg	0.074
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.079
2-Nitrotoluene	ND	0.25	mg/kg	0.074
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND R(m)	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND U	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.074
SURROGATE		PERCENT RECOVERY	RECOVERY LIMITS	
3,4-Dinitrotoluene		86	(74 - 117)	

MH  
12/13

University of Hawaii at Manoa

Client Sample ID: ORD307C

HPLC

Lot-Sample #....: G2H160446-007    Work Order #....: MV6JX1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.075
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.075
3,5-Dinitroaniline	ND	0.50	mg/kg	0.075
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.075
HMX	ND	0.25	mg/kg	0.075
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.080
2-Nitrotoluene	ND	0.25	mg/kg	0.075
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.075

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
11/2/13



University of Hawaii at Manoa

Client Sample ID: ORD307C DUP

HPLC

Lot-Sample #....: G2H160446-007    Work Order #....: MV6JX1AU    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/13/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.073
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.073
3,5-Dinitroaniline	ND	0.48	mg/kg	0.073
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	NC	0.48	mg/kg	0.16
2,4-Dinitrotoluene	NC	0.24	mg/kg	0.037
2,6-Dinitrotoluene	NC	0.24	mg/kg	0.073
HMX	ND	0.24	mg/kg	0.073
Nitrobenzene	ND	0.48	mg/kg	0.24
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.073
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.073
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		87	(74 - 117)	

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD308C

HPLC

Lot-Sample #....: G2H160446-008    Work Order #....: MV6J01AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 1.01  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.076
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.076
3,5-Dinitroaniline	ND	0.50	mg/kg	0.076
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	NC	0.50	mg/kg	0.16
2,4-Dinitrotoluene	NC	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.076
HMX	ND	0.25	mg/kg	0.076
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.081
4-Nitrophenol	ND	0.50	mg/kg	0.081
2-Nitrotoluene	ND	0.25	mg/kg	0.076
3-Nitrotoluene	ND	0.25	mg/kg	0.076
4-Nitrotoluene	ND	0.25	mg/kg	0.076
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.076
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.076

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD309C

HPLC

Lot-Sample #....: G2H160446-009    Work Order #....: MV6J21AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.075
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.075
3,5-Dinitroaniline	ND	0.50	mg/kg	0.075
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.075
HMX	ND	0.25	mg/kg	0.075
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.080
2-Nitrotoluene	ND	0.25	mg/kg	0.075
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.075
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		85	(74 - 117)	

M4  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD310C

HPLC

Lot-Sample #....: G2H160446-010    Work Order #....: MV6J31AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/31/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.073
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.073
3,5-Dinitroaniline	ND	0.48	mg/kg	0.073
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.073
HMX	ND	0.24	mg/kg	0.073
Nitrobenzene	ND	0.48	mg/kg	0.24
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.073
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.073
		PERCENT	RECOVERY	
		RECOVERY	LIMITS	
SURROGATE		85	(74 - 117)	
3,4-Dinitrotoluene				

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD311C

HPLC

Lot-Sample #....: G2H160446-011    Work Order #....: MV6J51AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 08/02/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.074
3,5-Dinitroaniline	ND	0.50	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.074
HMX	ND	0.25	mg/kg	0.074
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.079
2-Nitrotoluene	ND	0.25	mg/kg	0.074
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.074

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD311C DUP

HPLC

Lot-Sample #...: G2H160446-011    Work Order #...: MV6J51AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 08/02/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.073
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.073
3,5-Dinitroaniline	ND	0.48	mg/kg	0.073
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.073
HMX	ND	0.24	mg/kg	0.073
Nitrobenzene	ND	0.48	mg/kg	0.24
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.073
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.073

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD312C

HPLC

Lot-Sample #...: G2H160446-012    Work Order #...: MV6J71AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 08/02/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.074
3,5-Dinitroaniline	ND	0.50	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.074
HMX	ND	0.25	mg/kg	0.074
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.079
2-Nitrotoluene	ND	0.25	mg/kg	0.074
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.074

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD313C

HPLC

Lot-Sample #....: G2H160446-013    Work Order #....: MV6J81AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 08/02/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 1.01  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.076
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.076
3,5-Dinitroaniline	ND	0.50	mg/kg	0.076
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.076
HMX	ND	0.25	mg/kg	0.076
Nitrobenzene	ND	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.081
4-Nitrophenol	ND	0.50	mg/kg	0.081
2-Nitrotoluene	ND	0.25	mg/kg	0.076
3-Nitrotoluene	ND	0.25	mg/kg	0.076
4-Nitrotoluene	ND	0.25	mg/kg	0.076
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.076
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.076
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	86	(74 - 117)		

MH  
11/2/13



University of Hawaii at Manoa

Client Sample ID: ORD314C

HPLC

Lot-Sample #...: G2H160446-014 Work Order #...: MV6J91AA Matrix.....: BIOLOGIC  
 Date Sampled...: 08/02/12 Date Received...: 08/16/12  
 Prep Date.....: 09/07/12 Analysis Date...: 09/14/12  
 Prep Batch #...: 2251053  
 Dilution Factor: 0.98  
 % Moisture.....: Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.074
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.074
3,5-Dinitroaniline	ND	0.49	mg/kg	0.074
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.074
HMX	ND	0.24	mg/kg	0.074
Nitrobenzene	ND	0.49	mg/kg	0.24
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.49	mg/kg	0.078
4-Nitrophenol	ND	0.49	mg/kg	0.078
2-Nitrotoluene	ND	0.24	mg/kg	0.074
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.074

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	86	(74 - 117)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD315C

HPLC

Lot-Sample #....: G2H160446-015    Work Order #....: MV6KA1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 08/02/12    Date Received...: 08/16/12  
 Prep Date.....: 09/07/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2251053  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.075
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.075
3,5-Dinitroaniline	ND	0.50	mg/kg	0.075
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.075
HMX	ND	0.25	mg/kg	0.075
Nitrobenzene	NC	0.50	mg/kg	0.25
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.080
2-Nitrotoluene	ND	0.25	mg/kg	0.075
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.075
<hr/>				
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
3,4-Dinitrotoluene	87	(74 - 117)		

MH  
1/2/13

LDC #: 28934A40  
 SDG #: G2H160446  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**

Level IV

Date: 12/28/12  
 Page: 1 of 1  
 Reviewer: SVG  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330<sup>B</sup>)

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: 7/31 - 8/02/12
II.	Initial calibration	A	% RSD ≤ 20%
III.	Calibration verification/ICV	A	CV ≤ 15% ICV %R = 75-125%
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates <i>Lab Dup</i>	SW A	
VII.	Laboratory control samples	A	LOD
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	ND	D <sub>1</sub> = 7, 8 D <sub>2</sub> = 12, 13
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:

*Soil Tissue*

1	ORD301C	11	ORD310C	21	2251053 MB	31	
2	ORD302C	12	ORD311C	22		32	
3	ORD303C	13	ORD311C-DUP	23		33	
4	ORD304C	14	ORD312C	24		34	
5	ORD305C	15	ORD313C	25		35	
6	ORD306C	16	ORD314C	26		36	
7	ORD307C	17	ORD315C	27		37	
8	ORD307C-DUP	18	ORD306CMS	28		38	
9	ORD308C	19	ORD306CMSD	29		39	
10	ORD309C	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Method: GC  HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Continuing calibration</b>				
What type of continuing calibration calculation was performed? <u>  </u> %D or <u>  </u> %R	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 20% or percent recoveries 80-120%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IX. Regional Quality Assurance and Quality Control</b>				

LDC #: 28934 A40

**VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/		/	
Target compounds were detected in the field duplicates.		/	/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

**METHOD:**  GC  HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 Y/N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?  
 Y/N N/A Were an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?  
 Y(N) N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	18/19	Tetryl	0 (10-150)	( ) ( )	200 (35)	6	%R: J/R/A RPD: JdotHAG

LDC #: 28 934 A#0

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: OZ

METHOD: GC            HPLC           

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (100 std)	Recalculated (100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/30/2012	HMX (C-18)	96.820	98.620	95.317	95.373	12.665	12.727
	LC11 C-18		2,4-Dinitrotoluene (C-18)	121.7	121.7	125	124.5	5.042	5.042

Conc	Height
100	9862
100	12168

C-18

Conc	HMX	2,4-DNT
5	108.000	136.2
10	107.000	131.6
20	102.000	124.9
50	97.020	120.6
100	96.820	121.7
200	94.205	121.7
500	87.588	122.0
1000	70.353	117.3
X=	95.373	124.5
S=	12.138	6.278

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC # 28934 A40

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: OZ

METHOD: GC        HPLC   /  

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) =  $100 * (N - C) / N$

Where:

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	N-000004	9/13/2012	HMX (C-18)	200	196.4	196.4	1.8	1.8
	LC11 C-18		2,4-Dinitrotoluene (C-18)	200	195.4	195.2	2.3	2.4
2	N-000015	9/13/2012	HMX (C-18)	100	104.8	99.6	0.45	0.45
	LC11 C-18		2,4-Dinitrotoluene (C-18)	100	97.9	97.8	2.1	2.2
3	N-000026	9/14/2012	HMX (C-18)	100	101.1	101.1	1.1	1.1
	LC11 C-18		2,4-Dinitrotoluene (C-18)	100	97.9	97.9	2.1	2.1

Compound	CF	CCV1		CCV2		CCV3	
		Height	Height	Height	Height	Height	Height
HMX (C-18)	95.32	18720	9489		9641		
2,4-Dinitrotoluene (C-18)	125	24325	12192		12193		



LDC #: 28934 A46

# VALIDATION FINDINGS WORKSHEET

## Surrogate Results Verification

Page: 1 of 1  
Reviewer: JVG  
2nd reviewer: [Signature]

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
SS = Surrogate Spiked

Sample ID: # /

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3,4-DNT	C-18	1961	1660	85	85	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates Results Verification**

**METHOD:** GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$       Where      SSC = Spiked sample concentration      MS = Matrix spike  
 SC = Sample concentration      MSD = Matrix spike duplicate  
 $\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$       SA = Spike added

MS/MSD samples: 18/19

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	0.976	0.980	9	0.886	0.878	91	91	90	90	0.83	0.91
2,4,6-Trinitrotoluene (8330)	↓	↓	↓	0.786	0.772	81	81	79	79	1.8	1.8

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28934 A46

**VALIDATION FINDINGS WORKSHEET**  
**Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification**

Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: OR

METHOD: GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * (SSC/SA)$   
 RPD =  $((SSCLCS - SSCLSD) * 2) / (SSCLCS + SSCLSD) * 100$

Where SSC = Spiked sample concentration  
 LCS = Laboratory Control Sample

SA = Spike added  
 LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 2251053 LCS

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS		LCSD		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)														
Diesel (8015)														
Benzene (8021B)														
Methane (RSK-175)														
2,4-D (8151)														
Dinoseb (8151)														
Naphthalene (8310)														
Anthracene (8310)														
HMX (8330)	1.00	NA	0.944	NA	94	94								
2,4,6-Trinitrotoluene (8330)	↓	↓	0.850	↓	85	85								

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28934 A40

# VALIDATION FINDINGS WORKSHEET

## Sample Calculation Verification

Page: 1 of 1  
Reviewer: JVG  
2nd Reviewer: SD

METHOD: GC  HPLC

Y N / N/A  
Y N / N/A

Were all reported results recalculated and verified for all level IV samples?  
Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A = Area or height of the compound to be measured  
Fv = Final Volume of extract  
Df = Dilution Factor

RF = Average response factor of the compound  
In the initial calibration

Vs = Initial volume of the sample

Ws = Initial weight of the sample

%S = Percent Solid

Example:

Sample ID: \_\_\_\_\_ Compound Name AD

Concentration = \_\_\_\_\_

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: \_\_\_\_\_

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** December 28, 2012  
**Matrix:** Tissue  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160472

**Sample Identification**

ORD301O  
ORD302O  
ORD302O-DUP  
ORD303O  
ORD304O  
ORD305O  
ORD307O  
ORD308O  
ORD309O  
ORD310O  
ORD311O  
ORD313O  
ORD314O  
ORD315O  
ORD315O-DUP  
ORD316O  
ORD305OMS  
ORD305OMSD

## Introduction

This data review covers 18 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

## IX. Internal Standards (ICP-MS)

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples ORD3020 and ORD3020-DUP and samples ORD3150 and ORD3150-DUP were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD3020	ORD3020-DUP	
Arsenic	24.6	23.3	5
Barium	0.15	0.17	13
Chromium	0.58	0.63	8
Copper	6.3	5.5	14
Selenium	0.19	0.19	0
Strontium	3.3	3.1	6
Zinc	12.8	12.6	2



Analyte	Concentration (mg/Kg)		RPD
	ORD3150	ORD3150-DUP	
Arsenic	21.4	22.7	6
Barium	0.099	0.14	34
Chromium	0.74	0.72	3
Copper	4.5	7.5	50
Selenium	0.10	0.15	40
Strontium	4.1	4.3	5
Zinc	12.1	12.9	6

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD3010

TOTAL Metals

Lot-Sample #...: G2H160472-001

Matrix.....: BIOLOGIC

Date Sampled...: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241115					
Arsenic	25.2	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.22	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.010 B	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.62	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	6.0	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.13 B	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.3	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MJ  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3010

TOTAL Metals

Lot-Sample #...: G2H160472-001

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.7	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6P71AR
		Dilution Factor: 1		MDL.....: 0.60		

**NOTE(S) :**

B Estimated result Result is less than RL

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3020

TOTAL Metals

Lot-Sample #...: G2H160472-002  
 Date Sampled...: 07/17/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	24.6	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.15	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.58	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	6.3	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.19 B	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.3	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

mt  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3020

TOTAL Metals

Lot-Sample #...: G2H160472-002

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.8	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6P91AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result. Result is less than RL

MH  
1/2/13

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #...: G2H160472

Work Order #...: MV6P9-SMP  
MV6P9-DUP

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	24.6	23.3	mg/kg	5.7	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Barium	0.15	0.17	mg/kg	9.6	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Cadmium	ND	ND	mg/kg	6.0	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Cobalt	ND	ND	mg/kg	3.6	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Chromium	0.58	0.63	mg/kg	8.7	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Copper	6.3	5.5	mg/kg	15	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Nickel	ND	ND	mg/kg	5.7	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Lead	ND	ND	mg/kg	20	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Antimony	ND	ND	mg/kg	46	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Selenium	0.19 B	0.19 B	mg/kg	0.98	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Strontium	3.3	3.1	mg/kg	5.5	(0-35)	SD Lot-Sample #: G2H160472-002 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					

(Continued on next page)

MA  
11/2/13





University of Hawaii at Manoa

Client Sample ID: ORD3030

TOTAL Metals

Lot-Sample #...: G2H160472-003

Date Sampled...: 07/18/12

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241115					
Arsenic	27.7	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.13	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.66	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.4	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.16 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.7	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
12/13

University of Hawaii at Manoa

Client Sample ID: ORD3030

TOTAL Metals

Lot-Sample #...: G2H160472-003

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	11.8	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QA1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3040

TOTAL Metals

Lot-Sample #...: G2H160472-004

Matrix.....: BIOLOGIC

Date Sampled...: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	26.5	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.11	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.70	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.5	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.15 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.7	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.77 B J	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
12/13

University of Hawaii at Manoa

Client Sample ID: ORD3040

TOTAL Metals

Lot-Sample #...: G2H160472-004

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	13.2	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QC1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3050

TOTAL Metals

Lot-Sample #...: G2H160472-005

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	21.6	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.27	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.64	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.6	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.19 B	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.2	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QD1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3050

TOTAL Metals

Lot-Sample #...: G2H160472-005

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	13.5	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QDIAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3070

TOTAL Metals

Lot-Sample #...: G2H160472-006

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241115					
Arsenic	16.9	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.091 B J	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.55	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.8	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.13 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.3	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND ↓	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3070

TOTAL Metals

Lot-Sample #...: G2H160472-006

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	11.6	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QE1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL.

11/2/13



University of Hawaii at Manoa

Client Sample ID: ORD3080

TOTAL Metals

Lot-Sample #...: G2H160472-007

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	17.2	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.12	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.68	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.4	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.13 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	2.8	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3080

TOTAL Metals

Lot-Sample #...: G2H160472-007

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>			<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	11.4	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QF1AR
		Dilution Factor: 1		MDL.....: 0.60		

**NOTE(S) :**

B Estimated result Result is less than RL

11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3090

TOTAL Metals

Lot-Sample #...: G2H160472-008

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	24.9	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.35	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND V	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.60	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.9	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND V	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.16 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.6	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND V	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3090

TOTAL Metals

Lot-Sample #...: G2H160472-008

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.0	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QG1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result. Result is less than RL

11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3100

TOTAL Metals

Lot-Sample #...: G2H160472-009

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	20.9	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.12	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.67	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.0	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.18 B	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.3	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3100

TOTAL Metals

Lot-Sample #...: G2H160472-009

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.9	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QH1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3110

TOTAL Metals

Lot-Sample #...: G2H160472-010

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2241115						
Arsenic	20.7	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.69	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.4	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND ✓	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.17 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.3	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.33 B J	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3110

TOTAL Metals

Lot-Sample #....: G2H160472-010

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.7	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QK1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result. Result is less than RL

MH  
1/2/13



University of Hawaii at Manoa

Client Sample ID: ORD3130

TOTAL Metals

Lot-Sample #...: G2H160472-011

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241115					
Arsenic	23.1	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.11	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.76	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	3.8	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.21	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.4	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3130

TOTAL Metals

Lot-Sample #...: G2H160472-011

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	13.2	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QL1AR
		Dilution Factor: 1		MDL.....: 0.60		

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3140

TOTAL Metals

Lot-Sample #...: G2H160472-012

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	24.5	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.14	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND $\cup$	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND $\downarrow$	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.99	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	5.2	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.11 B $\cup$	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND $\cup$	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND $\downarrow$	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.16 B $\cup$	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.4	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND $\cup$	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND $\downarrow$	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3140

TOTAL Metals

Lot-Sample #: G2H160472-012

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.3	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QM1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3150

TOTAL Metals

Lot-Sample #...: G2H160472-013

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	21.4	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.099 B J	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.74	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	4.5	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.10 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	4.1	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND ↓	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ↓	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3150

TOTAL Metals

Lot-Sample #: G2H160472-013

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.1	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QN1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

MH  
1/2/13

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #...: G2H160472

Work Order #...: MV6QN-SMP  
MV6QN-DUP

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	21.4	22.7	mg/kg	5.6	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Barium	0.099 B	0.14	mg/kg	34	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Cadmium	ND	ND	mg/kg	9.1	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Cobalt	ND	ND	mg/kg	8.5	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Chromium	0.74	0.72	mg/kg	2.9	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Copper	4.5	7.5	mg/kg	49	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Nickel	ND	ND	mg/kg	67	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Lead	ND	ND	mg/kg	42	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Antimony	ND	ND	mg/kg	15	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Selenium	0.10 B	0.15 B	mg/kg	41	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					
Strontium	4.1	4.3	mg/kg	5.7	(0-35)	SD Lot-Sample #: G2H160472-013 SW846 6020	08/29-09/25/12	2241115
			Dilution Factor: 1					

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*MH*  
*1/2/13*





University of Hawaii at Manoa

Client Sample ID: ORD3160

TOTAL Metals

Lot-Sample #...: G2H160472-014  
 Date Sampled...: 07/16/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241115						
Arsenic	21.9	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.17	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND ↓	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.72	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	7.5	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ↓	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.18 B J	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.4	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND ↓	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.89 B J	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6QQ1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3160

TOTAL Metals

Lot-Sample #: G2H160472-014

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	12.2	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6001AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

MH  
1/2/13

LDC #: 28934B4  
 SDG #: G2H160472  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**

Level IV

Date: 12-18-12

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

**METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/16-18/12
II.	ICP/MS Tune	D	
III.	Calibration	D	
IV.	Blanks	D	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	D	
XII.	Sample Result Verification	D	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3), (14,15)
XV.	Field Blanks	N	(2,3), (14,15)

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:

*Biological Tissue*

1	ORD3010	11	ORD3110	21		31	
2	ORD3020	12	ORD3130	22		32	
3	ORD3020-DUP	13	ORD3140	23		33	
4	ORD3030	14	ORD3150	24		34	
5	ORD3040	15	ORD3150-DUP	25		35	
6	ORD3050	16	ORD3160	26		36	
7	ORD3070	17	ORD305OMS	27		37	
8	ORD3080	18	ORD305OMSD	28		38	
9	ORD3090	19		29		39	
10	ORD3100	20		30		40	

Notes: \_\_\_\_\_

**Method:Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $> 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.	/			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	



## VALIDATION FINDINGS WORKSHEET

### Field Duplicates

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	2	3	
Arsenic	24.6	23.3	5
Barium	0.15	0.17	13
Chromium	0.58	0.63	8
Copper	6.3	5.5	14
Selenium	0.19	0.19	0
Strontium	3.3	3.1	6
Zinc	12.8	12.6	2

Analyte	Concentration (mg/Kg)		RPD
	14	15	
Arsenic	21.4	22.7	6
Barium	0.099	0.14	34
Chromium	0.74	0.72	3
Copper	4.5	7.5	50
Selenium	0.10	0.15	40
Strontium	4.1	4.3	5
Zinc	12.1	12.9	6

LDC #: 2893105

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
Reviewer: GR  
2nd Reviewer: LR

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
  
Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R	%R	%R	%R	
ICV	ICP <sup>MS</sup> (Initial calibration)	Zn	81,288	80	102	102	102	102	Y
	ICP/MS (Initial calibration)								
	CVAA (Initial calibration)								
	ICP (Continuing calibration)								
CCV3	ICP/MS (Continuing calibration)	Tl	46703	50	93.4	93.4	93.4	93.4	Y
	CVAA (Continuing calibration)								
	GFAA (Initial calibration)								
	GFAA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



LDC #: 2878403

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: CR

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,  
 Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$
 Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	%R / RPD / %D	%R / RPD / %D	
ISSAB	ICP interference check	Ni	102,51	100	103	103	103	103	Y
LCS	Laboratory control sample	Cu	19,8	20	99	99	99	99	Y
17	Matrix spike	Sb	17,0 (SSR-SR)	20	85	85	85	85	Y
17/18	Duplicate	Cr	21,7	21,3	1,9	1,8	1,8	1,8	Y
18	ICP serial dilution	As	210,56	217,78	3,3	3,3	3,3	3,3	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 08934134

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: AR  
 2nd reviewer: ✓

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Have results been reported and calculated correctly?
- Y  N  N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y  N  N/A Are all detection limits below the CRDL?

Detected analyte results for Zn/Se were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$       Recalculation:  $Zn: 1 = \frac{100mL(127.052754 \mu g/L)}{1g(1000)} = 12.7 mg/kg$

RD = Raw data concentration  
 FV = Final volume (ml)  
 In. Vol. = Initial volume (ml) or weight (G)  
 Dil = Dilution factor

Se:  $11 = \frac{100mL(1.742318 \mu g/L)}{1.02g(1000)} = 0.17 mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	I	As	25.2	25.2	Y
		Ba	0.22	0.22	
		Ca	0.010	0.010	
		Cr	0.62	0.62	
		Cu	6.0	6.0	
		Se	0.13	0.13	
		Sr	3.3	3.3	
		Zn	12.7	12.7	
	II	As	20.7	20.7	
		Cr	0.69	0.69	
		Cu	3.4	3.4	
		Se	0.17	0.17	
		Sr	3.3	3.3	
		Zn	12.7	12.7	

Note: \_\_\_\_\_

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** December 28, 2012  
**Matrix:** Tissue  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160472

**Sample Identification**

ORD3010  
ORD3020  
ORD3020-DUP  
ORD3030  
ORD3040  
ORD3050  
ORD3070  
ORD3080  
ORD3090  
ORD3100  
ORD3110  
ORD3130  
ORD3140  
ORD3150  
ORD3150-DUP  
ORD3160  
ORD305OMS  
ORD305OMSD

## Introduction

This data review covers 18 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330A for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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**

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

## **VIII. Target Compound Identification**

All target compound identifications were within validation criteria.

## **IX. Compound Quantitation and RLs**

All compound quantitation and RLs were within validation criteria.

## **X. System Performance**

The system performance was acceptable.

## **XI. Overall Assessment of Data**

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

## **XII. Field Duplicates**

Samples ORD302O and ORD302O-DUP and samples ORD315O and ORD315O-DUP were identified as field duplicates. No energetics were detected in any of the samples.

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2H160472**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD3010

HPLC

Lot-Sample #....: G2H160472-001    Work Order #....: MV6P71AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.16
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.24	mg/kg	0.073
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
1/2/13



University of Hawaii at Manoa

Client Sample ID: ORD3020

HPLC

Lot-Sample #....: G2H160472-002    Work Order #....: MV6P91AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.16
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.038
Tetryl	ND	0.25	mg/kg	0.075
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

M4  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3020 DUP

HPLC

Lot-Sample #....: G2H160472-002    Work Order #....: MV6P91AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.16
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.24	mg/kg	0.073
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND ↓	0.24	mg/kg	0.037
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	83	(74 - 117)		

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3030

HPLC

Lot-Sample #....: G2H160472-003    Work Order #....: MV6QA1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.95  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.95	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.076
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.071
4-Nitrotoluene	ND	0.24	mg/kg	0.071
PETN	ND	0.95	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.071
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.95	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	83	(74 - 117)		

MH  
11/13

University of Hawaii at Manoa

Client Sample ID: ORD3040

HPLC

Lot-Sample #...: G2H160472-004    Work Order #...: MV6QC1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.49	mg/kg	0.078
4-Nitrophenol	ND	0.49	mg/kg	0.16
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.24	mg/kg	0.074
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	82	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3050

HPLC

Lot-Sample #....: G2H160472-005    Work Order #....: MV6QD1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: C7/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.080
4-Nitrophenol	ND	0.50	mg/kg	0.16
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.038
Tetryl	ND	0.25	mg/kg	0.075
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3070

HPLC

Lot-Sample #...: G2H160472-006 Work Order #...: MV6QE1AA Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12 Date Received...: 08/16/12  
 Prep Date.....: 09/11/12 Analysis Date...: 09/14/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.95  
 % Moisture.....: Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.95	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.076
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.071
4-Nitrotoluene	ND	0.24	mg/kg	0.071
PETN	ND	0.95	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.071
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.95	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3080

HPLC

Lot-Sample #....: G2H160472-007    Work Order #....: MV6QF1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/14/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.95  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.95	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.076
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.071
4-Nitrotoluene	ND	0.24	mg/kg	0.071
PETN	ND	0.95	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.071
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.95	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036
	PERCENT RECOVERY	RECOVERY LIMITS		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	83	(74 - 117)		

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3090

HPLC

Lot-Sample #...: G2H160472-008    Work Order #...: MV6QG1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.16
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.038
Tetryl	ND	0.25	mg/kg	0.074
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
1/2/13



University of Hawaii at Manoa

Client Sample ID: ORD3100

HPLC

Lot-Sample #: G2H160472-009    Work Order #: MV6QH1AA    Matrix: BIOLOGIC  
 Date Sampled: 07/16/12    Date Received: 08/16/12  
 Prep Date: 09/11/12    Analysis Date: 09/15/12  
 Prep Batch #: 2255044  
 Dilution Factor: 0.98  
 % Moisture:    Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.49	mg/kg	0.078
4-Nitrophenol	ND	0.49	mg/kg	0.16
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.24	mg/kg	0.074
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
1/21/13

University of Hawaii at Manoa

Client Sample ID: ORD3110

HPLC

Lot-Sample #....: G2H160472-010    Work Order #....: MV6QK1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.95  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.95	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.076
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.071
4-Nitrotoluene	ND	0.24	mg/kg	0.071
PETN	ND	0.95	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.071
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.95	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	83	(74 - 117)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3130

HPLC

Lot-Sample #...: G2H160472-011    Work Order #...: MV6QL1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.95  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.95	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.076
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.071
4-Nitrotoluene	ND	0.24	mg/kg	0.071
PETN	ND	0.95	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.071
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.95	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	82	(74 - 117)

MH  
12/13

University of Hawaii at Manoa

Client Sample ID: ORD3140

HPLC

Lot-Sample #...: G2H160472-012    Work Order #...: MV6QM1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.96  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.96	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.077
4-Nitrophenol	ND	0.48	mg/kg	0.15
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.072
4-Nitrotoluene	ND	0.24	mg/kg	0.072
PETN	ND	0.96	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.036
Tetryl	ND	0.24	mg/kg	0.072
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.96	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	82	(74 - 117)

MH  
1/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3150

HPLC

Lot-Sample #....: G2H160472-013    Work Order #....: MV6QN1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.48	mg/kg	0.078
4-Nitrophenol	ND	0.48	mg/kg	0.16
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.24	mg/kg	0.073
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	81	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3150 DUP

HPLC

Lot-Sample #....: G2H160472-013    Work Order #....: MV6QN1AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/15/12  
 Prep Batch #....: 2255044  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.16
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.038
Tetryl	ND	0.25	mg/kg	0.074
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	81	(74 - 117)

MH  
11/2/13

University of Hawaii at Manoa

Client Sample ID: ORD3160

HPLC

Lot-Sample #...: G2H160472-014 Work Order #...: MV6QQ1AA Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12 Date Received...: 08/16/12  
 Prep Date.....: 09/11/12 Analysis Date...: 09/15/12  
 Prep Batch #...: 2255044  
 Dilution Factor: 0.99  
 % Moisture.....: Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.50	mg/kg	0.079
4-Nitrophenol	ND	0.50	mg/kg	0.16
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.038
Tetryl	ND	0.25	mg/kg	0.074
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	84	(74 - 117)		

MH  
11/2/13

LDC #: 28934B40  
 SDG #: G2H160472  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**

Level IV

Date: 12/28/12  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330<sup>B</sup>)

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>7/16 - 18/12</u>
II.	Initial calibration	A	<u>7% RSD ≤ 20%</u>
III.	Calibration verification/ICV	A	<u>CV ≤ 15% CV %R = 75-125%</u>
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates /Lab Dup	A/A	
VII.	Laboratory control samples	A	<u>LCS</u>
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	ND	<u>D<sub>1</sub> = 2, 3 D<sub>2</sub> = 14, 15</u>
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:

Soil tissue

1	ORD3010	11	ORD3110	21	<u>2255044 MB</u>	31	
2	ORD3020 <u>D<sub>1</sub></u>	12	ORD3130	22		32	
3	ORD3020-DUP <u>D<sub>1</sub></u>	13	ORD3140	23		33	
4	ORD3030	14	ORD3150 <u>D<sub>2</sub></u>	24		34	
5	ORD3040	15	ORD3150-DUP <u>D<sub>1</sub></u>	25		35	
6	ORD3050	16	ORD3160	26		36	
7	ORD3070	17	ORD305OMS	27		37	
8	ORD3080	18	ORD305OMSD	28		38	
9	ORD3090	19		29		39	
10	ORD3100	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



LDC #: 28934 BFO

**VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	/			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		/		
Did the initial calibration meet the curve fit acceptance criteria?			/	
Were the RT windows properly established?	/			
<b>IV. Continuing calibration</b>				
What type of continuing calibration calculation was performed? <u>/</u> %D or %R	/			
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) < 20%.0 or percent recoveries 80-120%?	/			
Were all the retention times within the acceptance windows?	/			
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	/			
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
<b>IX. Regional Quality Assurance and Quality Control</b>				

LDC #: 28934 Bo

**VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

LDC # 28934 B40

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

METHOD: GC        HPLC   /  

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) =  $100 * (N - C) / N$

Where:

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	N-000026 LC11 C-18	9/14/2012	HMX (C-18)	100	101.1	101.1	1.1	1.1
			2,4-Dinitrotoluene (C-18)	100	97.9	97.9	2.1	2.1
2	N-000037 LC11 C-18	9/14/2012	HMX (C-18)	100	99.4	99.4	0.58	0.58
			2,4-Dinitrotoluene (C-18)	100	97.7	97.7	2.2	2.3
3	N-000048 LC11 C-18	9/15/2012	HMX (C-18)	100	100.5	100.5	0.5	0.5
			2,4-Dinitrotoluene (C-18)	100	97.5	97.5	2.4	2.5

Compound	CF	CCV1		CCV2		CCV3	
		Height	Height	Height	Height	Height	Height
HMX (C-18)	95.32	9641	9476	9580			
2,4-Dinitrotoluene (C-18)	125	12193	12177	12148			

LDC #: 28934 B40

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: CR

METHOD: GC \_\_\_\_\_ HPLC ✓

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (100 std)	Recalculated (100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL LC11 C-18	8/30/2012	HMX (C-18)	96.820	98.620	95.317	95.373	12.665	12.727
			2,4-Dinitrotoluene (C-18)	121.7	121.7	125	124.5	5.042	5.042

Conc	Height
100	9862
100	12168

C-18

Conc	HMX	2,4-DNT
5	108.000	136.2
10	107.000	131.6
20	102.000	124.9
50	97.020	120.6
100	96.820	121.7
200	94.205	121.7
500	87.588	122.0
1000	70.353	117.3
X=	95.373	124.5
S=	12.138	6.278

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100  
 Where: SF = Surrogate Found  
 SS = Surrogate Spiked

Sample ID: #1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
<u>3,4-DAT</u>	<u>C-18</u>	<u>1951</u>	<u>1617</u>	<u>83</u>	<u>83</u>	<u>0</u>

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates Results Verification**

METHOD: GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$       Where      SSC = Spiked sample concentration      MS = Matrix spike  
 $\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$       SC = Sample concentration      MSD = Matrix spike duplicate  
 SA = Spike added

MS/MSD samples: 17/18

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
	Reported	Recalc.		Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	0.962	0.966	0	0.847	0.858	88	88	89	84	1.3	1.3
2,4,6-Trinitrotoluene (8330)	J	J	J	0.772	0.778	80	80	81	81	0.76	0.77

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification**

**METHOD:** GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * (SSC/SA)$

RPD =  $((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD) * 100$

Where SSC = Spiked sample concentration  
LCS = Laboratory Control Sample

SA = Spike added  
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 2255044 LCS

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	1.00	NA	0.959	NA	96	96				
2,4,6-Trinitrotoluene (8330)	↓	↓	0.843	↓	84	84				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

METHOD: GC HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?  
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$  Example: \_\_\_\_\_  
 Sample ID \_\_\_\_\_ Compound Name ND  
 Concentration = \_\_\_\_\_

A= Area or height of the compound to be measured  
 Fv= Final Volume of extract  
 Df= Dilution Factor  
 RF= Average response factor of the compound  
 In the initial calibration  
 Vs= Initial volume of the sample  
 Ws= Initial weight of the sample  
 %S= Percent Solid

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





## Laboratory Data Consultants, Inc.

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Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Environet  
650 Iwilei Road, Suite 204  
Honolulu, HI 96817  
ATTN: Ms. Shelby Koide

March 8, 2013

SUBJECT: Ordnance Reef, Data Validation

Dear Ms. Koide,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on February 11, 2013. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 29217:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
G2H160455	Metals & Energetics
G2H160464	

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

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- 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,

Ming-Hwa Hwang  
Project Manager/Senior Chemist



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 18 through July 19, 2012  
**LDC Report Date:** February 14, 2013  
**Matrix:** Tissue  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160455

### Sample Identification

ORD303F	ORD308FMSD
ORD305F	ORD327FDUP
ORD307F	
ORD308F	
ORD312F	
ORD313F	
ORD314F	
ORD315F	
ORD316F	
ORD317F	
ORD318F	
ORD319F	
ORD320F	
ORD323F	
ORD325F	
ORD326F	
ORD327F	
ORD329F	
ORD303FDUP	
ORD308FMS	

## Introduction

This data review covers 22 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

### IX. Internal Standards (ICP-MS)

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

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

### XII. Sample Result Verification

All sample result verifications were acceptable.

### XIII. Overall Assessment of Data

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

### XIV. Field Duplicates

Samples ORD303F and ORD303FDUP and samples ORD327F and ORD327FDUP were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD303F	ORD303FDUP	
Arsenic	10.5	10.4	1
Barium	0.11	0.090U	200
Chromium	0.66	0.68	3
Copper	0.23	0.23	0
Selenium	0.15	0.14	7
Strontium	1.5	0.38	119
Zinc	4.2	4.0	5

Analyte	Concentration (mg/Kg)		RPD
	ORD327F	ORD327FDUP	
Arsenic	16.1	17.8	10
Barium	0.11	0.12	9
Chromium	0.60	0.70	15
Copper	0.28	0.29	4
Lead	0.095	0.15	45
Selenium	0.22	0.21	5
Strontium	3.9	4.0	3
Zinc	11.5	6.5	56

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2H160455**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2H160455**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2H160455**

No Sample Data Qualified in this SDG



University of Hawaii at Manoa

Client Sample ID: ORD303F

TOTAL Metals

Lot-Sample #...: G2H160455-001

Matrix.....: BIOLOGIC

Date Sampled...: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241106						
Arsenic	10.5	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.11	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.66	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.23	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.15 B J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	1.5	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KM1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

02/21/13

University of Hawaii at Manoa

Client Sample ID: ORD303F

TOTAL Metals

Lot-Sample #....: G2H160455-001

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KMLAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD305F

TOTAL Metals

Lot-Sample #...: G2H160455-002  
 Date Sampled...: 07/18/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241106						
Arsenic	19.1	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.10	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	1.1	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.32	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.28	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	0.48 B J	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.3	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6KP1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

*08/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD305F

TOTAL Metals

Lot-Sample #...: G2H160455-002

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>			<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	6.6	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6KPLAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result Result is less than RL.

CR 2/21/13

University of Hawaii at Manoa

Client Sample ID: ORD307F

TOTAL Metals

Lot-Sample #...: G2H160455-003

Matrix.....: BIOLOGIC

Date Sampled...: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	17.5	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.20	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	0.017 B J	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.72	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.31	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	0.18	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.49	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	3.8	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6KT1AQ
		Dilution Factor: 1			MDL.....: 0.30		

(Continued on next page)

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD307F

TOTAL Metals

Lot-Sample #...: G2H160455-003

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	3.7	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KT1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

022/2/13

University of Hawaii at Manoa

Client Sample ID: ORD308F

TOTAL Metals

Lot-Sample #....: G2H160455-004

Matrix.....: BIOLOGIC

Date Sampled....: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....:	2241106					
Arsenic	16.1	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.11	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.029 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.82	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.46	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.12 B J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.58	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	1.1	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD308F

TOTAL Metals

Lot-Sample #...: G2H160455-004

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.7	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KV1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

022/21/13



University of Hawaii at Manoa

Client Sample ID: ORD312F

TOTAL Metals

Lot-Sample #...: G2H160455-005  
 Date Sampled...: 07/18/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241106						
Arsenic	11.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.013 B 5	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	1.1	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.64	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND ✓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.34	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ✓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.46	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	1.2	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND ✓	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ✓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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*CS 2/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD312F

TOTAL Metals

Lot-Sample #...: G2H160455-005

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	14.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6KW1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD313F

TOTAL Metals

Lot-Sample #...: G2H160455-006  
 Date Sampled...: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	13.5	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.53	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.70	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.31	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.25	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	10.9	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6KX1AQ
		Dilution Factor: 1			MDL.....: 0.30		

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*08/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD313F

TOTAL Metals

Lot-Sample #...: G2H160455-006

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.8	1.0	mg/kg	SW846 6020	08/29--09/24/12	MV6KX1AR
		Dilution Factor: 1		MDL.....: 0.60		

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD314F

TOTAL Metals

Lot-Sample #....: G2H160455-007  
 Date Sampled....: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #....: 2241106							
Arsenic	4.4	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.17 B J	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.13 B J	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	1.3	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6K01AQ
		Dilution Factor: 1			MDL.....: 0.30		

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*08/22/13*

University of Hawaii at Manoa

Client Sample ID: ORD314F

TOTAL Metals

Lot-Sample #....: G2H160455-007

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	2.0	1.0	mg/kg	SWB46 6020	08/29-09/24/12	MV6K01AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result. Result is less than RL

*CEZ/2/13*

University of Hawaii at Manoa

Client Sample ID: ORD315F

TOTAL Metals

Lot-Sample #...: G2H160455-008

Matrix.....: BIOLOGIC

Date Sampled...: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2241106						
Arsenic	10.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.24	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.72	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AF
		Dilution Factor: 1		MDL.....: 0.20		
Copper	0.41	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.25	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	8.1	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K11AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD315F

TOTAL Metals

Lot-Sample #...: G2H160455-008

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	5.9	1.0	mg/kg	SW846 6020	08/29--09/24/12	MV6K11AR
		Dilution Factor: 1		MDL.....: 0.60		

022/21/13



University of Hawaii at Manoa

Client Sample ID: ORD316F

TOTAL Metals

Lot-Sample #....: G2H160455-009

Matrix.....: BIOLOGIC

Date Sampled....: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2241106						
Arsenic	9.7	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.63	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.26	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND ✓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND ✓	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.28	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	1.2	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND ✓	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND ✓	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND ✓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD316F

TOTAL Metals

Lot-Sample #....: G2H160455-009

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	3.0	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K21AR
		Dilution Factor: 1		MDL.....: 0.60		

02/21/13

University of Hawaii at Manoa

Client Sample ID: ORD317F

TOTAL Metals

Lot-Sample #....: G2H160455-010

Matrix.....: BIOLOGIC

Date Sampled...: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2241106						
Arsenic	5.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.13	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.56	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.37	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.31	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	7.2	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AQ
		Dilution Factor: 1		MDL.....: 0.30		

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*ce 2/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD317F

TOTAL Metals

Lot-Sample #...: G2H160455-010

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	5.3	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K31AR
		Dilution Factor: 1		MDL.....: 0.60		

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD318F

TOTAL Metals

Lot-Sample #....: G2H160455-011  
 Date Sampled....: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #....: 2241106						
Arsenic	16.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.093 B <i>J</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.61	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.30	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND <i>U</i>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND <i>U</i>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.20	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	3.1	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND <i>U</i>	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND <i>U</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AQ
		Dilution Factor: 1		MDL.....: 0.30		

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*08/22/13*

University of Hawaii at Manoa

Client Sample ID: ORD318F

TOTAL Metals

Lot-Sample #...: G2H160455-011

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	5.9	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K41AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD319F

TOTAL Metals

Lot-Sample #...: G2H160455-012

Matrix.....: BIOLOGIC

Date Sampled...: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	9.0	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.16	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.59	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.27	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	0.088 B S	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.44	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	7.7	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6K71AQ
		Dilution Factor: 1			MDL.....: 0.30		

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08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD319F

TOTAL Metals

Lot-Sample #...: G2H160455-012

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.0	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K71AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL.

02/21/13



University of Hawaii at Manoa

Client Sample ID: ORD320F

TOTAL Metals

Lot-Sample #...: G2H160455-013

Date Sampled...: 07/19/12

% Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	18.3	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.092 B J	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.71	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.27	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.19 B S	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	1.7	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AQ
		Dilution Factor: 1			MDL.....: 0.30		

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*ce 2/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD320F

TOTAL Metals

Lot-Sample #: G2H160455-013

Matrix: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	4.4	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6K81AR
		Dilution Factor: 1			MDL: 0.60		

NOTE(S):

B Estimated result. Result is less than RL.

02/21/13

University of Hawaii at Manoa

Client Sample ID: ORD323F

TOTAL Metals

Lot-Sample #...: G2H160455-014  
 Date Sampled...: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241106					
Arsenic	21.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.14	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.60	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.25	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.19 B J	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	4.1	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AQ
		Dilution Factor: 1		MDL.....: 0.30		

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*08/22/13*

University of Hawaii at Manoa

Client Sample ID: ORD323F

TOTAL Metals

Lot-Sample #: G2H160455-014

Matrix: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	5.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6K91AR
		Dilution Factor: 1		MDL: 0.60		

NOTE(S):

B Estimated result Result is less than RL

02/2/13

University of Hawaii at Manoa

Client Sample ID: ORD325F

TOTAL Metals

Lot-Sample #...: G2H160455-015

Matrix.....: BIOLOGIC

Date Sampled...: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241106					
Arsenic	5.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.14	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.83	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.37	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.090 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.32	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	4.0	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6LA1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD325F

TOTAL Metals

Lot-Sample #...: G2H160455-015

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	3.5	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6L1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result Result is less than RL.

02/21/13

University of Hawaii at Manoa

Client Sample ID: ORD326F

TOTAL Metals

Lot-Sample #...: G2H160455-016  
 Date Sampled...: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	8.5	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.17	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.92	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.44	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	0.27	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.37	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	1.9	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	0.85 B S	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6LC1AQ
		Dilution Factor: 1			MDL.....: 0.30		

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University of Hawaii at Manoa

Client Sample ID: ORD326F

TOTAL Metals

Lot-Sample #...: G2H160455-016

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	19.7	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6LC1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result Result is less than RL.

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University of Hawaii at Manoa

Client Sample ID: ORD327F

TOTAL Metals

Lot-Sample #...: G2H160455-017  
 Date Sampled...: 07/19/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2241106							
Arsenic	16.1	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AT
		Dilution Factor: 1			MDL.....: 0.15		
Barium	0.11	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AC
		Dilution Factor: 1			MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AD
		Dilution Factor: 1			MDL.....: 0.050		
Cobalt	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AE
		Dilution Factor: 1			MDL.....: 0.010		
Chromium	0.60	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AF
		Dilution Factor: 1			MDL.....: 0.10		
Copper	0.28	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AG
		Dilution Factor: 1			MDL.....: 0.010		
Nickel	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AH
		Dilution Factor: 1			MDL.....: 0.10		
Lead	0.095 B J	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AJ
		Dilution Factor: 1			MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AK
		Dilution Factor: 1			MDL.....: 0.10		
Selenium	0.22	0.20	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AL
		Dilution Factor: 1			MDL.....: 0.10		
Strontium	3.9	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AM
		Dilution Factor: 1			MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AN
		Dilution Factor: 1			MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AP
		Dilution Factor: 1			MDL.....: 0.10		
Vanadium	ND U	1.0	mg/kg		SW846 6020	08/29-09/24/12	MV6LD1AQ
		Dilution Factor: 1			MDL.....: 0.30		

(Continued on next page)

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University of Hawaii at Manoa

Client Sample ID: ORD327F

TOTAL Metals

Lot-Sample #...: G2H160455-017

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	11.5	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6LD1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result Result is less than RL

*09/24/13*

University of Hawaii at Manoa

Client Sample ID: ORD329F

TOTAL Metals

Lot-Sample #...: G2H160455-018

Matrix.....: BIOLOGIC

Date Sampled...: 07/19/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241106					
Arsenic	15.4	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.097 B <i>J</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.68	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.31	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	ND <i>U</i>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.086 B <i>J</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND <i>U</i>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	0.34	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	1.8	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND <i>U</i>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND <i>U</i>	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	ND <i>U</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

*CE 2/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD329F

TOTAL Metals

Lot-Sample #...: G2H160455-018

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.6	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6LE1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

B Estimated result Result is less than RL

*08/24/13*

SAMPLE DUPLICATE EVALUATION REPORT

Metals

Client Lot #....: G2H160455      Work Order #....: MV6KM-SMP      Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12      Date Received...: 08/16/12  
 MV6KM-DUP

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	10.5	10.4	mg/kg	0.98	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Barium	0.11	ND U	mg/kg	35	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Cadmium	ND	ND U	mg/kg	15	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Cobalt	ND	ND U	mg/kg	0.60	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Chromium	0.66	0.68	mg/kg	2.9	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Copper	0.23	0.23	mg/kg	0.27	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Nickel	ND	ND U	mg/kg	33	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Lead	ND	ND U	mg/kg	69	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Antimony	ND	ND U	mg/kg	180	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Selenium	0.15 B	0.14 B J	mg/kg	12	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Strontium	1.5	0.38 B J	mg/kg	118	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					

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*CR 2/21/13*

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Lot-Sample #....: G2H160455-000    Work Order #....: MV6KM-SMP    Matrix.....: BIOLOGIC  
 MV6KM-DUP

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Thallium	ND	ND U	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Uranium	ND	ND U	mg/kg	200	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Vanadium	ND	ND U	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Zinc	4.2	4.0	mg/kg	5.2	(0-35)	SD Lot-Sample #: G2H160455-001 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results

B Estimated result Result is less than RL

02/21/13

SAMPLE DUPLICATE EVALUATION REPORT

Metals

Client Lot #....: G2H160455

Work Order #....: MV6LD-SMP  
MV6LD-DUP

Matrix.....: BIOLOGIC

Date Sampled....: 07/19/12

Date Received...: 08/16/12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	16.1	17.8	mg/kg	10	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Barium	0.11	0.12	mg/kg	12	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Cadmium	ND	ND U	mg/kg	49	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Cobalt	ND	ND U	mg/kg	0.98	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Chromium	0.60	0.70	mg/kg	15	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Copper	0.28	0.29	mg/kg	5.7	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Nickel	ND	ND U	mg/kg	18	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Lead	0.095 B	0.15	mg/kg	47	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Antimony	ND	ND U	mg/kg	200	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Selenium	0.22	0.21	mg/kg	7.0	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					
Strontium	3.9	4.0	mg/kg	3.2	(0-35)	SD Lot-Sample #: G2H160455-017 SW846 6020	08/29-09/24/12	2241106
			Dilution Factor: 1					

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*022/24/13*





LDC #: 29217A4  
 SDG #: G2H160455  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 8-12-13  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/18-19/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1, 19), (17, 22)
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:

*Site Tissue*

1	ORD303F	11	ORD318F	21	ORD308FMSD	31	
2	ORD305F	12	ORD319F	22	ORD327FDUP	32	
3	ORD307F	13	ORD320F	23		33	
4	ORD308F	14	ORD323F	24		34	
5	ORD312F	15	ORD325F	25		35	
6	ORD313F	16	ORD326F	26		36	
7	ORD314F	17	ORD327F	27		37	
8	ORD315F	18	ORD329F	28		38	
9	ORD316F	19	ORD303FDUP	29		39	
10	ORD317F	20	ORD308FMS	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $> 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.	/			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analyses have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL (ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	✓			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	



**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	1	19	
Arsenic	10.5	10.4	1
Barium	0.11	0.090U	200
Chromium	0.66	0.68	3
Copper	0.23	0.23	0
Selenium	0.15	0.14	7
Strontium	1.5	0.38	119
Zinc	4.2	4.0	5

Analyte	Concentration (mg/Kg)		RPD
	17	22	
Arsenic	16.1	17.8	10
Barium	0.11	0.12	9
Chromium	0.60	0.70	15
Copper	0.28	0.29	4
Lead	0.095	0.15	45
Selenium	0.22	0.21	5
Strontium	3.9	4.0	3
Zinc	11.5	6.5	56

LDC #: 9901779

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: CR

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R		%R		
ICV	ICP (Initial calibration)								
	ICP/MS (Initial calibration)	Cu	80.651	80	101		101		Y
	CVAA (Initial calibration)								
CCV q	ICP (Continuing calibration)								
	ICP/MS (Continuing calibration)	Ba	98.366	100	98.4		98.4		Y
	CVAA (Continuing calibration)								
	GFAA (Initial calibration)								
	GFAA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} - \text{True}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,  
 Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Acceptable (Y/N)
					%R / RPD / %D	Reported %R / RPD / %D	
ICSAB	ICP interference check	Zn	86,374	100	86.4	86.4	Y
LCS	Laboratory control sample	Ni	20.4	20	102	102	Y
20	Matrix spike	Sb (SSR-SR)	17.0	20	85	85	Y
20/20	Duplicate	As	34.4	34.8	1.2	1.1	Y
4	ICP serial dilution	Cu	5,0763	4,6426	9.3	9.3	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Have results been reported and calculated correctly?
- Y  N  N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y  N  N/A Are all detection limits below the CRDL?

Detected analyte results for Ba / Sr were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:  $Ba = 1 = \frac{100mL (1.135616 \mu g/L)}{0.99g (1000)} = 0.1147 \text{ mg/kg}$

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor

$Sr: 11 = \frac{100mL (30.303717 \mu g/L)}{0.99g (1000)} = 3.06 \text{ mg/kg}$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	As	10.5	10.5	Y
		Ba	0.11	0.11	
		Cr	0.66	0.66	
		Cu	0.23	0.23	
		Se	0.15	0.15	
		Sr	1.5	1.5	
		Zn	4.2	4.2	
	11	As	16.6	16.6	Y
		Ba	0.093	0.093	
		Cr	0.61	0.61	
		Cu	0.30	0.30	
		Se	0.20	0.20	
		Sr	3.1	3.1	
		Zn	5.9	5.9	

Note: \_\_\_\_\_



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 18 through July 19, 2012  
**LDC Report Date:** February 22, 2013  
**Matrix:** Tissue  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160455

### Sample Identification

ORD303F	ORD308FMSD
ORD305F	ORD327FDUP
ORD307F	
ORD308F	
ORD312F	
ORD313F	
ORD314F	
ORD315F	
ORD316F	
ORD317F	
ORD318F	
ORD319F	
ORD320F	
ORD323F	
ORD325F	
ORD326F	
ORD327F	
ORD329F	
ORD303FDUP	
ORD308FMS	

## Introduction

This data review covers 22 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330B for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD308FMS/MSD (ORD308F)	Tetryl	0 (10-150)	0 (10-150)	-	J (all detects) R (all non-detects)	A

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation

All compound quantitations were within validation criteria.

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD303F and ORD303FDUP and samples ORD327F and ORD327FDUP were identified as field duplicates. No energetics were detected in any of the samples.

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2H160455**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G2H160455	ORD308F	Tetryl	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2H160455**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2H160455**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD303F

HPLC

Lot-Sample #...: G2H160455-001    Work Order #...: MV6KM1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U <sub>o</sub>	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037
	↓			
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>		
3,4-Dinitrotoluene	86	(74 - 117)		

*022/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD303F DUP

HPLC

Lot-Sample #...: G2H160455-001 Work Order #...: MV6KM1AU Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12 Date Received...: 08/16/12  
 Prep Date.....: 09/11/12 Analysis Date...: 09/21/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.98  
 % Moisture.....: Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.24	mg/kg	0.037
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.037
4-Nitrotoluene	ND	0.24	mg/kg	0.037
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.037
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037
	PERCENT RECOVERY	RECOVERY LIMITS		
3,4-Dinitrotoluene	86	(74 - 117)		

02/25/13

University of Hawaii at Manoa

Client Sample ID: ORD305F

HPLC

Lot-Sample #....: G2H160455-002    Work Order #....: MV6KP1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND ✓	0.24	mg/kg	0.037
	PERCENT RECOVERY	RECOVERY LIMITS		
SURROGATE	85	(74 - 117)		
3,4-Dinitrotoluene				

023/25/13



University of Hawaii at Manoa

Client Sample ID: ORD307F

HPLC

Lot-Sample #...: G2H160455-003    Work Order #...: MV6KT1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.080
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE		RECOVERY	LIMITS	
3,4-Dinitrotoluene		88	(74 - 117)	

*Handwritten signature/initials: CE 2/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD308F

HPLC

Lot-Sample #...: G2H160455-004    Work Order #...: MV6KV1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.079
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND R(m)	0.50	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ✓	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ↓	0.25	mg/kg	0.038
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE		87	(74 - 117)	

*Handwritten signature/initials: CEZ/RS/B*

University of Hawaii at Manoa

Client Sample ID: ORD312F

HPLC

Lot-Sample #....: G2H160455-005    Work Order #....: MV6KW1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.037

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	87	(74 - 117)

*CE 2/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD313F

HPLC

Lot-Sample #....: G2H160455-006    Work Order #....: MV6KX1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/21/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.080
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.038
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		87	(74 - 117)	

*ORA/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD314F

HPLC

Lot-Sample #....: G2H160455-007    Work Order #....: MV6K01AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 0.96  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.96	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.077
4-Nitrophenol	ND	0.24	mg/kg	0.036
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.072
4-Nitrotoluene	ND	0.24	mg/kg	0.072
PETN	ND	0.96	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.072
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.96	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(74 - 117)

*028/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD315F

HPLC

Lot-Sample #...: G2H160455-008    Work Order #...: MV6K11AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.079
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.038
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		89	(74 - 117)	

*02/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD316F

HPLC

Lot-Sample #....: G2H160455-009    Work Order #....: MV6K21AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.080
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.038

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(74 - 117)



*CE 2/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD317F

HPLC

Lot-Sample #...: G2H160455-010    Work Order #...: MV6K31AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND 	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND 	0.24	mg/kg	0.037
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE		88	(74 - 117)	

*023/25/13*



University of Hawaii at Manoa

Client Sample ID: ORD318F

HPLC

Lot-Sample #...: G2H160455-011    Work Order #...: MV6K41AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.96  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <i>U</i>	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.96	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.077
4-Nitrophenol	ND	0.24	mg/kg	0.036
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.072
4-Nitrotoluene	ND	0.24	mg/kg	0.072
PETN	ND	0.96	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.072
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.96	mg/kg	0.036
2,4,6-Trinitrotoluene	ND <i>✓</i>	0.24	mg/kg	0.036
<hr/>		PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	89	(74 - 117)		

*09/22/13*

University of Hawaii at Manoa

Client Sample ID: ORD319F

HPLC

Lot-Sample #...: G2H160455-012    Work Order #...: MV6K71AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.96  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.96	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.077
4-Nitrophenol	ND	0.24	mg/kg	0.036
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.072
4-Nitrotoluene	ND	0.24	mg/kg	0.072
PETN	ND	0.96	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.072
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.96	mg/kg	0.036
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.036
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE		89	(74 - 117)	



022/25/13

University of Hawaii at Manoa

Client Sample ID: ORD320F

HPLC

Lot-Sample #....: G2H160455-013    Work Order #....: MV6K81AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #....: 2255047  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND 	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.48	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.48	mg/kg	0.16
Picramic Acid	ND	0.48	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.97	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.073
4-Nitrotoluene	ND	0.24	mg/kg	0.073
PETN	ND	0.97	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.073
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.97	mg/kg	0.037
2,4,6-Trinitrotoluene	ND 	0.24	mg/kg	0.037
		PERCENT	RECOVERY	
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	88	(74 - 117)		

*Handwritten signature:* CEZ/25/13

University of Hawaii at Manoa

Client Sample ID: ORD323F

HPLC

Lot-Sample #...: G2H160455-014    Work Order #...: MV6K91AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.079
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.038
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE		88	(74 - 117)	

09/22/25/13

University of Hawaii at Manoa

Client Sample ID: ORD325F

HPLC

Lot-Sample #...: G2H160455-015    Work Order #...: MV6LA1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	1.0	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.080
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.075
4-Nitrotoluene	ND	0.25	mg/kg	0.075
PETN	ND	1.0	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.075
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	1.0	mg/kg	0.038
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.038
		PERCENT RECOVERY	RECOVERY LIMITS	
SURROGATE				
3,4-Dinitrotoluene	88		(74 - 117)	

*CRZ/RS/B*

University of Hawaii at Manoa

Client Sample ID: ORD326F

HPLC

Lot-Sample #....: G2H160455-016    Work Order #....: MV6LC1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.96  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.036
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.036
3,5-Dinitroaniline	ND	0.48	mg/kg	0.036
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.036
2,4-Dinitrophenol	ND	0.48	mg/kg	0.15
Picramic Acid	ND	0.48	mg/kg	0.15
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.036
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.036
HMX	ND	0.24	mg/kg	0.036
Nitrobenzene	ND	0.24	mg/kg	0.036
Nitroglycerin	ND	0.96	mg/kg	0.48
2-Nitrophenol	ND	0.24	mg/kg	0.077
4-Nitrophenol	ND	0.24	mg/kg	0.036
2-Nitrotoluene	ND	0.24	mg/kg	0.036
3-Nitrotoluene	ND	0.24	mg/kg	0.072
4-Nitrotoluene	ND	0.24	mg/kg	0.072
PETN	ND	0.96	mg/kg	0.48
RDX	ND	0.24	mg/kg	0.072
Tetryl	ND	0.48	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.036
Picric Acid	ND	0.96	mg/kg	0.036
2,4,6-Trinitrotoluene	ND ✓	0.24	mg/kg	0.036

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(74 - 117)

*02/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD327F

HPLC

Lot-Sample #...: G2H160455-017    Work Order #...: MV6LD1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND ✓	0.24	mg/kg	0.037
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
3,4-Dinitrotoluene	86	(74 - 117)		



02/25/13

University of Hawaii at Manoa

Client Sample ID: ORD327F DUP

HPLC

Lot-Sample #...: G2H160455-017    Work Order #...: MV6LD1AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND 	0.24	mg/kg	0.037
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.037
3,5-Dinitroaniline	ND	0.49	mg/kg	0.037
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.037
2,4-Dinitrophenol	ND	0.49	mg/kg	0.16
Picramic Acid	ND	0.49	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.037
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.037
HMX	ND	0.24	mg/kg	0.037
Nitrobenzene	ND	0.24	mg/kg	0.037
Nitroglycerin	ND	0.98	mg/kg	0.49
2-Nitrophenol	ND	0.24	mg/kg	0.078
4-Nitrophenol	ND	0.24	mg/kg	0.037
2-Nitrotoluene	ND	0.24	mg/kg	0.037
3-Nitrotoluene	ND	0.24	mg/kg	0.074
4-Nitrotoluene	ND	0.24	mg/kg	0.074
PETN	ND	0.98	mg/kg	0.49
RDX	ND	0.24	mg/kg	0.074
Tetryl	ND	0.49	mg/kg	0.29
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.037
Picric Acid	ND	0.98	mg/kg	0.037
2,4,6-Trinitrotoluene	ND 	0.24	mg/kg	0.037
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		87	(74 - 117)	

*02/25/13*



University of Hawaii at Manoa

Client Sample ID: ORD329F

HPLC

Lot-Sample #...: G2H160455-018    Work Order #...: MV6LE1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/19/12    Date Received...: 08/16/12  
 Prep Date.....: 09/11/12    Analysis Date...: 09/22/12  
 Prep Batch #...: 2255047  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.038
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.038
3,5-Dinitroaniline	ND	0.50	mg/kg	0.038
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.038
2,4-Dinitrophenol	ND	0.50	mg/kg	0.16
Picramic Acid	ND	0.50	mg/kg	0.16
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.038
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.038
HMX	ND	0.25	mg/kg	0.038
Nitrobenzene	ND	0.25	mg/kg	0.038
Nitroglycerin	ND	0.99	mg/kg	0.50
2-Nitrophenol	ND	0.25	mg/kg	0.079
4-Nitrophenol	ND	0.25	mg/kg	0.038
2-Nitrotoluene	ND	0.25	mg/kg	0.038
3-Nitrotoluene	ND	0.25	mg/kg	0.074
4-Nitrotoluene	ND	0.25	mg/kg	0.074
PETN	ND	0.99	mg/kg	0.50
RDX	ND	0.25	mg/kg	0.074
Tetryl	ND	0.50	mg/kg	0.30
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.038
Picric Acid	ND	0.99	mg/kg	0.038
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.038
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
3,4-Dinitrotoluene	87	(74 - 117)		

022/25/13

LDC #: 29217A40  
 SDG #: G2H160455  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 02/20/2013  
 Page: 1 of 1  
 Reviewer: SW  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330B)

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: 07/18/2012 - 07/19/2012
II.	Initial calibration	A	RSD ≤ 20
III.	Calibration verification/ICV	A	ICV/CCV = 15 ICV = 75-125%
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates / LD <sup>2</sup>	SW/A	
VII.	Laboratory control samples	A	LCS
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	NB ND	<del>1,19</del> , <del>17,22</del> (1,19), (17,22)
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	ORD303F	11	ORD318F	21	ORD308FMSD	31	MWHXX1AA
2	ORD305F	12	ORD319F	22	ORD327FDUP	32	
3	ORD307F	13	ORD320F	23		33	
4	ORD308F	14	ORD323F	24		34	
5	ORD312F	15	ORD325F	25		35	
6	ORD313F	16	ORD326F	26		36	
7	ORD314F	17	ORD327F	27		37	
8	ORD315F	18	ORD329F	28		38	
9	ORD316F	19	ORD303FDUP	29		39	
10	ORD317F	20	ORD308FMS	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Method: GC X HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) < 20%?	/			
Was a curve fit used for evaluation?		/		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?			/	
Were the RT windows properly established?	/			
<b>III. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) < 15.0% or < 20.0% ?	/			
Were all the retention times within the acceptance windows?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>V. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
<b>VIII. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	/			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XII. System performance				
System performance was found to be acceptable.	/			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	NA	/		
Target compounds were detected in the field duplicates.		NA	/	
XV. Field blanks				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

# VALIDATION FINDINGS WORKSHEET

METHOD: GC  HPLC

8310	8330	8151	8141	8141 (Cont')	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethylbenzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. o-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. m,p-Xylenes
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total xylenes
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotepp	BB. Famphur	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Phosmet	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	<b>Krone</b>
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	A. Tetra-n-butyltin
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	B. Tri-n-butyltin Cation
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	C. Di-n-butyltin Cation
O. Phenanthrene	O.		O. Chlorpyrifos		D. N-Butyltin Cation
P. Pyrene	P.		P. Fenthion		
Q.	Q		Q. Parathion-ethyl		
R.			R. Trichloronate		
S.			S. Merphos		
			T. Stirophos		
			U. Tokuthion		

Notes:



**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

METHOD: GC X HPLC (EPA 8330B)

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C  
 Average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (1σ std)	CF (10 std)	CF (10 std)	CF (10 std)	%RSD	%RSD	CF (initial)	%RSD
1	0-000004.d LC11	08/15/2012 17:02	HMX 2,4,6-TRINITROTOLUENE	107	106.7	95.31700	95.317	12.665	12.665	118.449	5.270
2	C-000003.d LC12	06/11/2012 16:21	HMX 2,4,6-TRINITROTOLUENE	64.2	64.2	61.49462	61.494625	4.575	4.575	81.18225	4.797
3	PF-000006.d LC12	09/24/2012 23:32	HMX 2,4,6-TRINITROTOLUENE	653	653.05	661	661.5723	13.422	13.432	1351.1522	9.020
4											

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

METHOD: GC X HPLC (EPA 8330 B)

The continuing calibration percent difference (%D) values were recalculated for \_\_\_\_\_ using the following calculation:

Percent difference (%D) =  $100 * (N - C) / N$  Where: N =      Initial Calibration Factor or      Nominal Amount (ng)  
 C =      Calibration Factor from Continuing Calibration Standard or      Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/CCV Conc	Reported		Recalculated		Reported		Recalculated	
				CF/Conc CCV	CF/Conc CCV	CF/Conc CCV	CF/Conc CCV	%D	%D		
N-000003-d	09/21/2012 10:36	HMX 2,4,6-TRINITROTOLUENE	200 200	201.0	201.7688	0.90	0.88	0.90	0.90	0.88	0.88
				199.1	199.1068	0.45	0.45	0.45	0.45	0.45	0.45
N-000013-d	09/21/2012 20:07	HMX 2,4,6-TRINITROTOLUENE	100 ↓	101.4	101.3565	1.4	1.4	1.4	1.4	1.4	1.4
			↓	99.13	99.1313	0.87	0.87	0.87	0.87	0.87	0.87
N-000024-d	09/22/2012 06:34	HMX 2,4,6-TRINITROTOLUENE	100 ↓	101.3	101.3041	1.3	1.3	1.3	1.3	1.3	1.3
			↓	98.78	98.7851	1.2	1.2	1.2	1.2	1.2	1.2
C-000034-d	09/22/2012 21:15	HMX 2,4,6-TRINITROTOLUENE	100 ↓	105.6	105.6515	5.6	5.7	5.6	5.6	5.7	5.7
			↓	100.6	100.6878	0.60	0.60	0.60	0.60	0.60	0.60

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

METHOD: GC X HPLC (EPA 8330 B)

The continuing calibration percent difference (%D) values were recalculated for \_\_\_\_\_ using the following calculation:

Percent difference (%D) =  $100 * (N - C) / N$       Where: N = Initial Calibration Factor or Nominal Amount (ng)  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/CCV Conc	Reported		Recalculated		Reported		Recalculated	
				CF/Conc CCV	%D	CF/Conc CCV	%D	CF/Conc CCV	%D		
C-000044.d	09/23/2012 08:10	HMX	100	101.7	1.7	101.7325	1.7				1.7
		2,4,6-TRINITROTOLUENE	↓	97.46	2.5	97.4597	2.5				2.5
C-000054.d	09/23/2012 19:04	HMX	100	99.21	0.79	99.2119	0.79				0.79
		2,4,6-TRINITROTOLUENE	↓	94.32	5.7	94.3186	5.7				5.7
PF-000025.d	09/29/2012 12:28	HMX	100	93.40	6.6	93.3922	6.6				6.6
		2,4,6-TRINITROTOLUENE	↓	96.38	3.6	96.3807	3.6				3.6
PF-000036.d	09/30/2012 01:23	HMX	100	94.40	5.6	94.3906	5.6				5.6
		2,4,6-TRINITROTOLUENE	↓	96.57	3.4	96.5724	3.4				3.4

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

METHOD: GC  HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
SS = Surrogate Spiked

Sample ID: 9

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3,4-DINITROBENZENE	LC11	2010	1806	90	89.845	0

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

**Matrix Spike/Matrix Spike Duplicates Results Verification**

Reviewer: SW

2nd Reviewer: K

METHOD: GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$$

Where

SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

$$\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$$

MS = Matrix spike

MSD = Matrix spike duplicate

MS/MSD samples: 20 / 21

Compound	Spike Added (mg/Kg)		Sample Conc. (mg/Kg)	Spike Sample Concentration (mg/Kg)		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery	Recalc.	Percent Recovery	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	0.995	0.990	ND	0.914	0.901	92	91.86	91	91.05	1.4	1.4
2,4,6-Trinitrotoluene (8330)	0.995	0.990	ND	0.799	0.796	80	80.34	80	80.36	0.47	0.48

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: GC XHPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 \* (SSC - SC)/SA

Where SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

RPD = (((SSCLCS - SSCLCSD) \* 2) / (SSCLCS + SSCLCSD)) \* 100

LCS = Laboratory Control Sample

LCS D = Laboratory Control Sample duplicate

LCS/LCSD samples: MWHXX1AC

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		LCS		LCS D		LCS		LCS D		LCS/LCSD		
	LCS	LCS D		LCS	LCS D	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	
	Percent Recovery			Percent Recovery		Percent Recovery		Percent Recovery		RPD		RPD		RPD		
Gasoline (8015)																
Diesel (8015)																
Benzene (8021B)																
Methane (RSK-175)																
2,4-D (8151)																
Dinoseb (8151)																
Naphthalene (8310)																
Anthracene (8310)																
HMX (8330)	1.00	1.00	ND	0.967	0.967	97	96.71									
2,4,6-Trinitrotoluene (8330)	1.00	1.00	ND	0.873	0.873	87	87.31									

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** February 26, 2013  
**Matrix:** Tissue  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160464

### Sample Identification

ORD301L  
ORD302L  
ORD303L  
ORD304L  
ORD305L  
ORD306L  
ORD307L  
ORD308L  
ORD309L  
ORD310L  
ORD311L  
ORD301LDUP  
ORD305LMS  
ORD305LMSD  
ORD306LDUP

## Introduction

This data review covers 15 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330B for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD305LMS/MSD (ORD305L)	Tetryl	0 (10-150)	0 (10-150)	-	J (all detects) R (all non-detects)	A

## VII. Laboratory Control Samples

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
MWJT31AC	Picric acid 2,4-Dinitrophenol	7.5 (25-150) 0 (25-150)	All samples in SDG G2H160464	J (all detects) R (all non-detects) J (all detects) R (all non-detects)	P

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation

All compound quantitations were within validation criteria.

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD301L and ORD301LDUP and samples ORD306L and ORD306LDUP were identified as field duplicates. No energetics were detected in any of the samples.

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2H160464**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G2H160464	ORD305L	Tetryl	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2H160464	ORD301L ORD302L ORD303L ORD304L ORD305L ORD306L ORD307L ORD308L ORD309L ORD310L ORD311L ORD301LDUP ORD306LDUP	Picric acid  2,4-Dinitrophenol	J (all detects) R (all non-detects) J (all detects) R (all non-detects)	P	Laboratory control samples (%R) (l)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2H160464**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2H160464**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD301L

HPLC

Lot-Sample #...: G2H160464-001    Work Order #...: MV6MF1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.98	mg/kg	0.49
3,5-Dinitroaniline	ND ↓	0.98	mg/kg	0.49
2,4-Dinitrophenol	NR R (L)	0.98	mg/kg	0.49
HMX	ND ✓	0.98	mg/kg	0.49
Nitrobenzene	ND	0.98	mg/kg	0.49
Nitroglycerin	ND	2.0	mg/kg	0.98
2-Nitrophenol	ND	0.98	mg/kg	0.49
4-Nitrophenol	ND	0.98	mg/kg	0.49
2-Nitrotoluene	ND	0.98	mg/kg	0.49
4-Nitrotoluene	ND	0.98	mg/kg	0.49
RDX	ND	0.98	mg/kg	0.49
Tetryl	ND ↓	0.98	mg/kg	0.49
1,3,5-Trinitrobenzene	ND ↓	0.24	mg/kg	0.020
Picric Acid	ND R (L)	2.0	mg/kg	0.49
2,4,6-Trinitrotoluene	ND ✓	0.98	mg/kg	0.49

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(65 - 135)

NOTE(S):  
 NR Not reportable.

OR 2/25/13

University of Hawaii at Manoa

Client Sample ID: ORD301L DUP

HPLC

Lot-Sample #...: G2H160464-001    Work Order #...: MV6MF1AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.94  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND <i>U</i>	0.94	mg/kg	0.47
3,5-Dinitroaniline	ND <i>↓</i>	0.94	mg/kg	0.47
2,4-Dinitrophenol	NR <i>R(L)</i>	0.94	mg/kg	0.47
HMX	ND <i>U</i>	0.94	mg/kg	0.47
Nitrobenzene	ND <i>↓</i>	0.94	mg/kg	0.47
Nitroglycerin	ND	1.9	mg/kg	0.94
2-Nitrophenol	ND	0.94	mg/kg	0.47
4-Nitrophenol	ND	0.94	mg/kg	0.47
2-Nitrotoluene	ND	0.94	mg/kg	0.47
4-Nitrotoluene	ND	0.94	mg/kg	0.47
RDX	ND	0.94	mg/kg	0.47
Tetryl	ND <i>↓</i>	0.94	mg/kg	0.47
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND <i>R(L)</i>	1.9	mg/kg	0.47
2,4,6-Trinitrotoluene	ND <i>U</i>	0.94	mg/kg	0.47

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	80	(65 - 135)

NOTE(S):

NR Not reportable

*022/25/13*

University of Hawaii at Manoa

Client Sample ID: ORD302L

HPLC

Lot-Sample #...: G2H160464-002    Work Order #...: MV6MG1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.99	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	0.99	mg/kg	0.50
2,4-Dinitrophenol	NR R(L)	0.99	mg/kg	0.50
HMX	ND ✓	0.99	mg/kg	0.50
Nitrobenzene	ND ↓	0.99	mg/kg	0.50
Nitroglycerin	ND ↓	2.0	mg/kg	0.99
2-Nitrophenol	ND ↓	0.99	mg/kg	0.50
4-Nitrophenol	ND ↓	0.99	mg/kg	0.50
2-Nitrotoluene	ND ↓	0.99	mg/kg	0.50
4-Nitrotoluene	ND ↓	0.99	mg/kg	0.50
RDX	ND ↓	0.99	mg/kg	0.50
Tetryl	ND ↓	0.99	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	ND R(L)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND ✓	0.99	mg/kg	0.50
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	83	(65 - 135)		

NOTE(S):

NR Not reportable.

022/25/13

University of Hawaii at Manoa

Client Sample ID: ORD303L

HPLC

Lot-Sample #...: G2H160464-003    Work Order #...: MV6MH1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.99	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	0.99	mg/kg	0.50
2,4-Dinitrophenol	NR R (l)	0.99	mg/kg	0.50
HMX	ND ✓	0.99	mg/kg	0.50
Nitrobenzene	ND ↓	0.99	mg/kg	0.50
Nitroglycerin	ND	2.0	mg/kg	0.99
2-Nitrophenol	ND	0.99	mg/kg	0.50
4-Nitrophenol	ND	0.99	mg/kg	0.50
2-Nitrotoluene	ND	0.99	mg/kg	0.50
4-Nitrotoluene	ND	0.99	mg/kg	0.50
RDX	ND	0.99	mg/kg	0.50
Tetryl	ND ↓	0.99	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	ND R (l)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND ✓	0.99	mg/kg	0.50

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	82	(65 - 135)

NOTE(S) :

NR Not reportable

G22/25/B

University of Hawaii at Manoa

Client Sample ID: ORD304L

HPLC

Lot-Sample #...: G2H160464-004    Work Order #...: MV6MJ1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	1.0	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	1.0	mg/kg	0.50
2,4-Dinitrophenol	NR R(L)	1.0	mg/kg	0.50
HMX	ND ✓	1.0	mg/kg	0.50
Nitrobenzene	ND	1.0	mg/kg	0.50
Nitroglycerin	ND	2.0	mg/kg	1.0
2-Nitrophenol	ND	1.0	mg/kg	0.50
4-Nitrophenol	ND	1.0	mg/kg	0.50
2-Nitrotoluene	ND	1.0	mg/kg	0.50
4-Nitrotoluene	ND	1.0	mg/kg	0.50
RDX	ND	1.0	mg/kg	0.50
Tetryl	ND	1.0	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	ND R(L)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND ✓	1.0	mg/kg	0.50

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(65 - 135)

NOTE (S) :

NR Not reportable.

022/25/13



University of Hawaii at Manoa

Client Sample ID: ORD305L

HPLC

Lot-Sample #....: G2H160464-005    Work Order #....: MV6MK1AA    Matrix.....: BIOLOGIC  
 Date Sampled....: 07/18/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/19/12  
 Prep Batch #....: 2256105  
 Dilution Factor: 0.98  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.98	mg/kg	0.49
3,5-Dinitroaniline	ND ↓	0.98	mg/kg	0.49
2,4-Dinitrophenol	NR R(l)	0.98	mg/kg	0.49
HMX	ND ✓	0.98	mg/kg	0.49
Nitrobenzene	ND ↓	0.98	mg/kg	0.49
Nitroglycerin	ND	2.0	mg/kg	0.98
2-Nitrophenol	ND	0.98	mg/kg	0.49
4-Nitrophenol	ND	0.98	mg/kg	0.49
2-Nitrotoluene	ND	0.98	mg/kg	0.49
4-Nitrotoluene	ND ↓	0.98	mg/kg	0.49
RDX	ND	0.98	mg/kg	0.49
Tetryl	ND R(m)	0.98	mg/kg	0.49
1,3,5-Trinitrobenzene	ND ✓	0.24	mg/kg	0.020
Picric Acid	ND R(l)	2.0	mg/kg	0.49
2,4,6-Trinitrotoluene	ND ✓	0.98	mg/kg	0.49
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
3,4-Dinitrotoluene	83	(65 - 135)		

NOTE (S) :

NR Not reportable.

022/25/13

University of Hawaii at Manoa

Client Sample ID: ORD306L

HPLC

Lot-Sample #...: G2H160464-006    Work Order #...: MV6ML1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.97  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND U	0.97	mg/kg	0.48
3,5-Dinitroaniline	ND ↓	0.97	mg/kg	0.48
2,4-Dinitrophenol	NR R(L)	0.97	mg/kg	0.48
HMX	ND U	0.97	mg/kg	0.48
Nitrobenzene	ND ↓	0.97	mg/kg	0.48
Nitroglycerin	ND ↓	1.9	mg/kg	0.97
2-Nitrophenol	ND ↓	0.97	mg/kg	0.48
4-Nitrophenol	ND ↓	0.97	mg/kg	0.48
2-Nitrotoluene	ND ↓	0.97	mg/kg	0.48
4-Nitrotoluene	ND ↓	0.97	mg/kg	0.48
RDX	ND ↓	0.97	mg/kg	0.48
Tetryl	ND ↓	0.97	mg/kg	0.48
1,3,5-Trinitrobenzene	ND ↓	0.24	mg/kg	0.019
Picric Acid	ND R(L)	1.9	mg/kg	0.48
2,4,6-Trinitrotoluene	ND U	0.97	mg/kg	0.48

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(65 - 135)

NOTE(S):

NR Not reportable.

CR2/25/B

University of Hawaii at Manoa

Client Sample ID: ORD306L DUP

HPLC

Lot-Sample #...: G2H160464-006    Work Order #...: MV6ML1AU    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 1  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	1.0	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	1.0	mg/kg	0.50
2,4-Dinitrophenol	NR (ll)	1.0	mg/kg	0.50
HMX	ND ✓	1.0	mg/kg	0.50
Nitrobenzene	ND ↓	1.0	mg/kg	0.50
Nitroglycerin	ND ↓	2.0	mg/kg	1.0
2-Nitrophenol	ND ↓	1.0	mg/kg	0.50
4-Nitrophenol	ND ↓	1.0	mg/kg	0.50
2-Nitrotoluene	ND ↓	1.0	mg/kg	0.50
4-Nitrotoluene	ND ↓	1.0	mg/kg	0.50
RDX	ND ↓	1.0	mg/kg	0.50
Tetryl	ND ↓	1.0	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	ND (ll)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND ✓	1.0	mg/kg	0.50

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(65 - 135)

NOTE(S):

NR Not reportable.

082125/13

University of Hawaii at Manoa

Client Sample ID: ORD307L

HPLC

Lot-Sample #...: G2H160464-007    Work Order #...: MV6MM1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.94  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND U	0.94	mg/kg	0.47
3,5-Dinitroaniline	ND ↓	0.94	mg/kg	0.47
2,4-Dinitrophenol	NR (L)	0.94	mg/kg	0.47
HMX	ND U	0.94	mg/kg	0.47
Nitrobenzene	ND ↓	0.94	mg/kg	0.47
Nitroglycerin	ND ↓	1.9	mg/kg	0.94
2-Nitrophenol	ND ↓	0.94	mg/kg	0.47
4-Nitrophenol	ND ↓	0.94	mg/kg	0.47
2-Nitrotoluene	ND ↓	0.94	mg/kg	0.47
4-Nitrotoluene	ND ↓	0.94	mg/kg	0.47
RDX	ND ↓	0.94	mg/kg	0.47
Tetryl	ND ↓	0.94	mg/kg	0.47
1,3,5-Trinitrobenzene	ND ↓	0.24	mg/kg	0.019
Picric Acid	ND (L)	1.9	mg/kg	0.47
2,4,6-Trinitrotoluene	ND U	0.94	mg/kg	0.47

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	81	(65 - 135)

NOTE (S) :

NR Not reportable.

0822/25/13

University of Hawaii at Manoa

Client Sample ID: ORD308L

HPLC

Lot-Sample #...: G2H160464-008    Work Order #...: MV6MN1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.93  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.93	mg/kg	0.46
3,5-Dinitroaniline	ND ↓	0.93	mg/kg	0.46
2,4-Dinitrophenol	NR R(L)	0.93	mg/kg	0.46
HMX	ND ✓	0.93	mg/kg	0.46
Nitrobenzene	ND ↓	0.93	mg/kg	0.46
Nitroglycerin	ND ↓	1.9	mg/kg	0.93
2-Nitrophenol	ND ↓	0.93	mg/kg	0.46
4-Nitrophenol	ND ↓	0.93	mg/kg	0.46
2-Nitrotoluene	ND ↓	0.93	mg/kg	0.46
4-Nitrotoluene	ND ↓	0.93	mg/kg	0.46
RDX	ND ↓	0.93	mg/kg	0.46
Tetryl	ND ↓	0.93	mg/kg	0.46
1,3,5-Trinitrobenzene	ND ↓	0.23	mg/kg	0.019
Picric Acid	ND R(L)	1.9	mg/kg	0.46
2,4,6-Trinitrotoluene	ND ✓	0.93	mg/kg	0.46

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	82	(65 - 135)

NOTE(S) :

NR Not reportable.

022/25/13

University of Hawaii at Manoa

Client Sample ID: ORD309L

HPLC

Lot-Sample #...: G2H160464-009    Work Order #...: MV6MP1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 1.01  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	1.0	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	1.0	mg/kg	0.50
2,4-Dinitrophenol	NR R(l)	1.0	mg/kg	0.50
HMX	ND ✓	1.0	mg/kg	0.50
Nitrobenzene	ND ↓	1.0	mg/kg	0.50
Nitroglycerin	ND ↓	2.0	mg/kg	1.0
2-Nitrophenol	ND ↓	1.0	mg/kg	0.50
4-Nitrophenol	ND ↓	1.0	mg/kg	0.50
2-Nitrotoluene	ND ↓	1.0	mg/kg	0.50
4-Nitrotoluene	ND ↓	1.0	mg/kg	0.50
RDX	ND ↓	1.0	mg/kg	0.50
Tetryl	ND ↓	1.0	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	NR R(l)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND ✓	1.0	mg/kg	0.50
	PERCENT RECOVERY	RECOVERY LIMITS		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	83	(65 - 135)		

NOTE(S) :

NR Not reportable.

022125/B

University of Hawaii at Manoa

Client Sample ID: ORD310L

HPLC

Lot-Sample #....: G2H160464-010    Work Order #....: MV6MQ1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/16/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #....: 2256105  
 Dilution Factor: 0.95  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2, 6-dinitrotoluene	ND ✓	0.95	mg/kg	0.48
3, 5-Dinitroaniline	ND ↓	0.95	mg/kg	0.48
2, 4-Dinitrophenol	NR (L)	0.95	mg/kg	0.48
HMX	ND ✓	0.95	mg/kg	0.48
Nitrobenzene	ND ↓	0.95	mg/kg	0.48
Nitroglycerin	ND ↓	1.9	mg/kg	0.95
2-Nitrophenol	ND ↓	0.95	mg/kg	0.48
4-Nitrophenol	ND ↓	0.95	mg/kg	0.48
2-Nitrotoluene	ND ↓	0.95	mg/kg	0.48
4-Nitrotoluene	ND ↓	0.95	mg/kg	0.48
RDX	ND ↓	0.95	mg/kg	0.48
Tetryl	ND ↓	0.95	mg/kg	0.48
1, 3, 5-Trinitrobenzene	ND ↓	0.24	mg/kg	0.019
Picric Acid	NR (L)	1.9	mg/kg	0.48
2, 4, 6-Trinitrotoluene	ND ✓	0.95	mg/kg	0.48

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3, 4-Dinitrotoluene	82	(65 - 135)

NOTE (S) :

NR Not reportable

CE 2/25/13

University of Hawaii at Manoa

Client Sample ID: ORD311L

HPLC

Lot-Sample #...: G2H160464-011    Work Order #...: MV6MR1AA    Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12    Date Received...: 08/16/12  
 Prep Date.....: 09/12/12    Analysis Date...: 10/20/12  
 Prep Batch #...: 2256105  
 Dilution Factor: 0.99  
 % Moisture.....:    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
4-Amino-2,6-dinitrotoluene	ND ✓	0.99	mg/kg	0.50
3,5-Dinitroaniline	ND ↓	0.99	mg/kg	0.50
2,4-Dinitrophenol	NR R(L)	0.99	mg/kg	0.50
HMX	ND ✓	0.99	mg/kg	0.50
Nitrobenzene	ND ↓	0.99	mg/kg	0.50
Nitroglycerin	ND ↓	2.0	mg/kg	0.99
2-Nitrophenol	ND ↓	0.99	mg/kg	0.50
4-Nitrophenol	ND ↓	0.99	mg/kg	0.50
2-Nitrotoluene	ND ↓	0.99	mg/kg	0.50
4-Nitrotoluene	ND ↓	0.99	mg/kg	0.50
RDX	ND ↓	0.99	mg/kg	0.50
Tetryl	ND ↓	0.99	mg/kg	0.50
1,3,5-Trinitrobenzene	ND ↓	0.25	mg/kg	0.020
Picric Acid	ND R(L)	2.0	mg/kg	0.50
2,4,6-Trinitrotoluene	ND U	0.99	mg/kg	0.50

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	83	(65 - 135)

NOTE(S):

NR Not reportable.

022/25/13



LDC #: 29217B40  
 SDG #: G2H160464  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 02/22/2012  
 Page: 1 of 1  
 Reviewer: SW  
 2nd Reviewer: A

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330B)

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>07/16/2012 - 07/18/2012</u>
II.	Initial calibration	A	<u>RSD ≤ 20</u>
III.	Calibration verification/ICV	A	<u>inv + ccv ≤ 15 ICV: 75-125%</u>
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates <u>/ TB</u>	<u>SW / A</u>	
VII.	Laboratory control samples	<u>SW</u>	<u>LCS</u>
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	<u>ND</u>	<u>(1,12), (6,15)</u>
XIII.	Field blanks	<u>N</u>	

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	ORD301L	11	ORD311L	21		31	<u>MWJT31AA</u>
2	ORD302L	12	ORD301L <u>DUP</u>	22		32	
3	ORD303L	13	ORD305LMS	23		33	
4	ORD304L	14	ORD305LMSD	24		34	
5	ORD305L	15	ORD306LDUP	25		35	
6	ORD306L	16		26		36	
7	ORD307L	17		27		37	
8	ORD308L	18		28		38	
9	ORD309L	19		29		39	
10	ORD310L	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Method: GC  HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) $\leq$ 20%?	/			
Was a curve fit used for evaluation?		/		
Did the initial calibration meet the curve fit acceptance criteria of $> 0.990$ ?			/	
Were the RT windows properly established?	/			
<b>IV. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) $\leq$ 15.0% or $<$ 20.0%?	/			
Were all the retention times within the acceptance windows?	/			
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		/		
<b>IX. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

Validation Area	Yes	No	NA	Findings/Comments
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

VALIDATION FINDINGS WORKSHEET

METHOD: GC  HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethylbenzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. o-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. m,p-Xylenes
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total xylenes
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotepp	BB. Famphur	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Phosmet	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	<b>Krone</b>
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	A. Tetra-n-butyltin
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	B. Tri-n-butyltin Cation
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	C. Di-n-butyltin Cation
O. Phenanthrene	O. Picic Acid		O. Chlorpyrifos		D. N-Butyltin Cation
P. Pyrene	P. 2,4-Dinitrophenol		P. Fenithion		
Q.	Q		Q. Parathion-ethyl		
R.			R. Trichloronate		
S.			S. Merphos		
			T. Stirophos		
			U. Tokuthion		

Notes:





**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

METHOD: GC X HPLC (EPA 8330 B)

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C  
 Average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (10 std)	CF (10 std)	CF (10 std)	CF (10 std)	CF (initial)	%RSD	CF (initial)	%RSD
1	0-000004.d LC11	08/15/2012 17:02	HMX 2,4,6-TRINITROTOLUENE	107	106.7	95.31700	12.665	95.317	12.665	95.317	12.665
				127	127.3	118	5.278	118.449	5.278	118.449	5.278
				(20 STD)	(20 STD)						
2	PF-000006.d LC12	09/26/2012 23:32	HMX 2,4,6-TRINITROTOLUENE	624	624	639	8.503	638.86	8.503	638.86	8.503
				1404	1403.55	1364	10.800	1364.3607	10.800	1364.3607	10.800
3	C-000004.d LC12	10/01/2012 12:30	HMX 2,4,6-TRINITROTOLUENE	64	64	62.31425	8.734	62.31425	8.734	62.31425	8.734
				76.1	76.1	74.14875	6.563	74.14875	6.563	74.14875	6.563
4											

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

METHOD: GC X HPLC (EPA 8330B)

The continuing calibration percent difference (%D) values were recalculated for \_\_\_\_\_ using the following calculation:

Percent difference (%D) =  $100 * (N - C) / N$  Where: N = Initial Calibration Factor or Nominal Amount (ng)  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/CCV Conc	Reported		Recalculated		Reported		Recalculated	
				CF/Conc CCV	%D	CF/Conc CCV	%D	CF/Conc CCV	%D		
N-000003.d	10/19/2012 13:15	HMX	200	195.4	2.3	195.4006	2.3				2.3
LC11		2,4,6-TRINITROTOLUENE	↓	187.9	6.1	187.8614	6.1				6.1
N-000013.d	10/19/2012 22:16	HMX	100	99.91	0.090	99.9087	0.090				0.091
LC11		2,4,6-TRINITROTOLUENE	↓	93.50	6.5	93.5002	6.5				6.5
N-000003.d	10/19/2012 14:16	HMX	200	<del>187.9</del> 181.4	<del>6.1</del> 6.3	187.3089	<del>6.1</del> 6.3				6.3
LC12		2,4,6-TRINITROTOLUENE	↓	<del>187.9</del> 185.4	<del>6.1</del> 7.3	185.3976	<del>6.1</del> 7.3				7.3
N-000013.d	10/20/2012 01:11	HMX	100	96.12	3.9	96.1257	3.9				3.9
LC12		2,4,6-TRINITROTOLUENE	↓	94.88	5.1	94.8769	5.1				5.1

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

METHOD: GC  HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
 SS = Surrogate Spiked

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3,4-DinitroToluene	LC11	7002	7107	90	90.167	0

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

**Matrix Spike/Matrix Spike Duplicates Results Verification**

**METHOD:** GC X HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$$

Where

SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

$$\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$$

MSD = Matrix spike duplicate

MS/MSD samples: 13 / 14

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	3.86	3.92	ND	3.44	3.57	89	89.24	91	91.14	3.6	3.7
2,4,6-Trinitrotoluene (8330)	3.86	3.92	ND	1.61	1.61	42	41.69	41	41.06	0.06	0.03

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: GC x HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * (SSC - SC) / SA$  Where SSC = Spiked sample concentration SC = Sample concentration SA = Spike added

RPD =  $\frac{((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD)}{100}$  LCS = Laboratory Control Sample

LCS/LCSD samples: MWIT 31A-C

Compound	Spike Added (wg/kg)		Sample Conc. (wg/kg)	Spike Sample Concentration (wg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD		LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)			--								
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	4.00	-	ND	3.99	-	100	99.67	-	-	-	-
2,4,6-Trinitrotoluene (8330)	4.00	-	ND	3.32	-	83	82.87	-	-	-	-

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Sample Calculation Verification

METHOD: GC  HPLC

N N/A  
 N N/A

Were all reported results recalculated and verified for all level IV samples?  
 Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(FV)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

- A= Area or height of the compound to be measured
- FV= Final Volume of extract
- Df= Dilution Factor
- RF= Average response factor of the compound  
 In the initial calibration
- Vs= Initial volume of the sample
- Ws= Initial weight of the sample
- %S= Percent Solid

Example:

Sample ID: 1 Compound Name 2,4,6-Trinitrotoluene

Concentration = ND

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications
	<u>1</u>	<u>TMX</u>	<u>ND</u>		

Comments: \_\_\_\_\_

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** February 22, 2013  
**Matrix:** Tissue  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2H160464

**Sample Identification**

ORD301L  
ORD302L  
ORD303L  
ORD304L  
ORD305L  
ORD306L  
ORD307L  
ORD308L  
ORD309L  
ORD310L  
ORD311L  
ORD301LDUP  
ORD305LMS  
ORD305LMSD  
ORD306LDUP

## Introduction

This data review covers 15 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

### 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
ICB/CCB	Chromium	1.1726 ug/L	ORD303L ORD306L ORD307L ORD308L ORD309L ORD310L ORD311L ORD306LDUP

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
ORD307L	Chromium	0.47 mg/Kg	0.47U mg/Kg
ORD309L	Chromium	0.46 mg/Kg	0.46U mg/Kg

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

## **IX. Internal Standards (ICP-MS)**

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

## **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

## **XI. ICP Serial Dilution**

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## **XII. Sample Result Verification**

All sample result verifications were acceptable.

## **XIII. Overall Assessment of Data**

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

## **XIV. Field Duplicates**

Samples ORD301L and ORD301LDUP and samples ORD306L and ORD306LDUP were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:



Analyte	Concentration (mg/Kg)		RPD
	ORD301L	ORD301LDUP	
Arsenic	0.86	0.75	14
Barium	1.0	0.99	1
Cobalt	0.13	0.14	7
Chromium	0.84	0.87	4
Copper	0.48	0.50	4
Nickel	0.80	1.0	22
Lead	0.26	0.29	11
Strontium	76.5	79.0	3
Vanadium	1.9	2.0	5
Zinc	2.7	1.2	77

Analyte	Concentration (mg/Kg)		RPD
	ORD306L	ORD306LDUP	
Arsenic	1.0	1.1	10
Barium	1.2	1.4	15
Cobalt	0.11	0.13	17
Chromium	0.95	1.0	5
Copper	1.2	1.2	0
Nickel	1.6	1.7	6
Lead	0.55	0.55	0
Strontium	343	298	14
Uranium	0.16	0.13	21
Vanadium	1.8	1.7	6

Analyte	Concentration (mg/Kg)		RPD
	ORD306L	ORD306LDUP	
Zinc	1.9	1.9	0

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2H160464**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2H160464**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
G2H160464	ORD307L	Chromium	0.47U mg/Kg	A	b <sub>2</sub>
G2H160464	ORD309L	Chromium	0.46U mg/Kg	A	b <sub>2</sub>

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2H160464**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD301L

TOTAL Metals

Lot-Sample #...: G2H160464-001  
 Date Sampled...: 07/17/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241108						
Arsenic	0.86	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.0	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.13	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.84	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.48	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.80	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.26	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	76.5	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.9	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

*08/22/13*

University of Hawaii at Manoa

Client Sample ID: ORD301L

TOTAL Metals

Lot-Sample #...: G2H160464-001

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	2.7	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MF1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S):

G Elevated reporting limit The reporting limit is elevated due to matrix interference.

02/21/13

University of Hawaii at Manoa

Client Sample ID: ORD302L

TOTAL Metals

Lot-Sample #...: G2H160464-002  
 Date Sampled...: 07/18/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #...: 2241108						
Arsenic	0.65	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	2.4	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.049 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.53	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.25	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.39	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.15	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	73.3	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD302L

TOTAL Metals

Lot-Sample #: G2H160464-002

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND ✓	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MG1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

CS22/21/13

University of Hawaii at Manoa

Client Sample ID: ORD303L

TOTAL Metals

Lot-Sample #...: G2H160464-003  
 Date Sampled...: 07/17/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241108						
Arsenic	1.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.6	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.15	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	1.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.42	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.1	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.36	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	127	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.9	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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*CEZ/21/13*



University of Hawaii at Manoa

Client Sample ID: ORD303L

TOTAL Metals

Lot-Sample #: G2H160464-003

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	1.1	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MH1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD304L

TOTAL Metals

Lot-Sample #...: G2H160464-004  
 Date Sampled...: 07/18/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241108						
Arsenic	0.93	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.69	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.16	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	1.0	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.39	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.1	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.29	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	86.9	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.2	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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022/21/13

University of Hawaii at Manoa

Client Sample ID: ORD304L

TOTAL Metals

Lot-Sample #: G2H160464-004

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	1.2	1.0	mg/kg	SW846 6020	08/29-09/25/12	MV6MJ1AR
		Dilution Factor: 1		MDL.....: 0.60		

**NOTE(S):**

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

CRZ/2/13

University of Hawaii at Manoa

Client Sample ID: ORD305L

TOTAL Metals

Lot-Sample #...: G2H160464-005

Matrix.....: BIOLOGIC

Date Sampled...: 07/18/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING			PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS	METHOD		
Prep Batch #...: 2241108						
Arsenic	1.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.5	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.16	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	1.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.40	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.34	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	128	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD305L

TOTAL Metals

Lot-Sample #...: G2H160464-005

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	1.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MK1AR
		Dilution Factor: 1		MDL.....: 0.60		

**NOTE (S) :**

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

08/21/13

University of Hawaii at Manoa

Client Sample ID: ORD306L

TOTAL Metals

Lot-Sample #...: G2H160464-006

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241108						
Arsenic	1.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.2	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND <input checked="" type="checkbox"/>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.11	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.95	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	1.2	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.6	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.55	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND <input checked="" type="checkbox"/>	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND g <input checked="" type="checkbox"/>	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	343	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND <input checked="" type="checkbox"/>	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	0.16 B <input checked="" type="checkbox"/>	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	1.8	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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022/2/13

University of Hawaii at Manoa

Client Sample ID: ORD306L

TOTAL Metals

Lot-Sample #: G2H160464-006

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	1.9	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6ML1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

B Estimated result. Result is less than RL.

022/2/13

University of Hawaii at Manoa

Client Sample ID: ORD307L

TOTAL Metals

Lot-Sample #...: G2H160464-007  
 Date Sampled...: 07/16/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241108					
Arsenic	0.80	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.98	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.074 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.47 U(ba)	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	2.5	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.1	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.31	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	383	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	0.11 B J	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.48 B J	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MM1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/21/13



University of Hawaii at Manoa

Client Sample ID: ORD307L

TOTAL Metals

Lot-Sample #....: G2H160464-007

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	2.2	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MMIAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

- B Estimated result. Result is less than RL
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD308L

TOTAL Metals

Lot-Sample #...: G2H160464-008

Matrix.....: BIOLOGIC

Date Sampled...: 07/16/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241108					
Arsenic	0.75	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.1	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.068 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.73	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	1.8	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	1.0	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.38	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	161	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.59 B J	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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University of Hawaii at Manoa

Client Sample ID: ORD308L

TOTAL Metals

Lot-Sample #...: G2H160464-008

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	3.5	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MN1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

B Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference

082/21/13

University of Hawaii at Manoa

Client Sample ID: ORD309L

TOTAL Metals

Lot-Sample #...: G2H160464-009  
 Date Sampled...: 07/16/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2241108					
Arsenic	0.58	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	0.57	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.029 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.46 UCb2)	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.30	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.36	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.14	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	67.5	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.79 B J	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AQ
		Dilution Factor: 1		MDL.....: 0.30		

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08/22/13

University of Hawaii at Manoa

Client Sample ID: ORD309L

TOTAL Metals

Lot-Sample #: G2H160464-009

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	0.72 B <i>J</i>	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MP1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S):

- B Estimated result. Result is less than RL.
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference

*08/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD310L

TOTAL Metals

Lot-Sample #...: G2H160464-010  
 Date Sampled...: 07/16/12  
 % Moisture.....:

Date Received...: 08/16/12

Matrix.....: BIOLOGIC

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2241108					
Arsenic	0.80	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	1.5	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.065 B J	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.74	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	1.5	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.99	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.40	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	140	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	0.79 B J	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

*0822/21/13*

University of Hawaii at Manoa

Client Sample ID: ORD310L

TOTAL Metals

Lot-Sample #...: G2H160464-010

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	1.5	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MQ1AR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE (S) :

- B Estimated result. Result is less than RL.
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference

022/21/13

University of Hawaii at Manoa

Client Sample ID: ORD311L

TOTAL Metals

Lot-Sample #...: G2H160464-011

Matrix.....: BIOLOGIC

Date Sampled...: 07/17/12

Date Received...: 08/16/12

% Moisture.....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2241108						
Arsenic	0.59	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AT
		Dilution Factor: 1		MDL.....: 0.15		
Barium	2.2	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AC
		Dilution Factor: 1		MDL.....: 0.090		
Cadmium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AD
		Dilution Factor: 1		MDL.....: 0.050		
Cobalt	0.043 B S	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AE
		Dilution Factor: 1		MDL.....: 0.010		
Chromium	0.71	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AF
		Dilution Factor: 1		MDL.....: 0.10		
Copper	0.87	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AG
		Dilution Factor: 1		MDL.....: 0.010		
Nickel	0.40	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AH
		Dilution Factor: 1		MDL.....: 0.10		
Lead	0.22	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AJ
		Dilution Factor: 1		MDL.....: 0.060		
Antimony	ND U	0.20	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AK
		Dilution Factor: 1		MDL.....: 0.10		
Selenium	ND G U	0.30	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AL
		Dilution Factor: 1		MDL.....: 0.10		
Strontium	108	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AM
		Dilution Factor: 1		MDL.....: 0.10		
Thallium	ND U	0.10	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AN
		Dilution Factor: 1		MDL.....: 0.050		
Uranium	ND U	0.50	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AP
		Dilution Factor: 1		MDL.....: 0.10		
Vanadium	2.7	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MR1AQ
		Dilution Factor: 1		MDL.....: 0.30		

(Continued on next page)

08/22/13



University of Hawaii at Manoa

Client Sample ID: ORD311L

TOTAL Metals

Lot-Sample #...: G2H160464-011

Matrix.....: BIOLOGIC

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	2.1	1.0	mg/kg	SW846 6020	08/29-09/24/12	MV6MRIAR
		Dilution Factor: 1		MDL.....: 0.60		

NOTE(S) :

- B Estimated result. Result is less than RL.
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference

CEZ/21/13

**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #...: G2H160464      Work Order #...: MV6MF-SMP      Matrix.....: BIOLOGIC  
 Date Sampled...: 07/17/12      Date Received...: 08/16/12

PARAM RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic 0.86	0.75	mg/kg	14	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Barium 1.0	0.99	mg/kg	3.1	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Cadmium ND	ND U	mg/kg	13	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Cobalt 0.13	0.14	mg/kg	7.6	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Chromium 0.84	0.87	mg/kg	3.6	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Copper 0.48	0.50	mg/kg	4.5	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Nickel 0.80	1.0	mg/kg	23	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Lead 0.26	0.29	mg/kg	11	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Antimony ND	ND U	mg/kg	92	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Selenium ND	ND U	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					
Strontium 76.5	79.0	mg/kg	3.2	(0-35)	SD Lot-Sample #: G2H160464-001 SW846 6020	08/29-09/24/12	2241108
		Dilution Factor: 1					

(Continued on next page)

*08/22/13*



**SAMPLE DUPLICATE EVALUATION REPORT**

**Metals**

Client Lot #....: G2H160464

Work Order #....: MV6ML-SMP  
MV6ML-DUP

Matrix.....: BIOLOGIC

Date Sampled....: 07/16/12

Date Received...: 08/16/12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Arsenic	1.0	1.1	mg/kg	9.1	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Barium	1.2	1.4	mg/kg	9.9	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Cadmium	ND	ND	mg/kg	14	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Cobalt	0.11	0.13	mg/kg	11	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Chromium	0.95	1.0	mg/kg	6.8	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Copper	1.2	1.2	mg/kg	3.4	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Nickel	1.6	1.7	mg/kg	4.3	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Lead	0.55	0.55	mg/kg	0.37	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Antimony	ND	ND	mg/kg	5.1	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Selenium	ND	ND	mg/kg	0	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					
Strontium	343	298	mg/kg	14	(0-35)	SD Lot-Sample #: G2H160464-006 SW846 6020	08/29-09/24/12	2241108
			Dilution Factor: 1					

(Continued on next page)

*022/21/13*



LDC #: 29217B4

**VALIDATION COMPLETENESS WORKSHEET**

Date: 2/12/13

SDG #: G2H160464

Level IV

Page: 1 of 1

Laboratory: Test America Inc.

Reviewer: [Signature]  
2nd Reviewer: [Signature]

**METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/16-18/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (Sc > 4x)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1, 12), (6, 15)
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	ORD301L	11	ORD311L	21		31	
2	ORD302L	12	ORD301L/DUP	22		32	
3	ORD303L	13	ORD305LMS	23		33	
4	ORD304L	14	ORD305LMSD	24		34	
5	ORD305L	15	ORD306LDUP	25		35	
6	ORD306L	16		26		36	
7	ORD307L	17		27		37	
8	ORD308L	18		28		38	
9	ORD309L	19		29		39	
10	ORD310L	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Method:Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the proper number of standards used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial calibration correlation coefficients $> 0.995$ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL (ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/	/	
Target analytes were detected in the field blanks.			/	



VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

Table with columns: Sample ID, Matrix, Target Analyte List (TAL). Rows include sample IDs like 1-12, IS and 00-13, M. The TAL column lists various elements with some circled (e.g., Sb, As, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Ni, K, Se, Ti, V, Zn). A section for Analysis Method includes ICP, ICP-MS, and GFAA.

Comments: Mercury by CVAA if performed

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

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

Sample Concentration units, unless otherwise noted: mg/Kg

Soil preparation factor applied: 100x

Associated Samples: 3, 6-11, 15 (b2)

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (µg/L)	Maximum ICB/CCB <sup>a</sup> (µg/L)	Action Level	7	9				
Cr			1.1726	0.5863	0.47	0.46				

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

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

LDC#: 29217B4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
Reviewer: AV  
2nd Reviewer: W

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	1	12	
Arsenic	0.86	0.75	14
Barium	1.0	0.99	1
Cobalt	0.13	0.14	7
Chromium	0.84	0.87	4
Copper	0.48	0.50	4
Nickel	0.80	1.0	22
Lead	0.26	0.29	11
Strontium	76.5	79.0	3
Vanadium	1.9	2.0	5
Zinc	2.7	1.2	77

LDC#: 29217B4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 22 of 22  
Reviewer: OL  
2nd Reviewer: W

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	6	15	
Arsenic	1.0	1.1	10
Barium	1.2	1.4	15
Cobalt	0.11	0.13	17
Chromium	0.95	1.0	5
Copper	1.2	1.2	0
Nickel	1.6	1.7	6
Lead	0.55	0.55	0
Strontium	343	298	14
Uranium	0.16	0.13	21
Vanadium	1.8	1.7	6
Zinc	1.9	1.9	0

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LDC #: 9921705

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
Reviewer: GR  
2nd Reviewer:

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found} \times 100}{\text{True}}$  Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R		%R		
	ICP (Initial calibration)								
ICV	ICP/MS (Initial calibration)	As	78.007	80	97.5		97.5		Y
	CVA (Initial calibration)								
	ICP (Continuing calibration)								
CCV16	ICP/MS (Continuing calibration)	Cd	97.921	100	97.9		97.9		Y
	CVA (Continuing calibration)								
	GFA (Initial calibration)								
	GFA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 992173

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
Reviewer: GR  
2nd Reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,  
 Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Acceptable (Y/N)
					%R / RPD / %D	Reported %R / RPD / %D	
ICSAB	ICP interference check	Ba	98.704	100	98.7	98.7	Y
LCS	Laboratory control sample	Cr	20.6	20	103	103	Y
13	Matrix spike	Cd (SSR-SR)	17.4	20	87	87	Y
13/14	Duplicate	Co	19	18.5	2.7	2.7	Y
5	ICP serial dilution	Sr	1186.7	1224.3	3.1	3.1	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Have results been reported and calculated correctly?
- Y  N  N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y  N  N/A Are all detection limits below the CRDL?

Detected analyte results for V / Zn were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:  $I: V = \frac{100mL (19.42249 \mu g/L)}{1g (1000)} = 1.94 mg/kg$

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor

$II: Zn = \frac{100mL (19.48358 \mu g/L)}{0.95g (1000)} = 2.05 mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	I	As	0.86	0.86	Y
		Ba	1.0	1.0	Y
		Co	0.13	0.13	Y
		Cr	0.84	0.84	Y
		Cu	0.48	0.48	Y
		Ni	0.80	0.80	Y
		Pb	0.26	0.26	Y
		Sr	76.5	76.5	Y
		V	1.9	1.9	Y
		Zn	2.7	2.7	Y
	II	As	0.59	0.59	Y
		Ba	2.2	2.2	Y
		Co	0.043	0.043	Y
		Cr	0.71	0.71	Y
		Cu	0.87	0.87	Y
		Ni	0.40	0.40	Y
		Pb	0.22	0.22	Y
		Sr	108	108	Y
		V	2.7	2.7	Y
		Zn	2.1	2.1	Y

Note: \_\_\_\_\_



## Laboratory Data Consultants, Inc.

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Environet  
650 Iwilei Road, Suite 204  
Honolulu, HI 96817  
ATTN: Ms. Shelby Koide

October 5, 2012

SUBJECT: Ordnance Reef, Data Validation

Dear Ms. Koide,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 21, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 28445:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
G1H110408	Metals
G2H110409	Energetics

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

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- 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,

Ming-Hwa Hwang  
Project Manager/Senior Chemist





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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** August 6, 2011  
**LDC Report Date:** October 2, 2012  
**Matrix:** Sediment  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G1H110408

**Sample Identification**

ORD201S	ORD210SMSD
ORD202S	ORD220S
ORD203S	
ORD204S	
ORD205S	
ORD206S	
ORD207S	
ORD208S	
ORD209S	
ORD210S	
ORD211S	
ORD212S	
ORD213S	
ORD214S	
ORD215S	
ORD216S	
ORD217S	
ORD218S	
ORD219S	
ORD210SMS	

## Introduction

This data review covers 22 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## 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)	Chromium	0.17 mg/Kg	All samples in SDG G1H110408

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.

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## 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)	Flag	A or P
ORD210SMS/MSD (All samples in SDG G1H110408)	Copper	88 (89-110)	422 (89-110)	104 ( $\leq 20$ )	J (all detects) UJ (all non-detects)	A
	Zinc	-	-	41 ( $\leq 20$ )	J (all detects) UJ (all non-detects)	
ORD210SMS/MSD (All samples in SDG G1H110408)	Zinc	-	159 (79-110)	-	J (all detects)	A

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards (ICP-MS)

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples ORD201S and ORD202S and samples ORD217S and ORD218S were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD201S	ORD202S	
Arsenic	1.9	1.8	5
Barium	3.9	3.8	3
Chromium	8.2	10.8	27
Cobalt	0.58	0.61	5
Copper	8.5	8.3	2
Lead	3.1	2.2	34
Selenium	0.87	1.0	14
Strontium	2790	2820	1
Uranium	0.61	0.58	5
Vanadium	3.2	4.8	40
Zinc	18.6	14.1	28

Analyte	Concentration (mg/Kg)		RPD
	ORD217S	ORD218S	
Arsenic	1.9	3.0	45
Barium	4.6	4.6	0
Chromium	23.6	21.1	11
Cobalt	3.3	2.3	36
Copper	10.7	5.0	73
Lead	1.4	1.9	30
Nickel	20.1	9.0	76
Selenium	1.0	1.1	10
Strontium	3070	3310	8

Analyte	Concentration (mg/Kg)		RPD
	ORD217S	ORD218S	
Uranium	0.83	0.92	10
Vanadium	13.0	12.0	8
Zinc	7.6	7.2	5

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G1H110408**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
G1H110408	ORD201S ORD202S ORD203S ORD204S ORD205S ORD206S ORD207S ORD208S ORD209S ORD210S ORD211S ORD212S ORD213S ORD214S ORD215S ORD216S ORD217S ORD218S ORD219S ORD220S	Copper	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD) (d,m)
G1H110408	ORD201S ORD202S ORD203S ORD204S ORD205S ORD206S ORD207S ORD208S ORD209S ORD210S ORD211S ORD212S ORD213S ORD214S ORD215S ORD216S ORD217S ORD218S ORD219S ORD220S	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (RPD) (d)



SDG	Sample	Analyte	Flag	A or P	Reason (Code)
G1H110408	ORD201S ORD202S ORD203S ORD204S ORD205S ORD206S ORD207S ORD208S ORD209S ORD210S ORD211S ORD212S ORD213S ORD214S ORD215S ORD216S ORD217S ORD218S ORD219S ORD220S	Zinc	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

**Ordnance Reef**

**Metals - Laboratory Blank Data Qualification Summary - SDG G1H110408**

No Sample Data Qualified in this SDG

**Ordnance Reef**

**Metals - Field Blank Data Qualification Summary - SDG G1H110408**

No Sample Data Qualified in this SDG

University of Hawaii

Client Sample ID: ORD201S

TOTAL Metals

Lot-Sample #...: G1H1104C8-001  
 Date Sampled...: 08/06/11  
 % Moisture.....: 22

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237080					
Arsenic	1.9	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AD
		Dilution Factor: 5		MDL.....: 0.97		
Barium	3.9	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AC
		Dilution Factor: 5		MDL.....: 0.58		
Cadmium	ND U	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AE
		Dilution Factor: 5		MDL.....: 0.32		
Cobalt	0.58 B J	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AF
		Dilution Factor: 5		MDL.....: 0.064		
Chromium	8.2 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AG
		Dilution Factor: 5		MDL.....: 0.64		
Copper	8.5 J (d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AH
		Dilution Factor: 5		MDL.....: 0.64		
Nickel	ND U	6.4	mg/kg	SW846 6020	08/25-09/04/11	MLJ201AJ
		Dilution Factor: 25		MDL.....: 3.2		
Lead	3.1	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AT
		Dilution Factor: 5		MDL.....: 0.39		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AK
		Dilution Factor: 5		MDL.....: 0.64		
Selenium	0.87 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AL
		Dilution Factor: 5		MDL.....: 0.64		
Strontium	2790	3.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AN
		Dilution Factor: 5		MDL.....: 0.32		
Uranium	0.61 B J	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AP
		Dilution Factor: 5		MDL.....: 0.19		
Vanadium	3.2 B J	6.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AQ
		Dilution Factor: 5		MDL.....: 1.9		

(Continued on next page)

*02 10/3/12*

University of Hawaii

Client Sample ID: ORD201S

TOTAL Metals

Lot-Sample #....: G1H110408-001

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	18.6 J (d,m)	6.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ201AR
		Dilution Factor: 5		MDL.....: 3.9		

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

02/03/12

University of Hawaii

Client Sample ID: ORD202S

TOTAL Metals

Lot-Sample #...: G1H110408-002  
 Date Sampled...: 08/06/11  
 % Moisture.....: 22

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 1237080							
Arsenic	1.8	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AD	
		Dilution Factor: 5		MDL.....: 0.97			
Barium	3.8	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AC	
		Dilution Factor: 5		MDL.....: 0.58			
Cadmium	ND U	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AE	
		Dilution Factor: 5		MDL.....: 0.32			
Cobalt	0.61 B J	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AF	
		Dilution Factor: 5		MDL.....: 0.064			
Chromium	10.8 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AG	
		Dilution Factor: 5		MDL.....: 0.64			
Copper	8.3 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AH	
		Dilution Factor: 5		MDL.....: 0.64			
Nickel	ND U	6.4	mg/kg	SW846 6020	08/25-09/04/11	MLJ231AJ	
		Dilution Factor: 25		MDL.....: 3.2			
Lead	2.2	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AT	
		Dilution Factor: 5		MDL.....: 0.39			
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AK	
		Dilution Factor: 5		MDL.....: 0.64			
Selenium	1.0 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AL	
		Dilution Factor: 5		MDL.....: 0.64			
Strontium	2820	3.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AM	
		Dilution Factor: 5		MDL.....: 1.3			
Thallium	ND U	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AN	
		Dilution Factor: 5		MDL.....: 0.32			
Uranium	0.58 B J	0.64	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AP	
		Dilution Factor: 5		MDL.....: 0.19			
Vanadium	4.8 B J	6.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AQ	
		Dilution Factor: 5		MDL.....: 1.9			

(Continued on next page)

02/10/12

University of Hawaii

Client Sample ID: ORD202S

TOTAL Metals

Lot-Sample #...: G1H110408-002

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	14.1 <i>S(d,m)</i>	6.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ231AR
		Dilution Factor: 5		MDL.....: 3.9		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*02/10/12*

University of Hawaii

Client Sample ID: ORD203S

TOTAL Metals

Lot-Sample #...: G1H110408-003  
 Date Sampled...: 08/06/11  
 % Moisture.....: 24

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237080					
Arsenic	2.8	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AD
		Dilution Factor: 5		MDL.....: 0.99		
Barium	4.3	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AC
		Dilution Factor: 5		MDL.....: 0.59		
Cadmium	ND U	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AE
		Dilution Factor: 5		MDL.....: 0.33		
Cobalt	0.72	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AF
		Dilution Factor: 5		MDL.....: 0.066		
Chromium	11.8 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AG
		Dilution Factor: 5		MDL.....: 0.66		
Copper	12.4 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AH
		Dilution Factor: 5		MDL.....: 0.66		
Nickel	ND U	6.6	mg/kg	SW846 6020	08/25-09/04/11	MLJ271AJ
		Dilution Factor: 25		MDL.....: 3.3		
Lead	2.5	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AT
		Dilution Factor: 5		MDL.....: 0.39		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AK
		Dilution Factor: 5		MDL.....: 0.66		
Selenium	1.0 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AL
		Dilution Factor: 5		MDL.....: 0.66		
Strontium	3430	3.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AN
		Dilution Factor: 5		MDL.....: 0.33		
Uranium	0.73	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	6.6	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AQ
		Dilution Factor: 5		MDL.....: 2.0		

(Continued on next page)

08/10/11/12

University of Hawaii  
Client Sample ID: ORD203S

TOTAL Metals

Lot-Sample #...: G1H110408-003

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	37.7 <i>J(d,m)</i>	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ271AR
		Dilution Factor: 5		MDL.....: 3.9		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*ORD203S*

University of Hawaii

Client Sample ID: ORD204S

TOTAL Metals

Lot-Sample #...: G1H110408-004  
 Date Sampled...: 08/06/11  
 % Moisture.....: 26

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1237080						
Arsenic	2.5	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	4.3	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AC
		Dilution Factor: 5		MDL.....: 0.61		
Cadmium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AE
		Dilution Factor: 5		MDL.....: 0.34		
Cobalt	0.74	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AF
		Dilution Factor: 5		MDL.....: 0.068		
Chromium	10.4 J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AG
		Dilution Factor: 5		MDL.....: 0.68		
Copper	9.1 J(d,m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AH
		Dilution Factor: 5		MDL.....: 0.68		
Nickel	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AJ
		Dilution Factor: 5		MDL.....: 0.68		
Lead	5.3	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AT
		Dilution Factor: 5		MDL.....: 0.41		
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AK
		Dilution Factor: 5		MDL.....: 0.68		
Selenium	1.7	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AL
		Dilution Factor: 5		MDL.....: 0.68		
Strontium	3150	3.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AN
		Dilution Factor: 5		MDL.....: 0.34		
Uranium	0.71	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	5.3 B J	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AQ
		Dilution Factor: 5		MDL.....: 2.0		

(Continued on next page)

02/10/3/12



University of Hawaii

Client Sample ID: ORD204S

TOTAL Metals

Lot-Sample #...: G1H110408-004

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	20.5 <i>J(d,m)</i>	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3F1AR
		Dilution Factor: 5		MDL.....: 4.1		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*0210/3/12*

University of Hawaii

Client Sample ID: ORD205S

TOTAL Metals

Lot-Sample #...: G1H110408-005

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 28

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 1237080							
Arsenic	2.1	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AD
		Dilution Factor: 5			MDL.....: 1.0		
Barium	4.2	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AC
		Dilution Factor: 5			MDL.....: 0.62		
Cadmium	ND <i>U</i>	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AE
		Dilution Factor: 5			MDL.....: 0.34		
Cobalt	0.60 B <i>J</i>	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AF
		Dilution Factor: 5			MDL.....: 0.069		
Chromium	10.0 J	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AG
		Dilution Factor: 5			MDL.....: 0.69		
Copper	9.0 <i>J(d,m)</i>	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AH
		Dilution Factor: 5			MDL.....: 0.69		
Nickel	ND <i>U</i>	5.5	mg/kg		SW846 6020	08/25-09/04/11	MLJ3G1AJ
		Dilution Factor: 20			MDL.....: 2.8		
Lead	11.2	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AT
		Dilution Factor: 5			MDL.....: 0.41		
Antimony	ND <i>U</i>	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AK
		Dilution Factor: 5			MDL.....: 0.69		
Selenium	1.1 B <i>J</i>	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AL
		Dilution Factor: 5			MDL.....: 0.69		
Strontium	2990	3.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AM
		Dilution Factor: 5			MDL.....: 1.4		
Thallium	ND <i>U</i>	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AN
		Dilution Factor: 5			MDL.....: 0.34		
Uranium	0.60 B <i>J</i>	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AP
		Dilution Factor: 5			MDL.....: 0.21		
Vanadium	4.4 B <i>J</i>	6.9	mg/kg		SW846 6020	08/25-09/02/11	MLJ3G1AQ
		Dilution Factor: 5			MDL.....: 2.1		

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*08/10/3/12*

University of Hawaii

Client Sample ID: ORD205S

TOTAL Metals

Lot-Sample #...: G1H110408-005

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	26.1 <i>J(d,m)</i>	6.9	mg/kg	SW846 6020	08/25-09/02/11	MLJ3G1AR
		Dilution Factor: 5		MDL.....: 4.1		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*02/03/12*

University of Hawaii

Client Sample ID: ORD206S

TOTAL Metals

Lot-Sample #...: G1H110408-006

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 28

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237080					
Arsenic	1.3 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	4.2	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AC
		Dilution Factor: 5		MDL.....: 0.62		
Cadmium	ND U	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AE
		Dilution Factor: 5		MDL.....: 0.35		
Cobalt	0.65 B J	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AF
		Dilution Factor: 5		MDL.....: 0.069		
Chromium	10.1 J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AG
		Dilution Factor: 5		MDL.....: 0.69		
Copper	8.6 J (d,m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AH
		Dilution Factor: 5		MDL.....: 0.69		
Nickel	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AJ
		Dilution Factor: 5		MDL.....: 0.69		
Lead	2.8	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AT
		Dilution Factor: 5		MDL.....: 0.42		
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AK
		Dilution Factor: 5		MDL.....: 0.69		
Selenium	1.7	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AL
		Dilution Factor: 5		MDL.....: 0.69		
Strontium	3100	3.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND U	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AN
		Dilution Factor: 5		MDL.....: 0.35		
Uranium	0.60 B J	0.69	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AP
		Dilution Factor: 5		MDL.....: 0.21		
Vanadium	4.3 B J	6.9	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AQ
		Dilution Factor: 5		MDL.....: 2.1		

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02/10/12

University of Hawaii

Client Sample ID: ORD206S

TOTAL Metals

Lot-Sample #...: G1H110408-006

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	24.2 <i>J(d,m)</i>	6.9	mg/kg	SW846 6020	08/25-09/02/11	MLJ3H1AR
		Dilution Factor: 5		MDL.....: 4.2		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*ORD206S*

University of Hawaii

Client Sample ID: ORD207S

TOTAL Metals

Lot-Sample #....: G1H110408-007  
 Date Sampled....: 08/06/11  
 % Moisture.....: 30

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....:	1237080					
Arsenic	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	3.7	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AC
		Dilution Factor: 5		MDL.....: 0.65		
Cadmium	ND U	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AE
		Dilution Factor: 5		MDL.....: 0.36		
Cobalt	0.50 B J	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AF
		Dilution Factor: 5		MDL.....: 0.072		
Chromium	7.2 J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AG
		Dilution Factor: 5		MDL.....: 0.72		
Copper	80.0 J (d,m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AH
		Dilution Factor: 5		MDL.....: 0.72		
Nickel	ND U	7.2	mg/kg	SW846 6020	08/25-09/04/11	MLJ3J1AJ
		Dilution Factor: 25		MDL.....: 3.6		
Lead	11.3	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AT
		Dilution Factor: 5		MDL.....: 0.43		
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AK
		Dilution Factor: 5		MDL.....: 0.72		
Selenium	1.9	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AL
		Dilution Factor: 5		MDL.....: 0.72		
Strontium	2760	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND U	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AN
		Dilution Factor: 5		MDL.....: 0.36		
Uranium	0.48 B J	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AP
		Dilution Factor: 5		MDL.....: 0.22		
Vanadium	3.1 B J	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AQ
		Dilution Factor: 5		MDL.....: 2.2		

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02103/12

University of Hawaii

Client Sample ID: ORD207S

TOTAL Metals

Lot-Sample #...: G1H110408-007

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	70.5 J(d,m)	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ3J1AR
		Dilution Factor: 5		MDL.....: 4.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

02/03/12

University of Hawaii

Client Sample ID: ORD208S

TOTAL Metals

Lot-Sample #....: G1H110408-008

Matrix.....: SOLID

Date Sampled....: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 33

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #....: 1237080						
Arsenic	2.7	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	3.9	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AC
		Dilution Factor: 5		MDL.....: 0.67		
Cadmium	ND U	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AE
		Dilution Factor: 5		MDL.....: 0.37		
Cobalt	0.57 B J	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AF
		Dilution Factor: 5		MDL.....: 0.074		
Chromium	9.9 J	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AG
		Dilution Factor: 5		MDL.....: 0.74		
Copper	77.3 J (d,m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AH
		Dilution Factor: 5		MDL.....: 0.74		
Nickel	ND U	5.9	mg/kg	SW846 6020	08/25-09/04/11	MLJ3K1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	8.7	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AT
		Dilution Factor: 5		MDL.....: 0.45		
Antimony	ND U	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AK
		Dilution Factor: 5		MDL.....: 0.74		
Selenium	2.4	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AL
		Dilution Factor: 5		MDL.....: 0.74		
Strontium	2930	3.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AM
		Dilution Factor: 5		MDL.....: 1.5		
Thallium	ND U	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AN
		Dilution Factor: 5		MDL.....: 0.37		
Uranium	0.58 B J	0.74	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AP
		Dilution Factor: 5		MDL.....: 0.22		
Vanadium	5.3 B J	7.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AQ
		Dilution Factor: 5		MDL.....: 2.2		

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0210/3/12



University of Hawaii

Client Sample ID: ORD208S

TOTAL Metals

Lot-Sample #...: G1H110408-008

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	88.7 <i>J (d,m)</i>	7.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3K1AR
		Dilution Factor: 5		MDL.....: 4.5		

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*02/03/12*

University of Hawaii

Client Sample ID: ORD209S

TOTAL Metals

Lot-Sample #...: G1H110408-009

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 34

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #...: 1237080						
Arsenic	2.1	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	3.9	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AC
		Dilution Factor: 5		MDL.....: 0.68		
Cadmium	ND ✓	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AE
		Dilution Factor: 5		MDL.....: 0.38		
Cobalt	0.63 B J	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AF
		Dilution Factor: 5		MDL.....: 0.076		
Chromium	10.3 J	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AG
		Dilution Factor: 5		MDL.....: 0.76		
Copper	48.9 J(d,m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AH
		Dilution Factor: 5		MDL.....: 0.76		
Nickel	ND ✓	6.1	mg/kg	SW846 6020	08/25-09/04/11	MLJ3M1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	7.8	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AT
		Dilution Factor: 5		MDL.....: 0.45		
Antimony	ND ✓	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AK
		Dilution Factor: 5		MDL.....: 0.76		
Selenium	2.2	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AL
		Dilution Factor: 5		MDL.....: 0.76		
Strontium	3100	3.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AM
		Dilution Factor: 5		MDL.....: 1.5		
Thallium	ND ✓	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AN
		Dilution Factor: 5		MDL.....: 0.38		
Uranium	0.57 B J	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AP
		Dilution Factor: 5		MDL.....: 0.23		
Vanadium	5.2 B J	7.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AQ
		Dilution Factor: 5		MDL.....: 2.3		

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02/10/3/12

University of Hawaii

Client Sample ID: ORD209S

TOTAL Metals

Lot-Sample #...: G1H110408-009

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	47.6 <i>J(d,m)</i>	7.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3M1AR
		Dilution Factor: 5		MDL.....: 4.5		

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination The associated method blank contains the target analyte at a reportable level.

*02/10/12*

University of Hawaii

Client Sample ID: ORD210S

TOTAL Metals

Lot-Sample #...: G1H110408-010

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 24

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237080					
Arsenic	1.8	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AF
		Dilution Factor: 5		MDL.....: 0.99		
Barium	3.8	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AE
		Dilution Factor: 5		MDL.....: 0.59		
Cadmium	ND U	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AG
		Dilution Factor: 5		MDL.....: 0.33		
Cobalt	0.58 B J	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AH
		Dilution Factor: 5		MDL.....: 0.066		
Chromium	8.9 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AJ
		Dilution Factor: 5		MDL.....: 0.66		
Copper	16.2 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AK
		Dilution Factor: 5		MDL.....: 0.66		
Nickel	ND U	6.6	mg/kg	SW846 6020	08/25-09/04/11	MLJ3N1AL
		Dilution Factor: 25		MDL.....: 3.3		
Lead	3.4	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AV
		Dilution Factor: 5		MDL.....: 0.39		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AM
		Dilution Factor: 5		MDL.....: 0.66		
Selenium	0.74 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AN
		Dilution Factor: 5		MDL.....: 0.66		
Strontium	2880	3.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AP
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AQ
		Dilution Factor: 5		MDL.....: 0.33		
Uranium	0.63 B J	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AR
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	3.4 B J	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AT
		Dilution Factor: 5		MDL.....: 2.0		

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02/10/3/12

University of Hawaii

Client Sample ID: ORD210S

TOTAL Metals

Lot-Sample #...: G1H110408-010

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	24.5 <i>J(a,m)</i>	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3N1AU

Dilution Factor: 5 MDL.....: 3.9

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*02/03/12*

University of Hawaii

Client Sample ID: ORD211S

TOTAL Metals

Lot-Sample #...: G1H110408-011

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 27

PARAMETER	RESULT	REPORTING			PREPARATION-	WORK
		LIMIT	UNITS	METHOD	ANALYSIS DATE	ORDER #
Prep Batch #...: 1237080						
Arsenic	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	3.6	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AC
		Dilution Factor: 5		MDL.....: 0.61		
Cadmium	ND <i>U</i>	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AE
		Dilution Factor: 5		MDL.....: 0.34		
Cobalt	0.61 B <i>J</i>	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AF
		Dilution Factor: 5		MDL.....: 0.068		
Chromium	8.6 J <i>J</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AG
		Dilution Factor: 5		MDL.....: 0.68		
Copper	2.1 <i>J(d,m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AH
		Dilution Factor: 5		MDL.....: 0.68		
Nickel	ND <i>U</i>	6.8	mg/kg	SW846 6020	08/25-09/04/11	MLJ3P1AJ
		Dilution Factor: 25		MDL.....: 3.4		
Lead	1.8	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AT
		Dilution Factor: 5		MDL.....: 0.41		
Antimony	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AK
		Dilution Factor: 5		MDL.....: 0.68		
Selenium	1.7	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AL
		Dilution Factor: 5		MDL.....: 0.68		
Strontium	2980	3.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND <i>U</i>	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AN
		Dilution Factor: 5		MDL.....: 0.34		
Uranium	0.58 B <i>J</i>	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	4.4 B <i>J</i>	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AQ
		Dilution Factor: 5		MDL.....: 2.0		

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*02/03/12*

University of Hawaii

Client Sample ID: ORD211S

TOTAL Metals

Lot-Sample #...: G1H110408-011

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			PREPARATION- WORK	
		LIMIT	UNITS	METHOD	ANALYSIS DATE	ORDER #
Zinc	4.7 B J(d,m)	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3P1AR
		Dilution Factor: 5		MDL.....: 4.1		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

02 10/3/12

University of Hawaii

Client Sample ID: ORD212S

TOTAL Metals

Lot-Sample #...: G1H110403-012

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 34

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...:	1237080						
Arsenic	ND <i>U</i>	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AD	
		Dilution Factor: 5		MDL.....: 1.1			
Barium	4.4	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AC	
		Dilution Factor: 5		MDL.....: 0.68			
Cadmium	ND <i>U</i>	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AE	
		Dilution Factor: 5		MDL.....: 0.38			
Cobalt	0.65 B <i>J</i>	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AF	
		Dilution Factor: 5		MDL.....: 0.076			
Chromium	10.1 J	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AG	
		Dilution Factor: 5		MDL.....: 0.76			
Copper	3.6 <i>J(d,m)</i>	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AH	
		Dilution Factor: 5		MDL.....: 0.76			
Nickel	ND <i>U</i>	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AJ	
		Dilution Factor: 5		MDL.....: 0.76			
Lead	3.1	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AT	
		Dilution Factor: 5		MDL.....: 0.45			
Antimony	ND <i>U</i>	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AK	
		Dilution Factor: 5		MDL.....: 0.76			
Selenium	1.4 B <i>J</i>	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AL	
		Dilution Factor: 5		MDL.....: 0.76			
Strontium	3070	3.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AM	
		Dilution Factor: 5		MDL.....: 1.5			
Thallium	ND <i>U</i>	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AN	
		Dilution Factor: 5		MDL.....: 0.38			
Uranium	0.58 B <i>J</i>	0.76	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AP	
		Dilution Factor: 5		MDL.....: 0.23			
Vanadium	6.8 B <i>J</i>	7.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AQ	
		Dilution Factor: 5		MDL.....: 2.3			

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*ORD/3/12*



University of Hawaii

Client Sample ID: ORD212S

TOTAL Metals

Lot-Sample #...: G1H110408-012

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	7.5 B J (d,m)	7.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ3R1AR

Dilution Factor: 5 MDL.....: 4.5

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

02/03/12

University of Hawaii

Client Sample ID: ORD213S

TOTAL Metals

Lot-Sample #...: G1H110408-013  
 Date Sampled...: 08/06/11  
 % Moisture.....: 31

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 1237080							
Arsenic	ND ✓	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AD
		Dilution Factor: 5			MDL.....: 1.1		
Barium	4.3	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AC
		Dilution Factor: 5			MDL.....: 0.66		
Cadmium	ND ✓	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AE
		Dilution Factor: 5			MDL.....: 0.36		
Cobalt	0.62 B ✓	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AF
		Dilution Factor: 5			MDL.....: 0.073		
Chromium	8.3 J	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AG
		Dilution Factor: 5			MDL.....: 0.73		
Copper	1.9 J (d,m)	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AH
		Dilution Factor: 5			MDL.....: 0.73		
Nickel	ND ✓	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AJ
		Dilution Factor: 5			MDL.....: 0.73		
Lead	2.1	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AT
		Dilution Factor: 5			MDL.....: 0.44		
Antimony	ND ✓	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AK
		Dilution Factor: 5			MDL.....: 0.73		
Selenium	0.76 B ✓	1.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AL
		Dilution Factor: 5			MDL.....: 0.73		
Strontium	2770	3.6	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AM
		Dilution Factor: 5			MDL.....: 1.5		
Thallium	ND ✓	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AN
		Dilution Factor: 5			MDL.....: 0.36		
Uranium	0.45 B ✓	0.73	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AP
		Dilution Factor: 5			MDL.....: 0.22		
Vanadium	5.7 B ✓	7.3	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AQ
		Dilution Factor: 5			MDL.....: 2.2		

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02/10/3/12

University of Hawaii

Client Sample ID: ORD213S

TOTAL Metals

Lot-Sample #...: G1H110408-013

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	5.0 B J (d,m)	7.3	mg/kg		SW846 6020	08/25-09/02/11	MLJ3T1AR
		Dilution Factor: 5			MDL.....: 4.4		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

0210/3/12

University of Hawaii

Client Sample ID: ORD214S

TOTAL Metals

Lot-Sample #...: G1H110408-014

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 26

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...	1237080					
Arsenic	2.0	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	3.6	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AC
		Dilution Factor: 5		MDL.....: 0.61		
Cadmium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AE
		Dilution Factor: 5		MDL.....: 0.34		
Cobalt	0.62 B J	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AF
		Dilution Factor: 5		MDL.....: 0.068		
Chromium	10.2 J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AG
		Dilution Factor: 5		MDL.....: 0.68		
Copper	590 J(d,m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AH
		Dilution Factor: 5		MDL.....: 0.68		
Nickel	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AJ
		Dilution Factor: 5		MDL.....: 0.68		
Lead	7.7	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AT
		Dilution Factor: 5		MDL.....: 0.41		
Antimony	ND V	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AK
		Dilution Factor: 5		MDL.....: 0.68		
Selenium	1.2 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AL
		Dilution Factor: 5		MDL.....: 0.68		
Strontium	2470	3.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AN
		Dilution Factor: 5		MDL.....: 0.34		
Uranium	0.53 B J	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	5.9 B J	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AQ
		Dilution Factor: 5		MDL.....: 2.0		

(Continued on next page)

021013/12

University of Hawaii

Client Sample ID: ORD214S

TOTAL Metals

Lot-Sample #...: G1H110408-014

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	188 <i>J(d,m)</i>	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ3V1AR

Dilution Factor: 5      MDL.....: 4.1

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*02/03/12*

University of Hawaii

Client Sample ID: ORD215S

TOTAL Metals

Lot-Sample #...: G1H110408-015  
 Date Sampled...: 08/06/11  
 % Moisture.....: 20

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 1237080						
Arsenic	1.2 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AD
		Dilution Factor: 5		MDL.....: 0.94		
Barium	3.5	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AC
		Dilution Factor: 5		MDL.....: 0.57		
Cadmium	ND U	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AE
		Dilution Factor: 5		MDL.....: 0.31		
Cobalt	0.56 B J	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AF
		Dilution Factor: 5		MDL.....: 0.063		
Chromium	9.1 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AG
		Dilution Factor: 5		MDL.....: 0.63		
Copper	123 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AH
		Dilution Factor: 5		MDL.....: 0.63		
Nickel	ND U	6.3	mg/kg	SW846 6020	08/25-09/04/11	MLJ3X1AJ
		Dilution Factor: 25		MDL.....: 3.1		
Lead	7.1	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AT
		Dilution Factor: 5		MDL.....: 0.38		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AK
		Dilution Factor: 5		MDL.....: 0.63		
Selenium	1.4	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AL
		Dilution Factor: 5		MDL.....: 0.63		
Strontium	2380	3.1	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AN
		Dilution Factor: 5		MDL.....: 0.31		
Uranium	0.43 B J	0.63	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AP
		Dilution Factor: 5		MDL.....: 0.19		
Vanadium	4.2 B J	6.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AQ
		Dilution Factor: 5		MDL.....: 1.9		

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0210/3/12

University of Hawaii

Client Sample ID: ORD215S

TOTAL Metals

Lot-Sample #...: G1H110408-015

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	124 J(d,m)	6.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ3X1AR

Dilution Factor: 5 MDL.....: 3.8

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level

02/16/12

University of Hawaii

Client Sample ID: ORD216S

TOTAL Metals

Lot-Sample #...: G1H110408-016  
 Date Sampled...: 08/06/11  
 % Moisture.....: 25

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1237080						
Arsenic	3.0	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	3.6	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AC
		Dilution Factor: 5		MDL.....: 0.60		
Cadmium	ND U	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AE
		Dilution Factor: 5		MDL.....: 0.33		
Cobalt	0.71	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AF
		Dilution Factor: 5		MDL.....: 0.067		
Chromium	11.4 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AG
		Dilution Factor: 5		MDL.....: 0.67		
Copper	4100 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AH
		Dilution Factor: 5		MDL.....: 0.67		
Nickel	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AJ
		Dilution Factor: 5		MDL.....: 0.67		
Lead	32.7	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AT
		Dilution Factor: 5		MDL.....: 0.40		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AK
		Dilution Factor: 5		MDL.....: 0.67		
Selenium	0.95 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AL
		Dilution Factor: 5		MDL.....: 0.67		
Strontium	2520	3.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AN
		Dilution Factor: 5		MDL.....: 0.33		
Uranium	0.55 B J	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	7.2	6.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AQ
		Dilution Factor: 5		MDL.....: 2.0		

(Continued on next page)

021013/12



University of Hawaii

Client Sample ID: ORD216S

TOTAL Metals

Lot-Sample #...: G1H110408-016

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	676 J(a,m)	6.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ301AR
		Dilution Factor: 5		MDL.....: 4.0		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

02/10/12

University of Hawaii

Client Sample ID: ORD217S

TOTAL Metals

Lot-Sample #...: G1H110408-017  
 Date Sampled...: 08/06/11  
 % Moisture.....: 26

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 1237080						
Arsenic	1.9	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	4.6	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AC
		Dilution Factor: 5		MDL.....: 0.61		
Cadmium	ND U	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AE
		Dilution Factor: 5		MDL.....: 0.34		
Cobalt	3.3	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AF
		Dilution Factor: 5		MDL.....: 0.067		
Chromium	23.6 J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AG
		Dilution Factor: 5		MDL.....: 0.67		
Copper	10.7 J(d,m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AH
		Dilution Factor: 5		MDL.....: 0.67		
Nickel	20.1	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AJ
		Dilution Factor: 5		MDL.....: 0.67		
Lead	1.4	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AT
		Dilution Factor: 5		MDL.....: 0.40		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AK
		Dilution Factor: 5		MDL.....: 0.67		
Selenium	1.0 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AL
		Dilution Factor: 5		MDL.....: 0.67		
Strontium	3070	3.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND U	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AN
		Dilution Factor: 5		MDL.....: 0.34		
Uranium	0.83	0.67	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	13.0	6.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AQ
		Dilution Factor: 5		MDL.....: 2.0		

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0210/3/12

University of Hawaii

Client Sample ID: ORD217S

TOTAL Metals

Lot-Sample #...: G1H110408-017

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>			<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	7.6 <i>J(d,m)</i>	6.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ311AR
		Dilution Factor: 5		MDL.....: 4.0		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*0210/3/12*

University of Hawaii

Client Sample ID: ORD218S

TOTAL Metals

Lot-Sample #...: G1H110408-018  
 Date Sampled...: 08/06/11  
 % Moisture.....: 24

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Prep Batch #...: 1237080							
Arsenic	3.0	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AD	
		Dilution Factor: 5		MDL.....: 0.99			
Barium	4.6	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AC	
		Dilution Factor: 5		MDL.....: 0.59			
Cadmium	ND <i>U</i>	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AE	
		Dilution Factor: 5		MDL.....: 0.33			
Cobalt	2.3	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AF	
		Dilution Factor: 5		MDL.....: 0.066			
Chromium	21.1 <i>J</i>	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AG	
		Dilution Factor: 5		MDL.....: 0.66			
Copper	5.0 <i>J(d,m)</i>	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AH	
		Dilution Factor: 5		MDL.....: 0.66			
Nickel	9.0	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AJ	
		Dilution Factor: 5		MDL.....: 0.66			
Lead	1.9	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AT	
		Dilution Factor: 5		MDL.....: 0.40			
Antimony	ND <i>U</i>	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AK	
		Dilution Factor: 5		MDL.....: 0.66			
Selenium	1.1 <i>B J</i>	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AL	
		Dilution Factor: 5		MDL.....: 0.66			
Strontium	3310	3.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AM	
		Dilution Factor: 5		MDL.....: 1.3			
Thallium	ND <i>U</i>	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AN	
		Dilution Factor: 5		MDL.....: 0.33			
Uranium	0.92	0.66	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AP	
		Dilution Factor: 5		MDL.....: 0.20			
Vanadium	12.0	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AQ	
		Dilution Factor: 5		MDL.....: 2.0			

(Continued on next page)

*02/03/12*

University of Hawaii

Client Sample ID: ORD218S

TOTAL Metals

Lot-Sample #...: G1H110408-018

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	7.2 <i>S(a,m)</i>	6.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ321AR
		Dilution Factor: 5		MDL.....: 4.0		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*02/10/3/12*

University of Hawaii

Client Sample ID: ORD219S

TOTAL Metals

Lot-Sample #...: G1H110408-019  
 Date Sampled...: 08/06/11  
 % Moisture.....: 28

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 1237080							
Arsenic	1.8	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AD
		Dilution Factor: 5			MDL.....: 1.0		
Barium	3.7	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AC
		Dilution Factor: 5			MDL.....: 0.63		
Cadmium	ND U	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AE
		Dilution Factor: 5			MDL.....: 0.35		
Cobalt	1.0	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AF
		Dilution Factor: 5			MDL.....: 0.070		
Chromium	8.8 J	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AG
		Dilution Factor: 5			MDL.....: 0.70		
Copper	1.8 J(d,m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AH
		Dilution Factor: 5			MDL.....: 0.70		
Nickel	1.6	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AJ
		Dilution Factor: 5			MDL.....: 0.70		
Lead	1.5	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AT
		Dilution Factor: 5			MDL.....: 0.42		
Antimony	ND U	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AK
		Dilution Factor: 5			MDL.....: 0.70		
Selenium	1.9	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AL
		Dilution Factor: 5			MDL.....: 0.70		
Strontium	3190	3.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AM
		Dilution Factor: 5			MDL.....: 1.4		
Thallium	ND U	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AN
		Dilution Factor: 5			MDL.....: 0.35		
Uranium	0.70	0.70	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AP
		Dilution Factor: 5			MDL.....: 0.21		
Vanadium	6.8 B J	7.0	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AQ
		Dilution Factor: 5			MDL.....: 2.1		

(Continued on next page)

0210/13/12

University of Hawaii

Client Sample ID: ORD219S

TOTAL Metals

Lot-Sample #...: G1H110408-019

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	ND <i>us (d)</i>	7.0	mg/kg		SW846 6020	08/25-09/02/11	MLJ331AR
		Dilution Factor: 5			MDL.....: 4.2		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*02/10/12*

University of Hawaii

Client Sample ID: ORD220S

TOTAL Metals

Lot-Sample #...: G1H110408-020

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 27

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...:	1237080					
Arsenic	1.3 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AD
		Dilution Factor: 5		MDL.....: 1.0		
Barium	6.9	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AC
		Dilution Factor: 5		MDL.....: 0.61		
Cadmium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AE
		Dilution Factor: 5		MDL.....: 0.34		
Cobalt	1.8	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AF
		Dilution Factor: 5		MDL.....: 0.068		
Chromium	12.1 J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AG
		Dilution Factor: 5		MDL.....: 0.68		
Copper	3.2 J(d,m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AH
		Dilution Factor: 5		MDL.....: 0.68		
Nickel	4.5	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AJ
		Dilution Factor: 5		MDL.....: 0.68		
Lead	1.1	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AT
		Dilution Factor: 5		MDL.....: 0.41		
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AK
		Dilution Factor: 5		MDL.....: 0.68		
Selenium	1.3 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AL
		Dilution Factor: 5		MDL.....: 0.68		
Strontium	4440	3.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND U	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AN
		Dilution Factor: 5		MDL.....: 0.34		
Uranium	1.1	0.68	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	8.0	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AQ
		Dilution Factor: 5		MDL.....: 2.0		

(Continued on next page)

0210/3/12



University of Hawaii

Client Sample ID: ORD220S

TOTAL Metals

Lot-Sample #...: G1H110408-020

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	4.7 B J(d,m)	6.8	mg/kg	SW846 6020	08/25-09/02/11	MLJ341AR

Dilution Factor: 5 MDL.....: 4.1

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

02/10/3/12

LDC #: 28445A4

# VALIDATION COMPLETENESS WORKSHEET

Date: 9-28-12

SDG #: G1H110408

Level IV

Page: 1 of 1

Laboratory: Test America Inc.

Reviewer: *ca*

2nd Reviewer: *W*

6020

METHOD: Metals (EPA SW 846 Method ~~6010B~~/7000)

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: 8/6/11
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/Ø
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2), (17,18)
XV.	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: sediment

1	ORD201S	11	ORD211S	21	ORD210SMSD	31	
2	ORD202S	12	ORD212S	22	ORD220S	32	
3	ORD203S	13	ORD213S	23		33	
4	ORD204S	14	ORD214S	24		34	
5	ORD205S	15	ORD215S	25		35	
6	ORD206S	16	ORD216S	26		36	
7	ORD207S	17	ORD217S	27		37	
8	ORD208S	18	ORD218S	28		38	
9	ORD209S	19	ORD219S	29		39	
10	ORD210S	20	ORD210SMS	30		40	

Notes: \_\_\_\_\_

**Method: Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	✓			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients $\geq 0.995$ ?	✓			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	✓			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			<del>Based on wet weight</del>
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target analytes were detected in the field duplicates.			/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

Table with columns: Sample ID, Matrix, Target Analyte List (TAL). Rows include sample IDs '1-101' and 'QC: 2021'. The TAL column lists elements like Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Sn, Ti. Some elements are circled in the original image. An 'Analysis Method' section at the bottom lists ICP, ICP-MS, and GFAA.

Comments: Mercury by CVAA if performed

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

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

Soil preparation factor applied: NA

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

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/L)	Maximum ICB/CCB <sup>a</sup> (ug/L)	Action Limit	No Qualifiers													
Cr	0.17			0.85														

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 SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Was a matrix spike analyzed for each matrix in this SDG?
- Y  N  N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
- Y  N  N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples?
- 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
	20/21	S	Cu	88(89-110)	422(89-110)	104 (<20)	All	JULIA (d,m)
			Zn		159(79-110)	41 ( <del>20</del> )	↓	JULIA (d,m)
			Zn			41 (<20)		JULIA (d)

Comments: \_\_\_\_\_

LDC#: 28445A4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
Reviewer: OL  
2nd Reviewer: [Signature]

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	1	2	
Arsenic	1.9	1.8	5
Barium	3.9	3.8	3
Chromium	8.2	10.8	27
Cobalt	0.58	0.61	5
Copper	8.5	8.3	2
Lead	3.1	2.2	34
Selenium	0.87	1.0	14
Strontium	2790	2820	1
Uranium	0.61	0.58	5
Vanadium	3.2	4.8	40
Zinc	18.6	14.1	28



LDC#: 28445A4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	17	18	
Arsenic	1.9	3.0	45
Barium	4.6	4.6	0
Chromium	23.6	21.1	11
Cobalt	3.3	2.3	36
Copper	10.7	5.0	73
Lead	1.4	1.9	30
Nickel	20.1	9.0	76
Selenium	1.0	1.1	10
Strontium	3070	3310	8
Uranium	0.83	0.92	10
Vanadium	13.0	12.0	8
Zinc	7.6	7.2	5

LDC #: 2840A9

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: GR  
 2nd Reviewer:   

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R		%R		
ICV	ICP (Initial calibration)								
	ICP/MS (Initial calibration)	As	81,201	80	102		102		Y
	CVAA (Initial calibration)								
CCV	ICP (Continuing calibration)								
	ICP/MS (Continuing calibration)	Pb	101,88	100	102		102		Y
	CVAA (Continuing calibration)								
	GFAA (Initial calibration)								
	GFAA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$  Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,  
 Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$  Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$  Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D			
ICSAB	ICP interference check	V	111.918	100	112	112	112	112	Y
LCS	Laboratory control sample	Ba	20.11	20.0	102	102	102	102	Y
70	Matrix spike	Sr (SSR-SR)	23.1	26.6	87	87	87	87	Y
20/21	Duplicate	Cd	37.3	35.0	96	96	96	96	Y
10	ICP serial dilution	Cu	129.76	122.01	6.1	6.1	6.1	6.1	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28445A4

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: ar  
 2nd reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y N N/A Have results been reported and calculated correctly?
- Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Ba/Zn were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:  $Ba: \frac{100ML(5)(5.879452ug/L)}{0.776(0.78)(1000)} = 3.9mg/kg$

$Zn: \frac{100ML(5)(7.103081ug/L)}{0.73(1.03g)(1000)} = 3.4mg/kg$

4.7

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	As	1.5 1.9	1.5 1.9	Y
		Ba	3.0 3.9	3.0 3.9	
		Co	0.45 0.58	0.45 0.58	
		Cr	6.3 8.2	6.3 8.2	
		Cu	6.6 8.5	6.6 8.5	
		Pb	2.4 3.1	2.4 3.1	
		Se	0.68 0.87	0.68 0.87	
		Sr	2170 2790	2170 2790	
		U	0.47 0.61	0.47 0.61	
		V	2.5 3.2	2.5 3.2	
		Zn	44.5 18.6	4.5 18.6	
	11	Ba	2.6 3.6	2.6 3.6	
		Co	0.44 0.61	0.44 0.6	
		Cr	6.3 8.6	6.3 8.6	
		Cu	1.5 2.1	1.5 2.1	
		Pb	1.7 1.8	1.7 1.8	
		Se	1.3 1.7	1.3 1.7	
		Sr	2190 2980	2190 2980	
		U	0.42 0.58	0.42 0.58	
		V	3.2 4.4	3.2 4.4	
		Zn	3.4 4.7	3.4 4.7	Y

Note: \_\_\_\_\_

~~Based off wet weight~~ or

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** August 6, 2011  
**LDC Report Date:** October 2, 2012  
**Matrix:** Sediment  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G1H110408

**Sample Identification**

ORD201S	ORD210SMS
ORD202S	ORD210SMSD
ORD203S	ORD220S
ORD204S	
ORD205S	
ORD206S	
ORD207S	
ORD208S	
ORD209S	
ORD210S	
ORD211S	
ORD212S	
ORD213S	
ORD214S	
ORD214SDL	
ORD215S	
ORD216S	
ORD217S	
ORD218S	
ORD219S	

## Introduction

This data review covers 23 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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. Surrogate recoveries (%R) were not within QC limits for sample ORD214SDL. Since the sample was diluted out, no data were qualified.

## **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)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD210SMS/MSD (ORD210S)	2,4-Dinitrophenol	29 (70-130)	5.2 (70-130)	140 (≤25)	J (all detects) UJ (all non-detects)	A
	Picric acid	71 (73-103)	67 (73-103)	-	J (all detects) UJ (all non-detects)	
ORD210SMS/MSD (ORD210S)	Picramic acid	4.5 (50-130)	0 (50-130)	200 (≤25)	J (all detects) R (all non-detects)	A
ORD210SMS/MSD (ORD210S)	Nitrobenzene	107 (76-106)	-	-	J (all detects)	A

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
ORD214S	2,4-Dinitrotoluene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
ORD214S	RDX	180	J (all detects)	A
ORD215S	2-Nitrotoluene	63	J (all detects)	A

## X. System Performance

The system performance was acceptable.



## XI. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
ORD214S	2,4-Dinitrotoluene	Do not use	-
ORD214SDL	All TCL compounds except 2,4-Dinitrotoluene	Do not use	-

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

## XII. Field Duplicates

Samples ORD201S and ORD202S and samples ORD217S and ORD218S were identified as field duplicates. No energetics were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD
	ORD201S	ORD202S	
2,4-Dinitrotoluene	1.1	1.4	24
2,6-Dinitrotoluene	0.12	0.18	40

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G1H110408**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G1H110408	ORD210S	2,4-Dinitrophenol Picric acid	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G1H110408	ORD210S	Picramic acid	J (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G1H110408	ORD210S	Nitrobenzene	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G1H110408	ORD210S	2,4-Dinitrophenol Picramic acid	J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (d)
G1H110408	ORD214S	2,4-Dinitrotoluene	J (all detects)	A	Compound quantitation and RLs (exceeded range) (q)
G1H110408	ORD214S	RDX	J (all detects)	A	Compound quantitation and RLs (column difference) (q)
G1H110408	ORD215S	2-Nitrotoluene	J (all detects)	A	Compound quantitation and RLs (column difference) (q)
G1H110408	ORD214S	2,4-Dinitrotoluene	Do not use	-	Overall assessment of data
G1H110408	ORD214SDL	All TCL compounds except 2,4-Dinitrotoluene	Do not use	-	Overall assessment of data

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G1H110408**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G1H110408**

No Sample Data Qualified in this SDG

University of Hawaii  
Client Sample ID: ORD201S

HPLC

Lot-Sample #...: G1H110408-001    Work Order #...: MLJ201AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 1.01  
 % Moisture.....: 22    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	1.1	0.25	mg/kg	0.020
2,6-Dinitrotoluene	0.12 J	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

**NOTE (S) :**

J Estimated result. Result is less than RL.

*02/10/12*

University of Hawaii

Client Sample ID: ORD202S

HPLC

Lot-Sample #...: G1H110408-002    Work Order #...: MLJ231AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.94  
 % Moisture.....: 22    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.094
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.47	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.047
2,4-Dinitrophenol	ND	0.47	mg/kg	0.19
Picramic Acid	ND	0.47	mg/kg	0.19
2,4-Dinitrotoluene	1.4	0.24	mg/kg	0.019
2,6-Dinitrotoluene	0.18 J ✓	0.24	mg/kg	0.028
HMX	ND ✓	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.047
Nitroglycerin	ND	0.47	mg/kg	0.12
2-Nitrophenol	ND	0.47	mg/kg	0.19
4-Nitrophenol	ND	0.47	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.075
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Nitrotoluene	ND	0.24	mg/kg	0.075
PETN	ND	0.47	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.047
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.94	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE(S) :

J Estimated result. Result is less than RL.

*C20/3/12*

University of Hawaii

Client Sample ID: ORD203S

HPLC

Lot-Sample #...: G1H110408-003    Work Order #...: MLJ271AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.97  
 % Moisture.....: 24    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	0.054 J J	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND U	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

02/10/3/12

University of Hawaii

Client Sample ID: ORD204S

HPLC

Lot-Sample #...: G1H110408-004    Work Order #...: MLJ3F1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.99  
 % Moisture.....: 26    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	88	(78 - 108)

0210/3/12

University of Hawaii

Client Sample ID: ORD205S

HPLC

Lot-Sample #...: G1H110408-005    Work Order #...: MLJ3G1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 1.01  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.57	0.25	mg/kg	0.020
2,6-Dinitrotoluene	0.066 J J	0.25	mg/kg	0.030
HMX	ND ✓	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT RECOVERY	RECOVERY LIMITS		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	90	(78 - 108)		

NOTE(S) :

J Estimated result. Result is less than RL.

*02/10/12*

University of Hawaii  
Client Sample ID: ORD206S

HPLC

Lot-Sample #...: G1H110408-006    Work Order #...: MLJ3H1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.96  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	0.079 J J	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND ✓	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

**NOTE (S) :**

J Estimated result. Result is less than RL.

02/10/3/12



University of Hawaii  
Client Sample ID: ORD207S

HPLC

Lot-Sample #...: G1H110408-007    Work Order #...: MLJ3J1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/01/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.96  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	0.28	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND ✓	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

*02/10/3/12*

University of Hawaii

Client Sample ID: ORD208S

HPLC

Lot-Sample #...: G1H110408-008    Work Order #...: MLJ3K1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.94  
 % Moisture.....: 33    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.094
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.47	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.047
2,4-Dinitrophenol	ND	0.47	mg/kg	0.19
Picramic Acid	ND	0.47	mg/kg	0.19
2,4-Dinitrotoluene	2.5	0.24	mg/kg	0.019
2,6-Dinitrotoluene	0.17 J 5	0.24	mg/kg	0.028
HMX	ND ✓	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.047
Nitroglycerin	ND	0.47	mg/kg	0.12
2-Nitrophenol	ND	0.47	mg/kg	0.19
4-Nitrophenol	ND	0.47	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.075
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Nitrotoluene	ND	0.24	mg/kg	0.075
PETN	ND	0.47	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.047
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.94	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

02/10/12

University of Hawaii

Client Sample ID: ORD209S

HPLC

Lot-Sample #...: G1H110408-009    Work Order #...: MLJ3M1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.99  
 % Moisture.....: 34    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	5.9	0.25	mg/kg	0.020
2,6-Dinitrotoluene	0.71	0.25	mg/kg	0.030
HMX	ND ✓	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	91	(78 - 108)

*02/10/3/12*

University of Hawaii

Client Sample ID: ORD210S

HPLC

Lot-Sample #....: G1H110408-010    Work Order #....: MLJ3N1AA    Matrix.....: SOLID  
 Date Sampled....: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1229106  
 Dilution Factor: 0.99  
 % Moisture.....: 24    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <u>u</u>	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND <u>UJ(m)</u>	0.50	mg/kg	0.20
Picramic Acid	ND <u>R(m)</u>	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.065 <u>J J</u>	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND <u>u</u>	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND <u>u</u>	0.25	mg/kg	0.020
Picric Acid	ND <u>UJ(m)</u>	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND <u>u</u>	0.25	mg/kg	0.020
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		88	(78 - 108)	

NOTE(S):

J Estimated result. Result is less than RL.

10/4/12

University of Hawaii

Client Sample ID: ORD211S

HPLC

Lot-Sample #...: G1H110408-011 Work Order #...: MLJ3P1AA Matrix.....: SOLID  
 Date Sampled...: 08/06/11 Date Received...: 08/10/11  
 Prep Date.....: 08/17/11 Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 1.02  
 % Moisture.....: 27 Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.26	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.26	mg/kg	0.020
3,5-Dinitroaniline	ND	0.51	mg/kg	0.026
1,3-Dinitrobenzene	ND	0.26	mg/kg	0.051
2,4-Dinitrophenol	ND	0.51	mg/kg	0.20
Picramic Acid	ND	0.51	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.26	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.26	mg/kg	0.031
HMX	ND	0.26	mg/kg	0.031
Nitrobenzene	ND	0.26	mg/kg	0.051
Nitroglycerin	ND	0.51	mg/kg	0.13
2-Nitrophenol	ND	0.51	mg/kg	0.20
4-Nitrophenol	ND	0.51	mg/kg	0.20
2-Nitrotoluene	ND	0.26	mg/kg	0.082
3-Nitrotoluene	ND	0.26	mg/kg	0.071
4-Nitrotoluene	ND	0.26	mg/kg	0.082
PETN	ND	0.51	mg/kg	0.16
RDX	ND	0.26	mg/kg	0.041
Tetryl	ND	0.26	mg/kg	0.051
1,3,5-Trinitrobenzene	ND	0.26	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.26
2,4,6-Trinitrotoluene	ND ✓	0.26	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

0210/3/12

University of Hawaii

Client Sample ID: ORD212S

HPLC

Lot-Sample #....: G1H110408-012    Work Order #....: MLJ3R1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1229106  
 Dilution Factor: 0.98  
 % Moisture.....: 34    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <u>U</u>	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	88	(78 - 108)

0210/3/12

University of Hawaii

Client Sample ID: ORD213S

HPLC

Lot-Sample #....: G1H110408-013    Work Order #....: MLJ3T1AA    Matrix.....: SOLID  
 Date Sampled....: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1229106  
 Dilution Factor: 0.94  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.094
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.47	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.047
2,4-Dinitrophenol	ND	0.47	mg/kg	0.19
Picramic Acid	ND	0.47	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.028
HMX	ND	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.047
Nitroglycerin	ND	0.47	mg/kg	0.12
2-Nitrophenol	ND	0.47	mg/kg	0.19
4-Nitrophenol	ND	0.47	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.075
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Nitrotoluene	ND	0.24	mg/kg	0.075
PETN	ND	0.47	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.047
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.94	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

02/10/3/12

University of Hawaii

Client Sample ID: ORD214S

HPLC

Lot-Sample #...: G1H110408-014    Work Order #...: MLJ3V1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 1.01  
 % Moisture.....: 26    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	110 E Do not use	0.25	mg/kg	0.020
2,6-Dinitrotoluene	10	0.25	mg/kg	0.030
HMX	ND ✓	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND ✓	0.50	mg/kg	0.20
2-Nitrotoluene	1.1	0.25	mg/kg	0.081
3-Nitrotoluene	ND ✓	0.25	mg/kg	0.071
4-Nitrotoluene	0.49	0.25	mg/kg	0.081
PETN	ND ✓	0.50	mg/kg	0.16
RDX	0.14 J, PG J(q)	0.25	mg/kg	0.040
Tetryl	ND ✓	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	100	(78 - 108)

NOTE (S) :

- E Estimated result. Result concentration exceeds the calibration range.
- J Estimated result Result is less than RL.
- PG The percent difference between the original and confirmation analyses is greater than 40%.

08/10/3/12



University of Hawaii

Client Sample ID: ORD214S

HPLC

Lot-Sample #...: G1H110408-014    Work Order #...: MLJ3V2AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 10.1  
 % Moisture.....: 26    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND Do not use	2.5	mg/kg	1.0
4-Amino-2,6-dinitrotoluene	ND	2.5	mg/kg	0.20
3,5-Dinitroaniline	ND	5.0	mg/kg	0.25
1,3-Dinitrobenzene	ND	2.5	mg/kg	0.50
2,4-Dinitrophenol	ND	5.0	mg/kg	2.0
Picramic Acid	ND	5.0	mg/kg	2.0
2,4-Dinitrotoluene	110 Q	2.5	mg/kg	0.20
2,6-Dinitrotoluene	9.9 Do not use	2.5	mg/kg	0.30
HMX	ND	2.5	mg/kg	0.30
Nitrobenzene	ND	2.5	mg/kg	0.50
Nitroglycerin	ND	5.0	mg/kg	1.3
2-Nitrophenol	ND	5.0	mg/kg	2.0
4-Nitrophenol	ND	5.0	mg/kg	2.0
2-Nitrotoluene	1.1 J	2.5	mg/kg	0.81
3-Nitrotoluene	ND	2.5	mg/kg	0.71
4-Nitrotoluene	0.83 J	2.5	mg/kg	0.81
PETN	ND	5.0	mg/kg	1.6
RDX	ND	2.5	mg/kg	0.40
Tetryl	ND	2.5	mg/kg	0.50
1,3,5-Trinitrobenzene	ND	2.5	mg/kg	0.20
Picric Acid	ND	10	mg/kg	2.5
2,4,6-Trinitrotoluene	ND	2.5	mg/kg	0.20

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	0.0 SRD, *	(78 - 108)

NOTE(S) :

- SRD The surrogate recovery was not calculated because the extract was diluted beyond the ability to quantitate a recovery.
- \* Surrogate recovery is outside stated control limits.
- Q Elevated reporting limit. The reporting limit is elevated due to high analyte levels.
- J Estimated result. Result is less than RL.

02/10/3/12

University of Hawaii  
Client Sample ID: ORD215S

HPLC

Lot-Sample #....: G1H110408-015    Work Order #....: MLJ3X1AA    Matrix.....: SOLID  
 Date Sampled....: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1229106  
 Dilution Factor: 0.97  
 % Moisture.....: 20    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	6.7	0.24	mg/kg	0.019
2,6-Dinitrotoluene	0.64	0.24	mg/kg	0.029
HMX	ND ✓	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	0.081 J, PG J(p)	0.24	mg/kg	0.078
3-Nitrotoluene	ND ✓	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

**NOTE (S) :**

J Estimated result. Result is less than RL  
 PG The percent difference between the original and confirmation analyses is greater than 40%.

02/03/12

University of Hawaii  
Client Sample ID: ORD216S

HPLC

Lot-Sample #...: G1H110408-016    Work Order #...: MLJ301AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.97  
 % Moisture.....: 25    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	2.3	0.24	mg/kg	0.019
2,6-Dinitrotoluene	0.19 J J	0.24	mg/kg	0.029
HMX	ND ✓	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

**NOTE (S) :**

J Estimated result. Result is less than RL.

*02/10/3/12*

University of Hawaii

Client Sample ID: ORD217S

HPLC

Lot-Sample #...: G1H110408-017    Work Order #...: MLJ311AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.99  
 % Moisture.....: 26    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

02/10/3/12

University of Hawaii

Client Sample ID: ORD218S

HPLC

Lot-Sample #....: G1H110408-018    Work Order #....: MLJ321AA    Matrix.....: SOLID  
 Date Sampled....: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1229106  
 Dilution Factor: 0.96  
 % Moisture.....: 24    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND ↓	0.24	mg/kg	0.019
	PERCENT RECOVERY	RECOVERY LIMITS		
SURROGATE	90	(78 - 108)		
3,4-Dinitrotoluene				

0210/3/12

University of Hawaii

Client Sample ID: ORD219S

HPLC

Lot-Sample #...: G1H110408-019    Work Order #...: MLJ331AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.95  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.095
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	0.027 J J	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND ✓	0.24	mg/kg	0.028
HMX	ND	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.076
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Nitrotoluene	ND	0.24	mg/kg	0.076
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.95	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

**NOTE (S) :**

J Estimated result. Result is less than RL.

0210/3/12

University of Hawaii

Client Sample ID: ORD220S

HPLC

Lot-Sample #...: G1H110408-020    Work Order #...: MLJ341AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/17/11    Analysis Date...: 09/02/11  
 Prep Batch #...: 1229106  
 Dilution Factor: 0.97  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

CR103/12

LDC #: 28445A40  
 SDG #: G1H110408  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 10/1/12  
 Page: 1 of 1  
 Reviewer: BR  
 2nd Reviewer: DL

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330~~8~~)

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: 8/6/12 <sup>1</sup>
II.	Initial calibration	A	% RSD $\leq$ 20?
III.	Calibration verification/ICV	A	<del>ICV</del> CCV $\leq$ 15% ICV # 75 KR - 125 KR
IV.	Blanks	A	
V.	Surrogate recovery	SW	
VI.	Matrix spike/Matrix spike duplicates	SW	
VII.	Laboratory control samples	A	LC
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	SW	
X.	System Performance	A	
XI.	Overall assessment of data	SW	
XII.	Field duplicates	A	FO = 1 + 2, 18 + 19
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: Sediment

1	ORD201S	D	11	ORD211S	21	ORD210SMS	31	1229106-4B
2	ORD202S	D	12	ORD212S	22	ORD210SMSD	32	
3	ORD203S		13	ORD213S	23	ORD220S	33	
4	ORD204S		14	ORD214S	24		34	
5	ORD205S		15	ORD214SDL	25		35	
6	ORD206S		16	ORD215S	26		36	
7	ORD207S		17	ORD216S	27		37	
8	ORD208S		18	ORD217S	28		38	
9	ORD209S		19	ORD218S	29		39	
10	ORD210S		20	ORD219S	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Method: GC  HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) $\leq$ 20%?	/			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		/		
Did the initial calibration meet the curve fit acceptance criteria?			/	
Were the RT windows properly established?	/			
<b>IV. Continuing calibration</b>				
What type of continuing calibration calculation was performed? <input checked="" type="checkbox"/> %D or <input type="checkbox"/> %R	/			
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) $\leq$ <sup>15%</sup> 20% or percent recoveries 80-120%?	/			
Were all the retention times within the acceptance windows?	/			
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>IX. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

VALIDATION FINDINGS WORKSHEET

METHOD: GC  HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	504.1
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	A 1,2-Dibromomethane
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	B 1,2-Dibromo-3-chloropropane
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel		
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion		
O. Phenanthrene	O. 2,4-Dinitrophenol		O. Chlorpyrifos		
P. Pyrene	P. Picramic acid		P. Fenthion		
Q.	Q. Nitrobenzene		Q. Parathion-ethyl		
R.	R. Picric acid		R. Trichloronate		
S.			S. Merphos		
			T. Stirofos		
			U. Tokuthion		

Notes:









**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330)

- N NA Were field duplicate pairs identified in this SDG?
- N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/kg)		RPD
	1	2	
J	1.1	1.4	24
K	0.12	0.18	40



LDC #: 28445A40

**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: BR  
 2nd Reviewer: *BR*

METHOD: GC \_\_\_\_\_ HPLC X

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

- CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)
- Where:  
 A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (CF 100 std)	Recalculated (CF 100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/31/2011	HMX	103	103	105	105	2.320	2.210
	LC11		2,4,6-TNT	110	110	112	112	2.051	2.047

Conc	HMX	2,4,6-TNT
5	107	113
10	109	117
20	103	111
50	105	113
100	103	110
200	104	111
500	105	112
1000	102	110
X=	105	112
S=	2.315	2.295

Area                      Area  
 10306                      11044

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28445A40

**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: BR  
 2nd Reviewer: OR

METHOD: GC \_\_\_\_\_ HPLC X

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (CF 100 std)	Recalculated (CF 100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/8/2011	HMX	70.25000	70.25000	67.20463	67.20463	5.003	5.003
	LC12		2,4,6-TNT	75.63000	75.63000	78.20087	78.20088	4.861	4.861

Conc	HMX	Area	2,4,6-TNT
5	70.20000		84.80000
10	68.30000		78.80000
20	67.80000		78.70000
50	67.26000		78.38000
100	70.25000	7025	75.63000
200	68.78000		80.88500
500	65.07400		76.57400
1000	59.97300		71.83800
X=	67.20463		78.20088
S=	3.36201		3.801

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration Calculation Verification

METHOD: GC HPLC X

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Where:  
 N = Initial Calibration Factor or Nominal Amount  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

Percent difference (%D) =  $100 * (N - C) / N$

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	M-000032	9/1/2011 14:17	HMX	200	198.60	198.53	1	1
	LC11		200	199.60	199.89	0	0	
2	M-000044	9/2/2011 1:41	HMX	100	103.40	103.35	3	3
	LC11		100	99.50	99.62	1	1	
3	M-000056	9/2/2011 13:07	HMX	100	106.90	106.84	7	7
	LC11		100	102.30	102.47	2	2	

Compound	CF	Area	Compound	CF	Area
CCV1 HMX	104.750	20796	2,4,6-TNT	112.125	22413
CCV2 HMX	104.750	10826	2,4,6-TNT	112.125	11170
CCV3 HMX	104.750	11191	2,4,6-TNT	112.125	11490

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Calculation Verification**

METHOD: GC HPLC X

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Where:  
 $Percent\ difference\ (%D) = 100 * (N - C) / N$   
 N = Initial Calibration Factor or Nominal Amount  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	C-000028	9/2/2011	HMX	100	103.00	103.01	3	3
	LC12	17:17	2,4,6-TNT	100	94.68	94.68	5	5
2	C-000038	9/2/2011	HMX	100	102.90	102.92	3	3
	LC12	4:11	2,4,6-TNT	100	94.56	94.56	5	5

Compound	CF	Area	Compound	CF	Area
CCV1 HMX	67.205	6923	2,4,6-TNT	78.201	7404
CCV2 HMX	67.205	6917	2,4,6-TNT	78.201	7395

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

METHOD: GC  HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
 SS = Surrogate Spiked

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
3, 4 - Dinitrophenol	LC11	2020.2020	1824.00	90	90	0

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

VALIDATION FINDINGS WORKSHEET  
Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD:  GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * (SSC - SC) / SA$

Where

SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

RPD =  $\frac{|(SSCMS - SSCMSD) * 2|}{(SSCMS + SSCMSD)} * 100$

MS = Matrix spike

MSD = Matrix spike duplicate

MS/MSD samples: 21/22

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	1.02 <del>1.02</del>	1.00	0	1.01	0.943	97	97	97	79	1.7	1.7
2,4,6-Trinitrotoluene (8330)	1.02	1.00	0	0.87	0.848	86	85	85	85	2.5	2.5

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: OR

METHOD: GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

$\% \text{Recovery} = 100 * ((\text{SSC} - \text{SC}) / \text{SA})$

Where SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

$\text{RPD} = (((\text{SSCLCS} - \text{SSCLCSD}) * 2) / (\text{SSCLCS} + \text{SSCLCSD})) * 100$

LCS = Laboratory Control Sample

LCS D = Laboratory Control Sample duplicate

LCS/LCSD samples: 1229 106-LCS

Compound	Spike Added (mg)		Spike Sample Concentration (mg/L)		LCS		LCS D		LCS D		LCS D	
	LCS	LCS D	LCS	LCS D	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)												
Diesel (8015)												
Benzene (8021B)												
Methane (RSK-175)												
2,4-D (8151)												
Dinoseb (8151)												
Naphthalene (8310)												
Anthracene (8310)												
HMX (8330)	1.00	—	0.985	—	99	99	—	—	—	—	—	—
2,4,6-Trinitrotoluene (8330)	1.00	—	0.857	—	86	86						

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.





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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** August 6 through August 7, 2011  
**LDC Report Date:** October 2, 2012  
**Matrix:** Sediment  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G1H110409

**Sample Identification**

ORD221S  
ORD222S  
ORD223S  
ORD224S  
ORD225S  
ORD226S  
ORD227S  
ORD228S  
ORD229S  
ORD230S  
ORD231S  
ORD232S  
ORD226SMS  
ORD226SMDS

## Introduction

This data review covers 14 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## IV. Blanks

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

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## 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)	Flag	A or P
ORD226SMS/MSD (All samples in SDG G1H110409)	Chromium	120 (88-113)	-	-	J (all detects)	A
	Nickel	140 (90-110)	133 (90-110)	-	J (all detects)	
	Vanadium	125 (84-112)	118 (84-112)	-	J (all detects)	
ORD226SMS/MSD (All samples in SDG G1H110409)	Copper	87 (89-110)	87 (89-110)	-	J (all detects)	A
	Lead	83 (87-113)	82 (87-113)	-	UJ (all non-detects)	
	Thallium	87 (88-119)	86 (88-119)	-		
	Uranium	50 (80-120)	49 (80-120)	-		
	Zinc	-	76 (79-110)	-		

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards (ICP-MS)

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples ORD223S and ORD224S and samples ORD230S and ORD231S were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD223S	ORD224S	
Arsenic	17.8	17.0	5
Barium	6.5	6.7	3
Chromium	30.3	32.4	7

Analyte	Concentration (mg/Kg)		RPD
	ORD223S	ORD224S	
Cobalt	6.6	6.6	0
Copper	7.4	7.2	3
Lead	4.6	4.8	4
Nickel	30.8	32.2	4
Selenium	1.7	1.8	6
Strontium	3470	3290	5
Uranium	0.80	0.79	1
Vanadium	41.5	40.3	3
Zinc	15.4	16.2	5

Analyte	Concentration (mg/Kg)		RPD
	ORD230S	ORD231S	
Arsenic	3.6	3.3	9
Barium	5.1	7.7	41
Chromium	13.0	13.2	2
Cobalt	1.4	1.8	25
Copper	1.5	1.5	0
Lead	3.2	3.8	17
Nickel	0.72U	1.1	200
Selenium	1.0	1.3	26
Strontium	3610	3460	4
Uranium	0.88	0.84	5
Vanadium	10.4	10.6	2

Analyte	Concentration (mg/Kg)		RPD
	ORD230S	ORD231S	
Zinc	8.8	5.1	53

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G1H110409**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
G1H110409	ORD221S ORD222S ORD223S ORD224S ORD225S ORD226S ORD227S ORD228S ORD229S ORD230S ORD231S ORD232S	Chromium Nickel Vanadium	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G1H110409	ORD221S ORD222S ORD223S ORD224S ORD225S ORD226S ORD227S ORD228S ORD229S ORD230S ORD231S ORD232S	Copper Lead Thallium Uranium Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G1H110409**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G1H110409**

No Sample Data Qualified in this SDG

University of Hawaii

Client Sample ID: ORD221S

TOTAL Metals

Lot-Sample #...: G1H110409-001  
 Date Sampled...: 08/06/11  
 % Moisture.....: 23

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1237082						
Arsenic	ND ✓	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AD
		Dilution Factor: 5		MDL.....: 0.98		
Barium	4.9	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AC
		Dilution Factor: 5		MDL.....: 0.59		
Cadmium	ND U	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AE
		Dilution Factor: 5		MDL.....: 0.33		
Cobalt	1.6	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AF
		Dilution Factor: 5		MDL.....: 0.065		
Chromium	12.5 J(m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AG
		Dilution Factor: 5		MDL.....: 0.65		
Copper	4.3 J(m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AH
		Dilution Factor: 5		MDL.....: 0.65		
Nickel	7.4 J(m)	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AJ
		Dilution Factor: 5		MDL.....: 0.65		
Lead	1.3 J(m)	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AT
		Dilution Factor: 5		MDL.....: 0.39		
Antimony	ND U	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AK
		Dilution Factor: 5		MDL.....: 0.65		
Selenium	0.77 B J	1.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AL
		Dilution Factor: 5		MDL.....: 0.65		
Strontium	3970	3.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AM
		Dilution Factor: 5		MDL.....: 1.3		
Thallium	ND UJ(m)	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AN
		Dilution Factor: 5		MDL.....: 0.33		
Uranium	0.92 J(m)	0.65	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AP
		Dilution Factor: 5		MDL.....: 0.20		
Vanadium	9.3 J(m)	6.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AQ
		Dilution Factor: 5		MDL.....: 2.0		

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*08/22/26/12*



University of Hawaii

Client Sample ID: ORD221S

TOTAL Metals

Lot-Sample #: G1H110409-001

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	4.5 B <i>JL</i> )	6.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ361AR
		Dilution Factor: 5		MDL.....: 3.9		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*CR 12/26/12*

University of Hawaii

Client Sample ID: ORD222S

TOTAL Metals

Lot-Sample #...: G1H110409-002

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 33

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237082					
Arsenic	ND U	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	4.5	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AC
		Dilution Factor: 5		MDL.....: 0.67		
Cadmium	ND U	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AE
		Dilution Factor: 5		MDL.....: 0.37		
Cobalt	1.4	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AF
		Dilution Factor: 5		MDL.....: 0.075		
Chromium	8.8 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AG
		Dilution Factor: 5		MDL.....: 0.75		
Copper	1.8 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AH
		Dilution Factor: 5		MDL.....: 0.75		
Nickel	2.9 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AJ
		Dilution Factor: 5		MDL.....: 0.75		
Lead	1.6 J(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AT
		Dilution Factor: 5		MDL.....: 0.45		
Antimony	ND U	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AK
		Dilution Factor: 5		MDL.....: 0.75		
Selenium	0.88 B J	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AL
		Dilution Factor: 5		MDL.....: 0.75		
Strontium	3030	3.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AM
		Dilution Factor: 5		MDL.....: 1.5		
Thallium	ND UJ(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AN
		Dilution Factor: 5		MDL.....: 0.37		
Uranium	0.47 B J(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AP
		Dilution Factor: 5		MDL.....: 0.22		
Vanadium	9.2 J(m)	7.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ391AQ
		Dilution Factor: 5		MDL.....: 2.2		

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University of Hawaii

Client Sample ID: ORD222S

TOTAL Metals

Lot-Sample #...: G1H110409-002

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	4.9 B <i>J(m)</i>	7.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ391AR

Dilution Factor: 5      MDL.....: 4.5

NOTE(S):

Results and reporting limits have been adjusted for dry weight.  
B Estimated result. Result is less than RL.

*08/26/12*

University of Hawaii

Client Sample ID: ORD223S

TOTAL Metals

Lot-Sample #....: G1H110409-003  
 Date Sampled....: 08/06/11  
 % Moisture.....: 30

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Prep Batch #....:	1237082					
Arsenic	17.8	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	6.5	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AC
		Dilution Factor: 5		MDL.....: 0.64		
Cadmium	ND <i>U</i>	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AE
		Dilution Factor: 5		MDL.....: 0.36		
Cobalt	6.6	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AF
		Dilution Factor: 5		MDL.....: 0.071		
Chromium	30.3 <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AG
		Dilution Factor: 5		MDL.....: 0.71		
Copper	7.4 <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AH
		Dilution Factor: 5		MDL.....: 0.71		
Nickel	30.8 <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AJ
		Dilution Factor: 5		MDL.....: 0.71		
Lead	4.6 <i>J(m)</i>	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AT
		Dilution Factor: 5		MDL.....: 0.43		
Antimony	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AK
		Dilution Factor: 5		MDL.....: 0.71		
Selenium	1.7	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AL
		Dilution Factor: 5		MDL.....: 0.71		
Strontium	3470	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND <i>UJ(m)</i>	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AN
		Dilution Factor: 5		MDL.....: 0.36		
Uranium	0.80 <i>J(m)</i>	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AP
		Dilution Factor: 5		MDL.....: 0.21		
Vanadium	41.5 <i>J(m)</i>	7.1	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AQ
		Dilution Factor: 5		MDL.....: 2.1		

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*08/22/12*

University of Hawaii

Client Sample ID: ORD223S

TOTAL Metals

Lot-Sample #...: G1H110409-003

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	15.4 <i>J(m)</i>	7.1	mg/kg	SW846 6020	08/25-09/02/11	MLJ4A1AR
		Dilution Factor: 5		MDL.....: 4.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

*08/22/12*

University of Hawaii

Client Sample ID: ORD224S

TOTAL Metals

Lot-Sample #....: G1H110409-004  
 Date Sampled....: 08/06/11  
 % Moisture.....: 33

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #....:	1237082						
Arsenic	17.0	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AD	
		Dilution Factor: 5		MDL.....: 1.1			
Barium	6.7	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AC	
		Dilution Factor: 5		MDL.....: 0.67			
Cadmium	ND U	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AE	
		Dilution Factor: 5		MDL.....: 0.37			
Cobalt	6.6	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AF	
		Dilution Factor: 5		MDL.....: 0.075			
Chromium	32.4 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AG	
		Dilution Factor: 5		MDL.....: 0.75			
Copper	7.2 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AH	
		Dilution Factor: 5		MDL.....: 0.75			
Nickel	32.2 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AJ	
		Dilution Factor: 5		MDL.....: 0.75			
Lead	4.8 J(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AT	
		Dilution Factor: 5		MDL.....: 0.45			
Antimony	ND U	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AK	
		Dilution Factor: 5		MDL.....: 0.75			
Selenium	1.8	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AL	
		Dilution Factor: 5		MDL.....: 0.75			
Strontium	3290	3.7	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AM	
		Dilution Factor: 5		MDL.....: 1.5			
Thallium	ND UJ(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AN	
		Dilution Factor: 5		MDL.....: 0.37			
Uranium	0.79 J(m)	0.75	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AP	
		Dilution Factor: 5		MDL.....: 0.22			
Vanadium	40.3 J(m)	7.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AQ	
		Dilution Factor: 5		MDL.....: 2.2			

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08/26/12

University of Hawaii

Client Sample ID: ORD224S

TOTAL Metals

Lot-Sample #....: G1H110409-004

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	16.2 <i>J(m)</i>	7.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4C1AR
		Dilution Factor: 5		MDL.....: 4.5		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

*08/22/12*

University of Hawaii

Client Sample ID: ORD225S

TOTAL Metals

Lot-Sample #...: G1H110409-005

Matrix.....: SOLID

Date Sampled...: 08/06/11

Date Received...: 08/10/11

% Moisture.....: 27

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 1237082							
Arsenic	5.7	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AD
		Dilution Factor: 5			MDL.....: 1.0		
Barium	5.1	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AC
		Dilution Factor: 5			MDL.....: 0.62		
Cadmium	ND U	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AE
		Dilution Factor: 5			MDL.....: 0.34		
Cobalt	3.7	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AF
		Dilution Factor: 5			MDL.....: 0.069		
Chromium	18.8 J(m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AG
		Dilution Factor: 5			MDL.....: 0.69		
Copper	4.1 J(m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AH
		Dilution Factor: 5			MDL.....: 0.69		
Nickel	18.4 J(m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AJ
		Dilution Factor: 5			MDL.....: 0.69		
Lead	2.8 J(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AT
		Dilution Factor: 5			MDL.....: 0.41		
Antimony	ND U	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AK
		Dilution Factor: 5			MDL.....: 0.69		
Selenium	0.91 B J	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AL
		Dilution Factor: 5			MDL.....: 0.69		
Strontium	3560	3.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AM
		Dilution Factor: 5			MDL.....: 1.4		
Thallium	ND UJ(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AN
		Dilution Factor: 5			MDL.....: 0.34		
Uranium	0.66 B J(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AP
		Dilution Factor: 5			MDL.....: 0.21		
Vanadium	21.3 J(m)	6.9	mg/kg		SW846 6020	08/25-09/02/11	MLJ4D1AQ
		Dilution Factor: 5			MDL.....: 2.1		

(Continued on next page)

08/26/12



University of Hawaii

Client Sample ID: ORD225S

TOTAL Metals

Lot-Sample #...: G1H110409-005

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	8.8 <i>J(m)</i>	6.9	mg/kg	SW846 6020	08/25-09/02/11	MLJ4D1AR
		Dilution Factor: 5		MDL.....: 4.1		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*08/26/12*

University of Hawaii

Client Sample ID: ORD226S

TOTAL Metals

Lot-Sample #...: G1H110409-006

Date Sampled...: 08/06/11

Date Received...: 08/10/11

Matrix.....: SOLID

% Moisture.....: 30

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...	1237082						
Arsenic	10.6	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AF	
		Dilution Factor: 5		MDL.....: 1.1			
Barium	4.4	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AE	
		Dilution Factor: 5		MDL.....: 0.65			
Cadmium	ND ✓	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AG	
		Dilution Factor: 5		MDL.....: 0.36			
Cobalt	3.4	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AH	
		Dilution Factor: 5		MDL.....: 0.072			
Chromium	15.1 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AJ	
		Dilution Factor: 5		MDL.....: 0.72			
Copper	2.8 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AK	
		Dilution Factor: 5		MDL.....: 0.72			
Nickel	15.7 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AL	
		Dilution Factor: 5		MDL.....: 0.72			
Lead	2.5 J(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AV	
		Dilution Factor: 5		MDL.....: 0.43			
Antimony	ND ✓	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AM	
		Dilution Factor: 5		MDL.....: 0.72			
Selenium	0.95 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AN	
		Dilution Factor: 5		MDL.....: 0.72			
Strontium	3060	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AP	
		Dilution Factor: 5		MDL.....: 1.4			
Thallium	ND ✓ J(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AQ	
		Dilution Factor: 5		MDL.....: 0.36			
Uranium	0.59 B J(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AR	
		Dilution Factor: 5		MDL.....: 0.22			
Vanadium	21.9 J(m)	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AT	
		Dilution Factor: 5		MDL.....: 2.2			

(Continued on next page)

*08/22/12*

University of Hawaii

Client Sample ID: ORD226S

TOTAL Metals

Lot-Sample #: G1H110409-006

Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	7.8 <i>J(m)</i>	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ4E1AU
		Dilution Factor: 5		MDL: 4.3		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*CRZ/26/12*

University of Hawaii

Client Sample ID: ORD227S

TOTAL Metals

Lot-Sample #...: G1H110409-007  
 Date Sampled...: 08/07/11  
 % Moisture.....: 28

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...	1237082						
Arsenic	1.2 B J	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AD
		Dilution Factor: 5		MDL.....: 1.0			
Barium	4.3	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AC
		Dilution Factor: 5		MDL.....: 0.63			
Cadmium	ND ✓	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AE
		Dilution Factor: 5		MDL.....: 0.35			
Cobalt	0.79	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AF
		Dilution Factor: 5		MDL.....: 0.069			
Chromium	10.3 J(m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AG
		Dilution Factor: 5		MDL.....: 0.69			
Copper	1.0 B J(m)	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AH
		Dilution Factor: 5		MDL.....: 0.69			
Nickel	ND ✓	6.9	mg/kg		SW846 6020	08/25-09/04/11	MLJ4F1AJ
		Dilution Factor: 25		MDL.....: 3.5			
Lead	1.4 J(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AT
		Dilution Factor: 5		MDL.....: 0.42			
Antimony	ND ✓	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AK
		Dilution Factor: 5		MDL.....: 0.69			
Selenium	1.0 B J	1.4	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AL
		Dilution Factor: 5		MDL.....: 0.69			
Strontium	3280	3.5	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AM
		Dilution Factor: 5		MDL.....: 1.4			
Thallium	ND UJ(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AN
		Dilution Factor: 5		MDL.....: 0.35			
Uranium	0.88 J(m)	0.69	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AP
		Dilution Factor: 5		MDL.....: 0.21			
Vanadium	6.5 B J(m)	6.9	mg/kg		SW846 6020	08/25-09/02/11	MLJ4F1AQ
		Dilution Factor: 5		MDL.....: 2.1			

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University of Hawaii

Client Sample ID: ORD227S

TOTAL Metals

Lot-Sample #....: G1H110409-007

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	ND <i>US(m)</i>	6.9	mg/kg	SW846 6020	08/25-09/02/11	MLJ4F1AR

Dilution Factor: 5      MDL.....: 4.2

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result Result is less than RL.

*02/26/12*

University of Hawaii

Client Sample ID: ORD228S

TOTAL Metals

Lot-Sample #...: G1H110409-008  
 Date Sampled...: 08/07/11  
 % Moisture.....: 28

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...	1237082						
Arsenic	1.5	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AD	
		Dilution Factor: 5		MDL.....: 1.0			
Barium	4.4	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AC	
		Dilution Factor: 5		MDL.....: 0.63			
Cadmium	ND <i>U</i>	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AE	
		Dilution Factor: 5		MDL.....: 0.35			
Cobalt	0.74	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AF	
		Dilution Factor: 5		MDL.....: 0.070			
Chromium	10.4 <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AG	
		Dilution Factor: 5		MDL.....: 0.70			
Copper	0.86 B <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AH	
		Dilution Factor: 5		MDL.....: 0.70			
Nickel	ND <i>U</i>	7.0	mg/kg	SW846 6020	08/25-09/04/11	MLJ4G1AJ	
		Dilution Factor: 25		MDL.....: 3.5			
Lead	1.2 <i>J(m)</i>	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AT	
		Dilution Factor: 5		MDL.....: 0.42			
Antimony	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AK	
		Dilution Factor: 5		MDL.....: 0.70			
Selenium	1.1 B <i>J</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AL	
		Dilution Factor: 5		MDL.....: 0.70			
Strontium	3420	3.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AM	
		Dilution Factor: 5		MDL.....: 1.4			
Thallium	ND <i>UJ(m)</i>	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AN	
		Dilution Factor: 5		MDL.....: 0.35			
Uranium	0.95 <i>J(m)</i>	0.70	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AP	
		Dilution Factor: 5		MDL.....: 0.21			
Vanadium	5.8 B <i>J(m)</i>	7.0	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AQ	
		Dilution Factor: 5		MDL.....: 2.1			

(Continued on next page)

*08/22/26/12*

University of Hawaii

Client Sample ID: ORD228S

TOTAL Metals

Lot-Sample #: G1H110409-008

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			PREPARATION-	WORK
		LIMIT	UNITS	METHOD	ANALYSIS DATE	ORDER #
Zinc	ND <i>vs(m)</i>	7.0	mg/kg	SW846 6020	08/25-09/02/11	MLJ4G1AR
		Dilution Factor: 5		MDL.....: 4.2		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

*08/26/12*

University of Hawaii

Client Sample ID: ORD229S

TOTAL Metals

Lot-Sample #...: G1H110409-009  
 Date Sampled...: 08/07/11  
 % Moisture.....: 30

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237082					
Arsenic	5.6	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	4.7	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AC
		Dilution Factor: 5		MDL.....: 0.65		
Cadmium	ND <i>U</i>	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AE
		Dilution Factor: 5		MDL.....: 0.36		
Cobalt	1.0	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AF
		Dilution Factor: 5		MDL.....: 0.072		
Chromium	13.3 <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AG
		Dilution Factor: 5		MDL.....: 0.72		
Copper	1.2 B <i>J(m)</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AH
		Dilution Factor: 5		MDL.....: 0.72		
Nickel	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AJ
		Dilution Factor: 5		MDL.....: 0.72		
Lead	2.3 <i>J(m)</i>	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AT
		Dilution Factor: 5		MDL.....: 0.43		
Antimony	ND <i>U</i>	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AK
		Dilution Factor: 5		MDL.....: 0.72		
Selenium	1.5	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AL
		Dilution Factor: 5		MDL.....: 0.72		
Strontium	3450	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND <i>J(m)</i>	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AN
		Dilution Factor: 5		MDL.....: 0.36		
Uranium	0.89 <i>J(m)</i>	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AP
		Dilution Factor: 5		MDL.....: 0.22		
Vanadium	9.3 <i>J(m)</i>	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AQ
		Dilution Factor: 5		MDL.....: 2.2		

(Continued on next page)

*CR 12/26/12*



University of Hawaii

Client Sample ID: ORD229S

TOTAL Metals

Lot-Sample #...: G1H110409-009

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	5.8 B <i>J(m)</i>	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ4H1AR

Dilution Factor: 5      MDL.....: 4.3

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

*CL 2/26/12*

University of Hawaii

Client Sample ID: ORD230S

TOTAL Metals

Lot-Sample #...: G1H110409-010  
 Date Sampled...: 08/07/11  
 % Moisture.....: 30

Date Received...: 08/10/11

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	1237082					
Arsenic	3.6	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	5.1	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AC
		Dilution Factor: 5		MDL.....: 0.64		
Cadmium	ND U	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AE
		Dilution Factor: 5		MDL.....: 0.36		
Cobalt	1.4	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AF
		Dilution Factor: 5		MDL.....: 0.072		
Chromium	13.0 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AG
		Dilution Factor: 5		MDL.....: 0.72		
Copper	1.5 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AH
		Dilution Factor: 5		MDL.....: 0.72		
Nickel	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AJ
		Dilution Factor: 5		MDL.....: 0.72		
Lead	3.2 J(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AT
		Dilution Factor: 5		MDL.....: 0.43		
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AK
		Dilution Factor: 5		MDL.....: 0.72		
Selenium	1.0 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AL
		Dilution Factor: 5		MDL.....: 0.72		
Strontium	3610	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AM
		Dilution Factor: 5		MDL.....: 1.4		
Thallium	ND US(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AN
		Dilution Factor: 5		MDL.....: 0.36		
Uranium	0.88 J(m)	0.72	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AP
		Dilution Factor: 5		MDL.....: 0.21		
Vanadium	10.4 J(m)	7.2	mg/kg	SW846 6020	08/25-09/02/11	MLJ4J1AQ
		Dilution Factor: 5		MDL.....: 2.1		

(Continued on next page)

*08/22/26/12*

University of Hawaii

Client Sample ID: ORD230S

TOTAL Metals

Lot-Sample #...: G1H110409-010

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	8.8 <i>5(m)</i>	7.2	mg/kg	SWS46 6020	08/25-09/02/11	MLJ4J1AR
		Dilution Factor: 5		MDL.....: 4.3		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*02/26/12*

University of Hawaii

Client Sample ID: ORD231S

TOTAL Metals

Lot-Sample #...: G1H110409-011

Matrix.....: SOLID

Date Sampled...: 08/07/11

Date Received..: 08/10/11

% Moisture.....: 31

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1237082						
Arsenic	3.3	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AD
		Dilution Factor: 5		MDL.....: 1.1		
Barium	7.7	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AC
		Dilution Factor: 5		MDL.....: 0.66		
Cadmium	ND U	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AE
		Dilution Factor: 5		MDL.....: 0.36		
Cobalt	1.8	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AF
		Dilution Factor: 5		MDL.....: 0.073		
Chromium	13.2 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AG
		Dilution Factor: 5		MDL.....: 0.73		
Copper	1.5 J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AH
		Dilution Factor: 5		MDL.....: 0.73		
Nickel	1.1 B J(m)	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AJ
		Dilution Factor: 5		MDL.....: 0.73		
Lead	3.8 J(m)	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AT
		Dilution Factor: 5		MDL.....: 0.44		
Antimony	ND U	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AK
		Dilution Factor: 5		MDL.....: 0.73		
Selenium	1.3 B J	1.5	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AL
		Dilution Factor: 5		MDL.....: 0.73		
Strontium	3460	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AM
		Dilution Factor: 5		MDL.....: 1.5		
Thallium	ND J(m)	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AN
		Dilution Factor: 5		MDL.....: 0.36		
Uranium	0.84 J(m)	0.73	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AP
		Dilution Factor: 5		MDL.....: 0.22		
Vanadium	10.6 J(m)	7.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AQ
		Dilution Factor: 5		MDL.....: 2.2		

(Continued on next page)

08/22/26/12

University of Hawaii

Client Sample ID: ORD231S

TOTAL Metals

Lot-Sample #...: G1H110409-011

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	5.1 B <i>J(m)</i>	7.3	mg/kg	SW846 6020	08/25-09/02/11	MLJ4K1AR

Dilution Factor: 5      MDL.....: 4.4

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*CE 12/26/12*

University of Hawaii

Client Sample ID: ORD232S

TOTAL Metals

Lot-Sample #...: G1H110409-012

Matrix.....: SOLID

Date Sampled...: 08/07/11

Date Received...: 08/10/11

% Moisture.....: 30

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...	1237082						
Arsenic	2.0	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AD	
		Dilution Factor: 5		MDL.....: 1.1			
Barium	5.8	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AC	
		Dilution Factor: 5		MDL.....: 0.64			
Cadmium	ND U	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AE	
		Dilution Factor: 5		MDL.....: 0.36			
Cobalt	1.6	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AF	
		Dilution Factor: 5		MDL.....: 0.071			
Chromium	11.0 J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AG	
		Dilution Factor: 5		MDL.....: 0.71			
Copper	1.3 B J(m)	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AH	
		Dilution Factor: 5		MDL.....: 0.71			
Nickel	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AJ	
		Dilution Factor: 5		MDL.....: 0.71			
Lead	3.8 J(m)	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AT	
		Dilution Factor: 5		MDL.....: 0.43			
Antimony	ND U	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AK	
		Dilution Factor: 5		MDL.....: 0.71			
Selenium	0.92 B J	1.4	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AL	
		Dilution Factor: 5		MDL.....: 0.71			
Strontium	3220	3.6	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AM	
		Dilution Factor: 5		MDL.....: 1.4			
Thallium	ND UJ(m)	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AN	
		Dilution Factor: 5		MDL.....: 0.36			
Uranium	0.76 J(m)	0.71	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AP	
		Dilution Factor: 5		MDL.....: 0.21			
Vanadium	8.8 J(m)	7.1	mg/kg	SW846 6020	08/25-09/02/11	MLJ4L1AQ	
		Dilution Factor: 5		MDL.....: 2.1			

(Continued on next page)

08/22/12

University of Hawaii

Client Sample ID: ORD232S

TOTAL Metals

Lot-Sample #...: G1H110409-012

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	ND <i>USC</i> )	7.1	mg/kg		SW846 6020	08/25-09/02/11	MLJ4L1AR
		Dilution Factor: 5			MDL.....: 4.3		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.  
B Estimated result. Result is less than RL.

*08/26/12*

LDC #: 28445B4  
 SDG #: G1H110409  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 9-28-12  
 Page: 1 of 1  
 Reviewer: OR  
 2nd Reviewer: V

METHOD: Metals (EPA SW 846 Method-6010B/7000) *6020*

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: 8/6-7/11
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(3,4), (10,11)
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: *sediment*

1	ORD221S	11	ORD231S	21		31	
2	ORD222S	12	ORD232S	22		32	
3	ORD223S	13	ORD226SMS	23		33	
4	ORD224S	14	ORD226MSD	24		34	
5	ORD225S	15		25		35	
6	ORD226S	16		26		36	
7	ORD227S	17		27		37	
8	ORD228S	18		28		38	
9	ORD229S	19		29		39	
10	ORD230S	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Method: Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $\geq 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	/			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?		/		
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target analytes were detected in the field duplicates.		/		
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.		/		



LDC #: 28445B1

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

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

**METHOD:** Trace metals (EPA SW 846 Method 6010/6020/7000)

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

- N N/A Was a matrix spike analyzed for each matrix in this SDG?
- N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
- N N/A Were all duplicate sample relative percent differences (RPD)  $\leq$  20% for water samples and  $\leq$  35% for soil samples?

**LEVEL IV ONLY:**  
 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
	13/14	S	Cu	120 (88-113)	87 (89-110)		A11	Jdet/A (m)
			Cu	87 (89-110)	87 (89-110)			J151A
			Pb	83 (87-113)	82 (87-113)			J
			Mn	140 (90-110)	133 (90-110)			Jdet/A
			Tl	87 (88-119)	86 (88-119)			J151A
			V	50 (80-120)	49 (80-120)			J
			V	125 (84-112)	118 (84-112)			Jdet/A
			Zn		76 (79-110)		J	J151A

Comments: [Signature]

LDC#: 28445B4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	3	4	
Arsenic	17.8	17.0	5
Barium	6.5	6.7	3
Chromium	30.3	32.4	7
Cobalt	6.6	6.6	0
Copper	7.4	7.2	3
Lead	4.6	4.8	4
Nickel	30.8	32.2	4
Selenium	1.7	1.8	6
Strontium	3470	3290	5
Uranium	0.80	0.79	1
Vanadium	41.5	40.3	3
Zinc	15.4	16.2	5

LDC#: 28445B4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	10	11	
Arsenic	3.6	3.3	9
Barium	5.1	7.7	41
Chromium	13.0	13.2	2
Cobalt	1.4	1.8	25
Copper	1.5	1.5	0
Lead	3.2	3.8	17
Nickel	0.72U	1.1	200
Selenium	1.0	1.3	26
Strontium	3610	3460	4
Uranium	0.88	0.84	5
Vanadium	10.4	10.6	2
Zinc	8.8	5.1	53

LDC #: 284507

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$       Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R		%R		
ICV	ICP (Initial calibration)								
	ICP/MS (Initial calibration)	Tl	41,283	40	103		103		Y
	CVAA (Initial calibration)								
	ICP (Continuing calibration)								
CCV10	ICP/MS (Continuing calibration)	Ba	100,01	100	100		100		Y
	CVAA (Continuing calibration)								
	GFAA (Initial calibration)								
	GFAA (Continuing calibration)								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 2845B7

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
Reviewer: DR  
2nd Reviewer: W

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} - \text{True}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,  
 Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
TSAB	ICP interference check	Co	101.09	100	101	101	Y
LCS	Laboratory control sample	Cu	20.1	20.0	101	101	Y
B	Matrix spike	Sb	129 (SSR-SR)	15.7	82	82	Y
13/14	Duplicate	α	33.9	32.5	4	4	Y
Q	ICP serial dilution	<del>As</del>	38947	40298	83	83	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



LDC #: 28445B-1

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: OR  
 2nd reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Have results been reported and calculated correctly?
- Y  N  N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y  N  N/A Are all detection limits below the CRDL?

Detected analyte results for V / SC were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$       Recalculation:  $V: 1 = \frac{100 mL(5)(13,548 \mu g/L)}{0.95g (1000)(0.766)} = 9.3 \text{ mg/kg}$

RD = Raw data concentration  
 FV = Final volume (ml)  
 In. Vol. = Initial volume (ml) or weight (G)  
 Dil = Dilution factor

SC:11 =  $\frac{4979.413954 \mu g/L (100 mL)(5)}{1.05g (1000)(0.686)} = 3456.5 \text{ mg/kg}$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	I	Ba	4.9	4.9	Y
		Co	1.6	1.6	
		Cr	12.5	12.5	
		Cu	4.3	4.3	
		Ni	7.4	7.4	
		Pb	1.3	1.3	
		Se	0.77	0.77	
		Sr	3970	3970	
		U	0.92	0.92	
		V	9.3	9.3	
		Zn	4.5	4.5	
	II	As	3.3	3.3	
		Ba	7.7	7.7	
		Co	1.8	1.8	
		Cr	13.2	13.2	
		Cu	1.5	1.5	
		Ni	1.1	1.1	
		Pb	3.8	3.9	
		Se	1.3	1.3	
		Sr	3460	3460	
		U	0.84	0.84	
		V	10.6	10.6	
		Zn	5.1	5.1	

Note:

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** August 6 through August 7, 2011  
**LDC Report Date:** October 2, 2012  
**Matrix:** Sediment  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G1H110409

### Sample Identification

ORD221S  
ORD222S  
ORD223S  
ORD224S  
ORD225S  
ORD226S  
ORD227S  
ORD228S  
ORD229S  
ORD230S  
ORD231S  
ORD232S  
ORD226SMS  
ORD226SMDS

## Introduction

This data review covers 14 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD226SMS/MSD (ORD226S)	Picramic acid	19 (50-130)	41 (50-130)	73 ( $\leq 25$ )	J (all detects) UJ (all non-detects)	A
	2,4-Dinitrophenol	61 (70-103)	-	-	J (all detects) UJ (all non-detects)	

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD223S and ORD224S and samples ORD230S and ORD231S were identified as field duplicates. No energetics were detected in any of the samples.

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G1H110409**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G1H110409	ORD226S	Picramic acid 2,4-Dinitrophenol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G1H110409	ORD226S	Picramic acid	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (d)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G1H110409**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G1H110409**

No Sample Data Qualified in this SDG

University of Hawaii

Client Sample ID: ORD221S

HPLC

Lot-Sample #....: G1H110409-001    Work Order #....: MLJ361AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.99  
 % Moisture.....: 23    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <sup>U</sup>	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	89	(78 - 108)		

021013/12

University of Hawaii

Client Sample ID: ORD222S

HPLC

Lot-Sample #: G1H110409-002 Work Order #: MLJ391AA Matrix: SOLID  
 Date Sampled: 08/06/11 Date Received: 08/10/11  
 Prep Date: 08/19/11 Analysis Date: 09/02/11  
 Prep Batch #: 1231144  
 Dilution Factor: 0.99  
 % Moisture: 33 Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT RECOVERY	RECOVERY LIMITS		
3,4-Dinitrotoluene	90	(78 - 108)		

02/10/12



University of Hawaii

Client Sample ID: ORD223S

HPLC

Lot-Sample #....: G1H110409-003    Work Order #....: MLJ4A1AA    Matrix.....: SOLID  
 Date Sampled....: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/02/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.96  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

02/03/12

University of Hawaii

Client Sample ID: ORD224S

HPLC

Lot-Sample #...: G1H110409-004    Work Order #...: MLJ4C1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/04/11  
 Prep Batch #...: 1231144  
 Dilution Factor: 1.01  
 % Moisture.....: 33    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND ✓	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

0210/31R

University of Hawaii

Client Sample ID: ORD225S

HPLC

Lot-Sample #....: G1H110409-005    Work Order #....: MLJ4D1AA    Matrix.....: SOLID  
 Date Sampled...: 08/06/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/04/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.99  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

0210/12

University of Hawaii

Client Sample ID: ORD226S

HPLC

Lot-Sample #....: G1H110409-006 Work Order #....: MLJ4E1AA Matrix.....: SOLID  
 Date Sampled...: 08/06/11 Date Received...: 08/10/11  
 Prep Date.....: 08/19/11 Analysis Date...: 09/04/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.99  
 % Moisture.....: 30 Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <i>u</i>	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND <i>uJ(m)</i>	0.50	mg/kg	0.20
Picramic Acid	ND <i>uJ(m)</i>	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND <i>u</i>	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

*MN 10/4/12*

University of Hawaii

Client Sample ID: ORD227S

HPLC

Lot-Sample #: G1H110409-007    Work Order #: MLJ4F1AA    Matrix: SOLID  
 Date Sampled: 08/07/11    Date Received: 08/10/11  
 Prep Date: 08/19/11    Analysis Date: 09/05/11  
 Prep Batch #: 1231144  
 Dilution Factor: 1  
 % Moisture: 28    Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	90	(78 - 108)		

02/10/3/12

University of Hawaii

Client Sample ID: ORD228S

HPLC

Lot-Sample #....: G1H110409-008    Work Order #....: MLJ4G1AA    Matrix.....: SOLID  
 Date Sampled....: 08/07/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/05/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.98  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

0210/3/12

University of Hawaii

Client Sample ID: ORD229S

HPLC

Lot-Sample #....: G1H110409-009    Work Order #....: MLJ4H1AA    Matrix.....: SOLID  
 Date Sampled....: 08/07/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/05/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 1.01  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

02/10/12

University of Hawaii

Client Sample ID: ORD230S

HPLC

Lot-Sample #....: G1H110409-010    Work Order #....: MLJ4J1AA    Matrix.....: SOLID  
 Date Sampled...: 08/07/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/05/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 0.97  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

0210/3/12



University of Hawaii

Client Sample ID: ORD231S

HPLC

Lot-Sample #....: G1H110409-011    Work Order #....: MLJ4K1AA    Matrix.....: SOLID  
 Date Sampled....: 08/07/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/05/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 1.02  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.26	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.26	mg/kg	0.020
3,5-Dinitroaniline	ND	0.51	mg/kg	0.026
1,3-Dinitrobenzene	ND	0.26	mg/kg	0.051
2,4-Dinitrophenol	ND	0.51	mg/kg	0.20
Picramic Acid	ND	0.51	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.26	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.26	mg/kg	0.031
HMX	ND	0.26	mg/kg	0.031
Nitrobenzene	ND	0.26	mg/kg	0.051
Nitroglycerin	ND	0.51	mg/kg	0.13
2-Nitrophenol	ND	0.51	mg/kg	0.20
4-Nitrophenol	ND	0.51	mg/kg	0.20
2-Nitrotoluene	ND	0.26	mg/kg	0.082
3-Nitrotoluene	ND	0.26	mg/kg	0.071
4-Nitrotoluene	ND	0.26	mg/kg	0.082
PETN	ND	0.51	mg/kg	0.16
RDX	ND	0.26	mg/kg	0.041
Tetryl	ND	0.26	mg/kg	0.051
1,3,5-Trinitrobenzene	ND	0.26	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.26
2,4,6-Trinitrotoluene	ND	0.26	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

*02/03/12*

University of Hawaii

Client Sample ID: ORD232S

HPLC

Lot-Sample #....: G1H110409-012    Work Order #....: MLJ4L1AA    Matrix.....: SOLID  
 Date Sampled...: 08/07/11    Date Received...: 08/10/11  
 Prep Date.....: 08/19/11    Analysis Date...: 09/05/11  
 Prep Batch #....: 1231144  
 Dilution Factor: 1.01  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	89	(78 - 108)

0210/3/12

LDC #: 28445B40  
 SDG #: G1H110409  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**

Level IV

Date: 10/1/12  
 Page: 1 of 1  
 Reviewer: DR  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330~~X~~)

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: 8/6/11 - 8/7/11
II.	Initial calibration	A	RSD ≤ 20%
III.	Calibration verification/ICV	A	FEV + CV ≤ 15% ICV ? R = 75% - 125%
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates	SW	
VII.	Laboratory control samples	A	LCS
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	ND	FD = 3 + 4, 10 + 11
XIII.	Field blanks	0.1.1 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: Sediment

1	ORD221S	11	ORD231S	D	21	31	1231194 - MRS
2	ORD222S	12	ORD232S		22	32	
3	ORD223S	13	ORD226SMS		23	33	
4	ORD224S	14	ORD226SMSD		24	34	
5	ORD225S	15			25	35	
6	ORD226S	16			26	36	
7	ORD227S	17			27	37	
8	ORD228S	18			28	38	
9	ORD229S	19			29	39	
10	ORD230S	20			30	40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Method: GC  HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) $\leq$ 20%?	/			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		/	/	
Did the initial calibration meet the curve fit acceptance criteria?	/			
Were the RT windows properly established?	/			
<b>IV. Continuing calibration</b>				
What type of continuing calibration calculation was performed? <u>X</u> %D or %R	/			
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) $\leq$ <u>15</u> % or percent recoveries <u>80-120</u> %?	/			
Were all the retention times within the acceptance windows?	/			
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			

LDC #: 284451340

**VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2  
 Reviewer: BR  
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
<b>IX. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/	/	
Target compounds were detected in the field blanks.			/	

VALIDATION FINDINGS WORKSHEET

METHOD: GC  HPLC

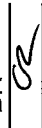
8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tearyl	E. Dinoseb	E. Ethoprop	Z. Courmaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	5041
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	A 1,2-Dibromopropane
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	B 1,2-Dibromo-3-chloropropane
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel		
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion		
O. Phenanthrene	O. 2,4-Dinitrophenol		O. Chlorpyrifos		
P. Pyrene	P.		P. Fenthion		
Q.	Q		Q. Parathion-ethyl		
R.			R. Trichlorate		
S.			S. Merphos		
			T. Stirofos		
			U. Tokuthion		

Notes:



LDC #: 28445B40

**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

Page: 1 of 1  
Reviewer: BR  
2nd Reviewer: 

METHOD: GC \_\_\_\_\_ HPLC   X  

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

- CF = A/C
  - average CF = sum of the CF/number of standards
  - %RSD = 100 \* (S/X)
- Where:
- A = Area of compound
  - C = Concentration of compound
  - S = Standard deviation of calibration factors
  - X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (CF 100 std)	Recalculated (CF 100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/31/2011	HMX	103	103	105	105	2.320	2.210
	LC11		2,4,6-TNT	110	110	112	112	2.051	2.047

Conc	HMX	2,4,6-TNT
5	107	113
10	109	117
20	103	111
50	105	113
100	103	110
200	104	111
500	105	112
1000	102	110
X=	105	112
S=	2.315	2.295

Area                      Area

10306                      11044

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.



LDC #: 28445B40

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 1 of 1  
 Reviewer: BR  
 2nd Reviewer:   

METHOD: GC \_\_\_\_\_ HPLC    X \_\_\_\_\_

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)  
 Where: A = Area of compound  
 C = Concentration of compound  
 S = Standard deviation of calibration factors  
 X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported (CF 100 std)	Recalculated (CF 100 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/8/2011	HMX	70.25000	70.25000	67.20463	67.20463	5.003	5.003
	LC12		2,4,6-TNT	75.63000	75.63000	78.20087	78.20088	4.861	4.861

Conc	HMX	2,4,6-TNT
5	70.20000	84.80000
10	68.30000	78.80000
20	67.80000	78.70000
50	67.26000	78.38000
100	70.25000	75.63000
200	68.78000	80.88500
500	65.07400	76.57400
1000	59.97300	71.83800
X=	67.20463	78.20088
S=	3.36201	3.801

Area                      Area  
 7025                      7583

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Calculation Verification**

METHOD: GC HPLC X

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Where:  
 $\text{Percent difference (\%D)} = 100 * (N - C) / N$   
 N = Initial Calibration Factor or Nominal Amount  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	M-000056	9/2/2011	HMX	100	106.90	106.84	7	7
	LC11	13:07	2,4,6-TNT	100	102.30	102.47	2	2
2	M-000068	9/3/2011	HMX	100	97.98	97.92	2	2
	LC11	1:23	2,4,6-TNT	100	98.08	98.20	2	2
3	M-000003	9/4/2011	HMX	200	195.70	195.60	2	2
	LC11	18:32	2,4,6-TNT	200	195.60	195.89	2	2

Compound	CF	Area	Compound	CF	Area
CCV1 HMX	104.750	11191	2,4,6-TNT	112.125	11490
CCV2 HMX	104.750	10257	2,4,6-TNT	112.125	11011
CCV3 HMX	104.750	20489	2,4,6-TNT	112.125	21964

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Calculation Verification**

METHOD: GC \_\_\_\_\_ HPLC X \_\_\_\_\_

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Where:  
 $\text{Percent difference (\%D)} = 100 * (N - C) / N$   
 N = Initial Calibration Factor or Nominal Amount  
 C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
4	M-000015	9/5/2011	HMX	100	97.04	96.98	3	3
		5:57	2,4,6-TNT	100	97.21	97.33	3	3

CCV1

Compound	CF	Area	Compound	CF	Area
HMX	104.750	10159	2,4,6-TNT	112.125	10913

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28485 B4D

SDG #: Sec Cover

METHOD: GC  HPLC

**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

Page: 1 of 1  
Reviewer: BA  
2nd reviewer: OR

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery:  $SF/SS * 100$   
Where: SF = Surrogate Found  
SS = Surrogate Spiked

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
3,4-Dinitrotoluene	LC11	1990.0498	1775.00	89	89	0

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

VALIDATION FINDINGS WORKSHEET  
Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD: GC  HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * ((SSC - SC)/SA)$

Where

SSC = Spiked sample concentration

SA = Spike added

SC = Sample concentration

RPD =  $((SSCMS - SSCMSD) * 2) / ((SSCMS + SSCMSD)) * 100$

MS = Matrix spike

MSD = Matrix spike duplicate

MS/MSD samples: 13 / 14

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	0.995 0.9	0.976	0	<del>0.995</del> 0.987	0.963	99	99	99	99	2.5	2.5
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: GC/HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery =  $100 * (SSC - SC) / SA$

Where SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

RPD =  $(|(SSCLCS - SSCLCSD) * 2| / (SSCLCS + SSCLCSD)) * 100$

LCS = Laboratory Control Sample

LCS D = Laboratory Control Sample duplicate

LCS/LCSD samples: 231144-LG

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS		LCS D		LCS D		LCS D	
	LCS	LCS D	LCS	LCS D	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)												
Diesel (8015)												
Benzene (8021B)												
Methane (RSK-175)												
2,4-D (8151)												
Dinoseb (8151)												
Naphthalene (8310)												
Anthracene (8310)												
HMX (8330)	1.00	-	1.00	-	100	100	-	-	-	-	-	-
2,4,6-Trinitrotoluene (8330)	1.00	-	0.855	-	85	85.5	-	-	-	-	-	-

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 2845840

# VALIDATION FINDINGS WORKSHEET

## Sample Calculation Verification

Page: 1 of 1  
Reviewer: BR  
2nd Reviewer: OR

METHOD: GC  HPLC

Y N N/A  
Y N N/A

Were all reported results recalculated and verified for all level IV samples?  
Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$  Example: Sample ID          Compound Name A11 ND  
Concentration =         

- A= Area or height of the compound to be measured
- Fv= Final Volume of extract
- Df= Dilution Factor
- RF= Average response factor of the compound in the initial calibration
- Vs= Initial volume of the sample
- Ws= Initial weight of the sample
- %S= Percent Solid

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Laboratory Data Consultants, Inc.

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Phone 760.634.0437

Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Environet  
650 Iwilei Road, Suite 204  
Honolulu, HI 96817  
ATTN: Ms. Shelby Koide

November 8, 2012

SUBJECT: Ordnance Reef, Data Validation

Dear Ms. Koide,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on October 23, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 28634:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
G2G240418	Metals
G2G260422	Energetics

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

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- 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,

  
Ming-Hwa Hwang  
Project Manager/Senior Chemist





## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** November 7, 2012  
**Matrix:** Soil  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2G240418

### Sample Identification

ORD301S	ORD321S
ORD302S	ORD322S
ORD303S	ORD303SMS
ORD304S	ORD303SMSD
ORD305S	ORD312SMS
ORD306S	ORD312SMSD
ORD307S	
ORD308S	
ORD309S	
ORD310S	
ORD311S	
ORD312S	
ORD313S	
ORD314S	
ORD315S	
ORD316S	
ORD317S	
ORD318S	
ORD319S	
ORD320S	

## Introduction

This data review covers 26 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## 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	0.92 mg/Kg	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S
ICB/CCB	Selenium	1.7304 ug/L	ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
ORD317S	Selenium	3.4 mg/Kg	3.4U mg/Kg

No field blanks were identified in this SDG.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### 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)	Flag	A or P
ORD303SMS/MSD (ORD301S ORD302S ORD303S ORD304S ORD305S ORD306S ORD307S ORD308S ORD309S ORD310S ORD311S)	Antimony  Copper	78 (83-110)  88 (89-110)	76 (83-110)  86 (89-110)	-  -	J (all detects) UJ (all non-detects)  J (all detects) UJ (all non-detects)	A
ORD312SMS/MSD (ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S)	Arsenic	120 (81-110)	119 (81-110)	-	J (all detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD312SMS/MSD (ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S)	Copper Nickel Zinc	88 (89-110) 78 (90-110) 115 (79-110)	128 (89-110) - 49 (79-110)	34 ( $\leq 20$ ) - 39 ( $\leq 20$ )	J (all detects) UJ (all non-detects)	A

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards (ICP-MS)

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

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

#### XIV. Field Duplicates

Samples ORD319S and ORD322S, samples ORD306S and ORD307S, samples ORD3012S and ORD313S, and samples ORD3016S and ORD3017S were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD319S	ORD322S	
Barium	3.5	3.8	8
Chromium	9.0	10	11
Cobalt	1.1	1.1	0
Copper	7.0	7.0	0
Lead	4.0	5.1	24
Nickel	4.6	7.5	48
Strontium	2080	2120	2
Uranium	0.76	0.79	4

Analyte	Concentration (mg/Kg)		RPD
	ORD306S	ORD307S	
Arsenic	19.9	16.7	17
Barium	6.6	5.9	11
Chromium	23.3	26.4	12
Cobalt	6.8	6.3	8
Copper	6.5	7.1	9
Lead	4.3	5.5	24
Nickel	40.9	35.3	15
Strontium	2790	2680	4

Analyte	Concentration (mg/Kg)		RPD
	ORD306S	ORD307S	
Uranium	1.2	1.1	9
Vanadium	32.3	30.0	7
Zinc	21.4	19.2U	200

Analyte	Concentration (mg/Kg)		RPD
	ORD312S	ORD313S	
Barium	3.7	3.7	0
Chromium	7.3	7.6	4
Cobalt	1.3	1.5	14
Copper	3.2	3.5	9
Lead	2.8	2.1	29
Nickel	5.7	6.8	18
Strontium	2450	2510	2
Uranium	0.88	0.97	10

Analyte	Concentration (mg/Kg)		RPD
	ORD316S	ORD317S	
Arsenic	4.9	4.5	9
Barium	5.3	5.1	4
Chromium	15.9	14.8	7
Cobalt	3.7	3.6	3
Copper	7.1	6.8	4
Lead	4.5	5.0	11
Nickel	24.4	22.5	8



Analyte	Concentration (mg/Kg)		RPD
	ORD316S	ORD317S	
Selenium	2.9U	3.4	200
Strontium	2590	2540	2
Uranium	1.2	1.1	9
Vanadium	19.2	16.4	16

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2G240418**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
G2G240418	ORD301S ORD302S ORD303S ORD304S ORD305S ORD306S ORD307S ORD308S ORD309S ORD310S ORD311S	Antimony  Copper	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2G240418	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S	Arsenic	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2G240418	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S	Copper  Zinc	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(RPD) (m,d)
G2G240418	ORD312S ORD313S ORD314S ORD315S ORD316S ORD317S ORD318S ORD319S ORD320S ORD321S ORD322S	Nickel	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2G240418**

SDG	Sample	Analyte	Modified Final Concentration	A or P
G2G240418	ORD317S	Selenium	3.4U mg/Kg	A

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2G240418**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD301S

TOTAL Metals

Lot-Sample #...: G2G240418-001  
 Date Sampled...: 07/17/12  
 % Moisture.....: 37

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2209021						
Arsenic	ND ✓	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AD
		Dilution Factor: 20		MDL.....: 4.7		
Barium	3.3	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AC
		Dilution Factor: 20		MDL.....: 2.8		
Cadmium	ND ✓	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AE
		Dilution Factor: 20		MDL.....: 1.6		
Cobalt	0.79 B J	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AF
		Dilution Factor: 20		MDL.....: 0.32		
Chromium	4.8 B J	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AG
		Dilution Factor: 20		MDL.....: 3.2		
Copper	49.8 J(m)	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AH
		Dilution Factor: 20		MDL.....: 3.2		
Nickel	ND ✓	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AJ
		Dilution Factor: 20		MDL.....: 3.2		
Lead	5.8	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AT
		Dilution Factor: 20		MDL.....: 1.9		
Antimony	ND J(m)	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AK
		Dilution Factor: 20		MDL.....: 3.2		
Selenium	ND ✓	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AL
		Dilution Factor: 20		MDL.....: 3.2		
Strontium	2350	15.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AM
		Dilution Factor: 20		MDL.....: 6.3		
Thallium	ND ✓	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AN
		Dilution Factor: 20		MDL.....: 1.6		
Uranium	0.84 B J	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AP
		Dilution Factor: 20		MDL.....: 0.32		
Vanadium	ND ✓	31.6	mg/kg	SW846 6020	07/27-09/06/12	MVQJ01AQ
		Dilution Factor: 20		MDL.....: 9.5		

(Continued on next page)

02112-12

University of Hawaii at Manoa

Client Sample ID: ORD301S

TOTAL Metals

Lot-Sample #....: G2G240418-001

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	24.2 B <i>J</i>	31.6	mg/kg	SW846 6020	07/27-08/31/12	MVQJ01AR

Dilution Factor: 20 MDL.....: 18.9

NOTE (S):

Results and reporting limits have been adjusted for dry weight  
B Estimated result Result is less than RL

*CR 11-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD302S

TOTAL Metals

Lot-Sample #....: G2G240418-002  
 Date Sampled....: 07/17/12  
 % Moisture.....: 31

Date Received...: 07/24/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209021						
Arsenic	ND <i>U</i>	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	5.3	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND <i>U</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	2.7 B <i>5</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	10.8	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	8.4 <i>5(m)</i>	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	17.0	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	2.4 B <i>5</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND <i>5(m)</i>	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND <i>U</i>	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	3160	14.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AM
		Dilution Factor: 20		MDL.....: 5.8		
Thallium	ND <i>U</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	1.5 B <i>5</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND <i>U</i>	28.8	mg/kg	SW846 6020	07/27-09/06/12	MVQJ11AQ
		Dilution Factor: 20		MDL.....: 8.6		

(Continued on next page)

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD302S

TOTAL Metals

Lot-Sample #...: G2G240418-002

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>			<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND U	28.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ11AR
		Dilution Factor: 20		MDL.....: 17.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result. Result is less than RL

02112-12

University of Hawaii at Manoa

Client Sample ID: ORD303S

TOTAL Metals

Lot-Sample #...: G2G240418-003

Matrix.....: SOLID

Date Sampled...: 07/17/12

Date Received...: 07/24/12

% Moisture.....: 30

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2209021					
Arsenic	18.5	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	5.7	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	7.4	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	22.7	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	6.1 J(m)	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	46.4	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	4.3	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND UJ(m)	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND U	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2720	14.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AM
		Dilution Factor: 20		MDL.....: 5.7		
Thallium	ND U	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	1.3 B J	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	36.0	28.7	mg/kg	SW846 6020	07/27-09/06/12	MVQJ21AQ
		Dilution Factor: 20		MDL.....: 8.6		

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02112-12



University of Hawaii at Manoa

Client Sample ID: ORD303S

TOTAL Metals

Lot-Sample #...: G2G240418-003

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	19.4 B <i>5</i>	28.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ21AR
		Dilution Factor: 20		MDL.....: 17.2		

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

University of Hawaii at Manoa

Client Sample ID: ORD304S

TOTAL Metals

Lot-Sample #...: G2G240418-004  
 Date Sampled...: 07/17/12  
 % Moisture.....: 37

Date Received...: 07/24/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2209021						
Arsenic	ND U	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 4.7	07/27-08/31/12	MVQJ31AD
Barium	3.1 B J	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 2.8	07/27-08/31/12	MVQJ31AC
Cadmium	ND U	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 1.6	07/27-08/31/12	MVQJ31AE
Cobalt	0.94 B J	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 0.32	07/27-08/31/12	MVQJ31AF
Chromium	4.0 B J	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 3.2	07/27-08/31/12	MVQJ31AG
Copper	ND UJ(m)	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 3.2	07/27-08/31/12	MVQJ31AH
Nickel	ND U	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 3.2	07/27-08/31/12	MVQJ31AJ
Lead	3.6	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 1.9	07/27-08/31/12	MVQJ31AT
Antimony	ND UJ(m)	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 3.2	07/27-08/31/12	MVQJ31AK
Selenium	ND U	6.3	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 3.2	07/27-08/31/12	MVQJ31AL
Strontium	2070	15.8	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 6.3	07/27-08/31/12	MVQJ31AM
Thallium	ND U	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 1.6	07/27-08/31/12	MVQJ31AN
Uranium	0.64 B J	3.2	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 0.32	07/27-08/31/12	MVQJ31AP
Vanadium	ND U	31.6	mg/kg	SW846 6020 Dilution Factor: 20 MDL.....: 9.5	07/27-08/31/12	MVQJ31AQ

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07-2-12

University of Hawaii at Manoa

Client Sample ID: ORD304S

TOTAL Metals

Lot-Sample #...: G2G240418-004

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND U	31.6	mg/kg	SW846 6020	07/27-08/31/12	MVQJ31AR
		Dilution Factor: 20		MDL.....: 19.0		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD305S

TOTAL Metals

Lot-Sample #...: G2G240418-005

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 41

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2209021					
Arsenic	ND ✓	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AD
		Dilution Factor: 20		MDL.....: 5.1		
Barium	5.2	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AC
		Dilution Factor: 20		MDL.....: 3.0		
Cadmium	ND ✓	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AE
		Dilution Factor: 20		MDL.....: 1.7		
Cobalt	0.87 B J	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AF
		Dilution Factor: 20		MDL.....: 0.34		
Chromium	5.2 B J	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AG
		Dilution Factor: 20		MDL.....: 3.4		
Copper	ND US(m)	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AH
		Dilution Factor: 20		MDL.....: 3.4		
Nickel	ND ✓	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AJ
		Dilution Factor: 20		MDL.....: 3.4		
Lead	5.0	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AT
		Dilution Factor: 20		MDL.....: 2.0		
Antimony	ND US(m)	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AK
		Dilution Factor: 20		MDL.....: 3.4		
Selenium	ND ✓	6.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AL
		Dilution Factor: 20		MDL.....: 3.4		
Strontium	2050	16.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AM
		Dilution Factor: 20		MDL.....: 6.8		
Thallium	ND ✓	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AN
		Dilution Factor: 20		MDL.....: 1.7		
Uranium	0.58 B J	3.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AP
		Dilution Factor: 20		MDL.....: 0.34		
Vanadium	ND ✓	33.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AQ
		Dilution Factor: 20		MDL.....: 10.1		

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University of Hawaii at Manoa

Client Sample ID: ORD305S

TOTAL Metals

Lot-Sample #...: G2G240418-005

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND <i>U</i>	33.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ41AR
		Dilution Factor: 20		MDL.....: 20.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight  
B Estimated result Result is less than RL

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD306S

TOTAL Metals

Lot-Sample #...: G2G240418-006

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 33

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2209021						
Arsenic	19.9	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	6.6	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	6.8	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	23.3	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	6.5 J(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	40.9	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	4.3	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND US(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND U	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2790	14.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AM
		Dilution Factor: 20		MDL.....: 6.0		
Thallium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	1.2 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	32.3	29.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AQ
		Dilution Factor: 20		MDL.....: 8.9		

(Continued on next page)

University of Hawaii at Manoa

Client Sample ID: ORD306S

TOTAL Metals

Lot-Sample #: G2G240418-006

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	21.4 B <i>5</i>	29.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ51AR
		Dilution Factor: 20		MDL.....: 17.9		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result Result is less than RL.

University of Hawaii at Manoa

Client Sample ID: ORD307S

TOTAL Metals

Lot-Sample #...: G2G240418-007

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 37

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2209021						
Arsenic	16.7	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AD
		Dilution Factor: 20		MDL.....: 4.8		
Barium	5.9	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AC
		Dilution Factor: 20		MDL.....: 2.9		
Cadmium	ND U	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AE
		Dilution Factor: 20		MDL.....: 1.6		
Cobalt	6.3	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AF
		Dilution Factor: 20		MDL.....: 0.32		
Chromium	26.4	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AG
		Dilution Factor: 20		MDL.....: 3.2		
Copper	7.1 J(m)	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AH
		Dilution Factor: 20		MDL.....: 3.2		
Nickel	35.3	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AJ
		Dilution Factor: 20		MDL.....: 3.2		
Lead	5.5	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AT
		Dilution Factor: 20		MDL.....: 1.9		
Antimony	ND US(m)	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AK
		Dilution Factor: 20		MDL.....: 3.2		
Selenium	ND U	6.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AL
		Dilution Factor: 20		MDL.....: 3.2		
Strontium	2680	16.0	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AM
		Dilution Factor: 20		MDL.....: 6.4		
Thallium	ND U	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AN
		Dilution Factor: 20		MDL.....: 1.6		
Uranium	1.1 B J	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AP
		Dilution Factor: 20		MDL.....: 0.32		
Vanadium	30.0 B J	31.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AQ
		Dilution Factor: 20		MDL.....: 9.6		

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0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD307S

TOTAL Metals

Lot-Sample #...: G2G240418-007

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND U	31.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ61AR
		Dilution Factor: 20		MDL.....: 19.2		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

University of Hawaii at Manoa

Client Sample ID: ORD308S

TOTAL Metals

Lot-Sample #....: G2G240418-008  
 Date Sampled....: 07/18/12  
 % Moisture.....: 31

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209021						
Arsenic	ND U	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	3.3	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.6 B J	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	8.7	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	ND US(m)	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	6.1	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	ND U	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND US(m)	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND U	5.8	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2040	14.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AM
		Dilution Factor: 20		MDL.....: 5.8		
Thallium	ND U	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.71 B J	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND U	28.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AQ
		Dilution Factor: 20		MDL.....: 8.7		

(Continued on next page)

University of Hawaii at Manoa

Client Sample ID: ORD308S

TOTAL Metals

Lot-Sample #: G2G240418-008

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Zinc	ND U	28.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ81AR
		Dilution Factor: 20		MDL.....: 17.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result: Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD309S

TOTAL Metals

Lot-Sample #...: G2G240418-009

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 30

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2209021						
Arsenic	5.8	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	4.1	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND <sup>U</sup>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B <sup>J</sup>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	8.5	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	ND <sup>US(m)</sup>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	3.4 B <sup>J</sup>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	3.8	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND <sup>US(m)</sup>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND <sup>U</sup>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2540	14.4	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AM
		Dilution Factor: 20		MDL.....: 5.7		
Thallium	ND <sup>U</sup>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	1.2 B <sup>J</sup>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND <sup>U</sup>	28.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AQ
		Dilution Factor: 20		MDL.....: 8.6		

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02112-12

University of Hawaii at Manoa

Client Sample ID: ORD309S

TOTAL Metals

Lot-Sample #: G2G240418-009

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND U	28.7	mg/kg	SW846 6020	07/27-08/31/12	MVQJ91AR
		Dilution Factor: 20		MDL.....: 17.2		

NOTE(S):

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD310S

TOTAL Metals

Lot-Sample #...: G2G240418-010

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 37

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	2209021					
Arsenic	5.4 B J	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AD
		Dilution Factor: 20		MDL.....: 4.7		
Barium	4.8	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AC
		Dilution Factor: 20		MDL.....: 2.8		
Cadmium	ND U	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AE
		Dilution Factor: 20		MDL.....: 1.6		
Cobalt	1.3 B J	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AF
		Dilution Factor: 20		MDL.....: 0.32		
Chromium	7.9	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AG
		Dilution Factor: 20		MDL.....: 3.2		
Copper	ND UJ(m)	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AH
		Dilution Factor: 20		MDL.....: 3.2		
Nickel	3.8 B J	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AJ
		Dilution Factor: 20		MDL.....: 3.2		
Lead	3.9	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AT
		Dilution Factor: 20		MDL.....: 1.9		
Antimony	ND UJ(m)	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AK
		Dilution Factor: 20		MDL.....: 3.2		
Selenium	ND U	6.3	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AL
		Dilution Factor: 20		MDL.....: 3.2		
Strontium	2990	15.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AM
		Dilution Factor: 20		MDL.....: 6.3		
Thallium	ND U	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AN
		Dilution Factor: 20		MDL.....: 1.6		
Uranium	1.3 B J	3.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AP
		Dilution Factor: 20		MDL.....: 0.32		
Vanadium	ND U	31.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AQ
		Dilution Factor: 20		MDL.....: 9.5		

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07/11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD310S

TOTAL Metals

Lot-Sample #...: G2G240418-010

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND ✓	31.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKA1AR
		Dilution Factor: 20		MDL.....: 18.9		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight  
B Estimated result Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD311S

TOTAL Metals

Lot-Sample #....: G2G240418-011

Matrix.....: SOLID

Date Sampled....: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 34

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #....: 2209021						
Arsenic	6.0	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	4.4	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.4 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	8.4	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	ND UJ(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	4.8 B J	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	3.6	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND UJ(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND U	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2880	15.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AM
		Dilution Factor: 20		MDL.....: 6.0		
Thallium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	1.2 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	ND U	30.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AQ
		Dilution Factor: 20		MDL.....: 9.0		

(Continued on next page)

07/27/12



University of Hawaii at Manoa

Client Sample ID: ORD311S

TOTAL Metals

Lot-Sample #...: G2G240418-011

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND ✓	30.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKD1AR
		Dilution Factor: 20		MDL.....: 18.1		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight  
B Estimated result Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD312S

TOTAL Metals

Lot-Sample #...: G2G240418-012

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 32

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2209023							
Arsenic	ND ✓	0.29	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AD
		Dilution Factor: 1			MDL.....: 0.22		
Barium	3.7	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AC
		Dilution Factor: 20			MDL.....: 2.6		
Cadmium	ND ✓	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AE
		Dilution Factor: 20			MDL.....: 1.5		
Cobalt	1.3 B J	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AF
		Dilution Factor: 20			MDL.....: 0.29		
Chromium	7.3	5.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AG
		Dilution Factor: 20			MDL.....: 2.9		
Copper	3.2 B J(m,d)	5.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AH
		Dilution Factor: 20			MDL.....: 2.9		
Nickel	5.7 B J(m)	5.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AJ
		Dilution Factor: 20			MDL.....: 2.9		
Lead	2.8 B J	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AT
		Dilution Factor: 20			MDL.....: 1.8		
Antimony	ND ✓	5.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AK
		Dilution Factor: 20			MDL.....: 2.9		
Selenium	ND ✓	5.9	mg/kg		SW846 6020	07/27-09/06/12	MVQKE1AL
		Dilution Factor: 20			MDL.....: 2.9		
Strontium	2450	14.6	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AM
		Dilution Factor: 20			MDL.....: 5.9		
Thallium	ND ✓	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AN
		Dilution Factor: 20			MDL.....: 1.5		
Uranium	0.88 B J	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKE1AP
		Dilution Factor: 20			MDL.....: 0.29		
Vanadium	ND ✓	29.3	mg/kg		SW846 6020	07/27-09/06/12	MVQKE1AQ
		Dilution Factor: 20			MDL.....: 8.8		

(Continued on next page)

02/12-12

University of Hawaii at Manoa

Client Sample ID: ORD312S

TOTAL Metals

Lot-Sample #...: G2G240418-012

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 2255037						
Zinc	ND <i>us(m,d)</i>	29.3	mg/kg	SW846 6020	09/11/12	MVQKE1AR
		Dilution Factor: 20		MDL.....: 17.6		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

*Q 11-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD313S

TOTAL Metals

Lot-Sample #....: G2G240418-013

Matrix.....: SOLID

Date Sampled....: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 33

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....:	2209023					
Arsenic	ND ✓	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	3.7	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND ✓	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.5 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	7.6	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	3.5 B J(mg)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	6.8 J(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	2.1 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND ✓	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND ✓	6.0	mg/kg	SW846 6020	07/27-09/06/12	MVQKF1AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2510	15.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AM
		Dilution Factor: 20		MDL.....: 6.0		
Thallium	ND ✓	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.97 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKF1AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	ND ✓	29.9	mg/kg	SW846 6020	07/27-09/06/12	MVQKF1AQ
		Dilution Factor: 20		MDL.....: 9.0		

(Continued on next page)

08/11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD313S

TOTAL Metals

Lot-Sample #...: G2G240418-013

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2255037						
Zinc	ND <i>us(m,d)</i>	29.9	mg/kg	SW846 6020	09/11/12	MVQKF1AR
		Dilution Factor: 20		MDL.....: 18.0		

NOTE(S):

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD314S

TOTAL Metals

Lot-Sample #...: G2G240418-014

Matrix.....: SOLID

Date Sampled...: 07/18/12

Date Received...: 07/24/12

% Moisture.....: 27

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2209023							
Arsenic	8.1 <i>J(m)</i>	5.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AD	
		Dilution Factor: 20		MDL.....: 4.1			
Barium	4.8	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AC	
		Dilution Factor: 20		MDL.....: 2.5			
Cadmium	ND <i>✓</i>	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AE	
		Dilution Factor: 20		MDL.....: 1.4			
Cobalt	1.4 B <i>J</i>	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AF	
		Dilution Factor: 20		MDL.....: 0.27			
Chromium	11.0	5.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AG	
		Dilution Factor: 20		MDL.....: 2.7			
Copper	ND <i>JS(m,d)</i>	5.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AH	
		Dilution Factor: 20		MDL.....: 2.7			
Nickel	9.6 <i>J(m)</i>	5.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AJ	
		Dilution Factor: 20		MDL.....: 2.7			
Lead	3.0	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AT	
		Dilution Factor: 20		MDL.....: 1.6			
Antimony	ND <i>✓</i>	5.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AK	
		Dilution Factor: 20		MDL.....: 2.7			
Selenium	ND <i>✓</i>	5.5	mg/kg	SW846 6020	07/27-09/06/12	MVQKG1AL	
		Dilution Factor: 20		MDL.....: 2.7			
Strontium	3100	13.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AM	
		Dilution Factor: 20		MDL.....: 5.5			
Thallium	ND <i>✓</i>	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AN	
		Dilution Factor: 20		MDL.....: 1.4			
Uranium	1.4 B <i>J</i>	2.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKG1AP	
		Dilution Factor: 20		MDL.....: 0.27			
Vanadium	ND <i>✓</i>	27.3	mg/kg	SW846 6020	07/27-09/06/12	MVQKG1AQ	
		Dilution Factor: 20		MDL.....: 8.2			

(Continued on next page)

*ORD-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD314S

TOTAL Metals

Lot-Sample #...: G2G240418-014

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 2255037						
Zinc	ND <i>0.5(m,d)</i>	27.3	mg/kg	SW846 6020	09/11/12	MVQKG1AR
		Dilution Factor: 20		MDL.....: 16.4		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

*02/11-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD315S

TOTAL Metals

Lot-Sample #...: G2G240418-015  
 Date Sampled...: 07/17/12  
 % Moisture.....: 36

Date Received...: 07/24/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...:	2209023					
Arsenic	ND U	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AD
		Dilution Factor: 20		MDL.....: 4.7		
Barium	5.6	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AC
		Dilution Factor: 20		MDL.....: 2.8		
Cadmium	ND U	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AE
		Dilution Factor: 20		MDL.....: 1.6		
Cobalt	4.0	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AF
		Dilution Factor: 20		MDL.....: 0.31		
Chromium	17.5	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AG
		Dilution Factor: 20		MDL.....: 3.1		
Copper	11.5 J(m,d)	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AH
		Dilution Factor: 20		MDL.....: 3.1		
Nickel	32.9 J(m)	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AJ
		Dilution Factor: 20		MDL.....: 3.1		
Lead	2.0 B J	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AT
		Dilution Factor: 20		MDL.....: 1.9		
Antimony	ND U	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AK
		Dilution Factor: 20		MDL.....: 3.1		
Selenium	ND U	6.2	mg/kg	SW846 6020	07/27-09/06/12	MVQKH1AL
		Dilution Factor: 20		MDL.....: 3.1		
Strontium	2960	15.5	mg/kg	SW846 6020	07/27-09/06/12	MVQKH1AM
		Dilution Factor: 20		MDL.....: 6.2		
Thallium	ND U	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AN
		Dilution Factor: 20		MDL.....: 1.6		
Uranium	1.5 B J	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AP
		Dilution Factor: 20		MDL.....: 0.31		
Vanadium	13.7 B J	31.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKH1AQ
		Dilution Factor: 20		MDL.....: 9.3		

(Continued on next page)

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD315S

TOTAL Metals

Lot-Sample #....: G2G240418-015

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 2255037						
Zinc	ND <i>vs(m,d)</i>	31.0	mg/kg	SW846 6020	09/11/12	MVQKH1AR
		Dilution Factor: 20		MDL.....: 18.6		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight  
B Estimated result Result is less than RL.

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD316S

TOTAL Metals

Lot-Sample #....: G2G240418-016  
 Date Sampled....: 07/17/12  
 % Moisture.....: 30

Date Received...: 07/24/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209023						
Arsenic	4.9 B <i>J(m)</i>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	5.3	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND <i>U</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	3.7	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	15.9	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	7.1 <i>J(m,d)</i>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	24.4 <i>J(m)</i>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	4.5	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND <i>U</i>	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND <i>U</i>	5.7	mg/kg	SW846 6020	07/27-09/06/12	MVQKJ1AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2590	14.4	mg/kg	SW846 6020	07/27-09/06/12	MVQKJ1AM
		Dilution Factor: 20		MDL.....: 5.7		
Thallium	ND <i>U</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	1.2 B <i>S</i>	2.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	19.2 B <i>J</i>	28.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKJ1AQ
		Dilution Factor: 20		MDL.....: 8.6		

(Continued on next page)

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD316S

TOTAL Metals

Lot-Sample #....: G2G240418-016

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 2255037						
Zinc	ND <i>us(m,d)</i>	28.7	mg/kg	SW846 6020	09/11/12	MVQKJLAR
		Dilution Factor: 20		MDL.....: 17.2		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result Result is less than RL

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD317S

TOTAL Metals

Lot-Sample #....: G2G240418-017

Matrix.....: SOLID

Date Sampled...: 07/17/12

Date Received...: 07/24/12

% Moisture.....: 31

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #....:	2209023						
Arsenic	4.5 B <i>J(m)</i>	5.8	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AD
		Dilution Factor: 20			MDL.....: 4.4		
Barium	5.1	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AC
		Dilution Factor: 20			MDL.....: 2.6		
Cadmium	ND <i>U</i>	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AE
		Dilution Factor: 20			MDL.....: 1.5		
Cobalt	3.6	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AF
		Dilution Factor: 20			MDL.....: 0.29		
Chromium	14.8	5.8	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AG
		Dilution Factor: 20			MDL.....: 2.9		
Copper	6.8 <i>J(m,d)</i>	5.8	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AH
		Dilution Factor: 20			MDL.....: 2.9		
Nickel	22.5 <i>J(m)</i>	5.8	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AJ
		Dilution Factor: 20			MDL.....: 2.9		
Lead	5.0	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AT
		Dilution Factor: 20			MDL.....: 1.7		
Antimony	ND <i>U</i>	5.8	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AK
		Dilution Factor: 20			MDL.....: 2.9		
Selenium	3.4 B <i>U (b2)</i>	5.8	mg/kg		SW846 6020	07/27-09/06/12	MVQKK1AL
		Dilution Factor: 20			MDL.....: 2.9		
Strontium	2540	14.5	mg/kg		SW846 6020	07/27-09/06/12	MVQKK1AM
		Dilution Factor: 20			MDL.....: 5.8		
Thallium	ND <i>U</i>	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AN
		Dilution Factor: 20			MDL.....: 1.5		
Uranium	1.1 B <i>S</i>	2.9	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AP
		Dilution Factor: 20			MDL.....: 0.29		
Vanadium	16.4 B <i>S</i>	29.0	mg/kg		SW846 6020	07/27-08/31/12	MVQKK1AQ
		Dilution Factor: 20			MDL.....: 8.7		

(Continued on next page)

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD317S

TOTAL Metals

Lot-Sample #....: G2G240418-017

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 2255037						
Zinc	ND 05(m,d)	29.0	mg/kg	SW846 6020	09/11/12	MVQKK1AR
		Dilution Factor: 20		MDL.....: 17.4		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD318S

TOTAL Metals

Lot-Sample #....: G2G240418-018

Matrix.....: SOLID

Date Sampled...: 07/17/12

Date Received...: 07/24/12

% Moisture.....: 28

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209023						
Arsenic	4.5 B $\checkmark$ (m)	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AD
		Dilution Factor: 20		MDL.....: 4.2		
Barium	4.6	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND $\checkmark$	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	3.2	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	17.0	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	8.0 $\checkmark$ (m,d)	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	20.8 $\checkmark$ (m)	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	1.9 B $\checkmark$	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND $\checkmark$	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND $\checkmark$	5.6	mg/kg	SW846 6020	07/27-09/06/12	MVQKN1AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2590	14.0	mg/kg	SW846 6020	07/27-09/06/12	MVQKN1AM
		Dilution Factor: 20		MDL.....: 5.6		
Thallium	ND $\checkmark$	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	1.3 B $\checkmark$	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	14.9 B $\checkmark$	27.9	mg/kg	SW846 6020	07/27-08/31/12	MVQKN1AQ
		Dilution Factor: 20		MDL.....: 8.4		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD318S

TOTAL Metals

Lot-Sample #....: G2G240418-018

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 2255037						
Zinc	ND <i>0.5(m,d)</i>	27.9	mg/kg	SW846 6020	09/11/12	MVQKN1AR
		Dilution Factor: 20		MDL.....: 16.8		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight

B Estimated result. Result is less than RL.

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD319S

TOTAL Metals

Lot-Sample #....: G2G240418-019

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received...: 07/24/12

% Moisture.....: 33

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209023						
Arsenic	ND U	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	3.5	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.1 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	9.0	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	7.0 J(m,d)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	4.6 B J(m)	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	4.0	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND U	6.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND U	6.0	mg/kg	SW846 6020	07/27-09/06/12	MVQKP1AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2080	15.0	mg/kg	SW846 6020	07/27-09/06/12	MVQKP1AM
		Dilution Factor: 20		MDL.....: 6.0		
Thallium	ND U	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.76 B J	3.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	ND U	30.0	mg/kg	SW846 6020	07/27-08/31/12	MVQKP1AQ
		Dilution Factor: 20		MDL.....: 9.0		

(Continued on next page)

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD319S

TOTAL Metals

Lot-Sample #...: G2G240418-019

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 2255037						
Zinc	ND <i>us(m,d)</i>	30.0	mg/kg	SW846 6020	09/11/12	MVQKP1AR
		Dilution Factor: 20		MDL.....: 18.0		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD320S

TOTAL Metals

Lot-Sample #....: G2G240418-020

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received...: 07/24/12

% Moisture.....: 29

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209023						
Arsenic	ND U	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AD
		Dilution Factor: 20		MDL.....: 4.2		
Barium	3.6	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND U	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B J	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	9.6	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	16.7 J(m,d)	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	5.5 B J(m)	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	3.9	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.6	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND U	5.6	mg/kg	SW846 6020	07/27-09/06/12	MVQKQ1AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2090	14.0	mg/kg	SW846 6020	07/27-09/06/12	MVQKQ1AM
		Dilution Factor: 20		MDL.....: 5.6		
Thallium	ND U	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.83 B J	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	ND U	28.1	mg/kg	SW846 6020	07/27-08/31/12	MVQKQ1AQ
		Dilution Factor: 20		MDL.....: 8.4		

(Continued on next page)

0412-12

University of Hawaii at Manoa

Client Sample ID: ORD320S

TOTAL Metals

Lot-Sample #....: G2G240418-020

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2255037						
Zinc	19.9 B, J <i>J(md)</i>	28.1	mg/kg	SW846 6020	09/11/12	MVQKQ1AR
		Dilution Factor: 20		MDL.....: 16.8		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

J Method blank contamination The associated method blank contains the target analyte at a reportable level

*02/12-12*

University of Hawaii at Manoa

Client Sample ID: ORD321S

TOTAL Metals

Lot-Sample #...: G2G240418-021  
 Date Sampled...: 07/16/12  
 % Moisture.....: 30

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2209023						
Arsenic	ND U	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	3.6	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.1 B J	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	9.8	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	7.0 J(m,d)	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	6.5 J(m)	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	6.8	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.7	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND U	5.7	mg/kg	SW846 6020	07/27-09/06/12	MVQKX1AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2060	14.2	mg/kg	SW846 6020	07/27-09/06/12	MVQKX1AM
		Dilution Factor: 20		MDL.....: 5.7		
Thallium	ND U	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.84 B J	2.8	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	ND U	28.5	mg/kg	SW846 6020	07/27-08/31/12	MVQKX1AQ
		Dilution Factor: 20		MDL.....: 8.5		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD321S

TOTAL Metals

Lot-Sample #....: G2G240418-021

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 2255037						
Zinc	17.9 B, J 5(m,d)	28.5	mg/kg	SW846 6020	09/11/12	MVQKX1AR
		Dilution Factor: 20		MDL.....: 17.1		

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

J Method blank contamination The associated method blank contains the target analyte at a reportable level

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD322S

TOTAL Metals

Lot-Sample #....: G2G240418-022  
 Date Sampled....: 07/16/12  
 % Moisture.....: 35

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....: 2209023						
Arsenic	ND U	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AD
		Dilution Factor: 20		MDL.....: 4.6		
Barium	3.8	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AC
		Dilution Factor: 20		MDL.....: 2.8		
Cadmium	ND U	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.1 B J	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AF
		Dilution Factor: 20		MDL.....: 0.31		
Chromium	10	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AG
		Dilution Factor: 20		MDL.....: 3.1		
Copper	7.0 J(m,d)	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AH
		Dilution Factor: 20		MDL.....: 3.1		
Nickel	7.5 J(m)	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AJ
		Dilution Factor: 20		MDL.....: 3.1		
Lead	5.1	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND U	6.2	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AK
		Dilution Factor: 20		MDL.....: 3.1		
Selenium	ND U	6.2	mg/kg	SW846 6020	07/27-09/06/12	MVQK01AL
		Dilution Factor: 20		MDL.....: 3.1		
Strontium	2120	15.4	mg/kg	SW846 6020	07/27-09/06/12	MVQK01AM
		Dilution Factor: 20		MDL.....: 6.2		
Thallium	ND U	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.79 B J	3.1	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AP
		Dilution Factor: 20		MDL.....: 0.31		
Vanadium	ND U	30.8	mg/kg	SW846 6020	07/27-08/31/12	MVQK01AQ
		Dilution Factor: 20		MDL.....: 9.2		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD322S

TOTAL Metals

Lot-Sample #: G2G240418-022

Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #: 2255037						
Zinc	ND <i>us(md)</i>	30.8	mg/kg	SW846 6020	09/11/12	MVQK01AR
		Dilution Factor: 20		MDL: 18.5		

NOTE(S):

Results and reporting limits have been adjusted for dry weight

B Estimated result Result is less than RL

*0211-2-12*

LDC #: 28634A4

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: G2G240418

Level IV

Laboratory: Test America Inc.

Date: 10-29-12

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

**METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/16-18/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(19,22), (16,7), (12,13), (16,17)
XV.	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: Soil

1	ORD301S	11	ORD311S	21	ORD321S	31	
2	ORD302S	12	ORD312S	22	ORD322S	32	
3	ORD303S	13	ORD313S	23	ORD303SMS	33	
4	ORD304S	14	ORD314S	24	ORD303SMSD	34	
5	ORD305S	15	ORD315S	25	ORD312SMS	35	
6	ORD306S	16	ORD316S	26	ORD312SMSD	36	
7	ORD307S	17	ORD317S	27		37	
8	ORD308S	18	ORD318S	28		38	
9	ORD309S	19	ORD319S	29		39	
10	ORD310S	20	ORD320S	30		40	

Notes: \_\_\_\_\_



**Method:Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $> 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL(\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.		/		
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL (ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/	/	
Target analytes were detected in the field blanks.			/	



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

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

Soil preparation factor applied: 67x x 20xdil  
 Associated Samples: 12-22

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/l)	Maximum ICB/CCB <sup>a</sup> (ug/l)	Action Level	No Qualifiers								
Zn	0.92			4.6									

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All (cb<sub>a</sub>)

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/l)	Maximum ICB/CCB <sup>a</sup> (ug/l)	Action Level	1	4	5	10	11	12	13		
Cr			1.2547	8.40649	4.8	4.0	5.2	7.9	8.4	7.3	7.6		

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 17-22 (ba)

Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/l)	Maximum ICB/CCB <sup>a</sup> (ug/l)	Action Level	17								
Se			1.7304	11.59368	3.4								

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 Matrix Spike/Matrix Spike Duplicates

**METHOD:** Trace metals (EPA SW 846 Method 6010/6020/7000)

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

- Y  N  N/A Was a matrix spike analyzed for each matrix in this SDG?
  - Y  N  N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
  - Y  N  N/A Were all duplicate sample relative percent differences (RPD)  $\leq 20\%$  for water samples and  $\leq 35\%$  for soil samples?
- LEVEL IV ONLY:**
- Y  N  N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	23124	S	Sb	78 (83-110)	76 (83-110)		1-11	J1UJ1A (m)
			Cu	88 (89-110)	86 (89-110)		↓	↓
	25126	S	As	120 (81-110)	119 (81-110)		12-22	Jdet/A (m)
			Cu	85 (89-110)	128 (89-110)	34 ( $\leq 20$ )	↓	J1UJ1A (m,d)
			Ni	78 (90-110)				J1UJ1A (m)
			Zn	<del>78</del> 115 (79-110)	49 (79-110)	39 ( $\leq 20$ )	↓	J1UJ1A (m,d)

Comments: Sr 74x

LDC#: 28634A4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 3 of 3  
Reviewer: RL  
2nd Reviewer: LN

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	19	22	
Barium	3.5	3.8	8
Chromium	9.0	10	11
Cobalt	1.1	1.1	0
Copper	7.0	7.0	0
Lead	4.0	5.1	24
Nickel	4.6	7.5	48
Strontium	2080	2120	2
Uranium	0.76	0.79	4

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LDC#: 28634A4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 3  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	6	7	
Arsenic	19.9	16.7	17
Barium	6.6	5.9	11
Chromium	23.3	26.4	12
Cobalt	6.8	6.3	8
Copper	6.5	7.1	9
Lead	4.3	5.5	24
Nickel	40.9	35.3	15
Strontium	2790	2680	4
Uranium	1.2	1.1	9
Vanadium	32.3	30.0	7
Zinc	21.4	19.2U	<i>at 200</i>

Analyte	Concentration (mg/Kg)		RPD
	12	13	
Barium	3.7	3.7	0
Chromium	7.3	7.6	4
Cobalt	1.3	1.5	14
Copper	3.2	3.5	9
Lead	2.8	2.1	29
Nickel	5.7	6.8	18

LDC#: 28634A4

**VALIDATION FINDINGS WORKSHEET**  
Field Duplicates

Page: 2 of 3  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	12	13	
Strontium	2450	2510	2
Uranium	0.88	0.97	10

Analyte	Concentration (mg/Kg)		RPD
	16	17	
Arsenic	4.9	4.5	9
Barium	5.3	5.1	4
Chromium	15.9	14.8	7
Cobalt	3.7	3.6	3
Copper	7.1	6.8	4
Lead	4.5	5.0	11
Nickel	24.4	22.5	8
Selenium	2.9U	3.4	<del>18</del> 200
Strontium	2590	2540	2
Uranium	1.2	1.1	9
Vanadium	19.2	16.4	16



LDC #: 285344

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: OR  
 2nd Reviewer: h

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$       Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	As	77.178	80	96.5	96.5	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV2	ICP/MS (Continuing calibration)	Pb	99.865	100	99.9	99.9	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibration)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 2853474

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
Reviewer: GR  
2nd Reviewer: W

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$
 Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$
 Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
IC5AB	ICP interference check	Zn	93.126	100	93.1	93.1	Y
LCS	Laboratory control sample	As	18.0	20.0	90	90	Y
23	Matrix spike	Cd	(SSR-SR) 18.4	20.4	88	88	Y
23/24	Duplicate	Cr	42.9	42.8	0.29	0.29	Y
3	ICP serial dilution	Sr	26168	26474	1.16	1.16	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28637A4

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: CR  
 2nd reviewer: W

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- N N/A Have results been reported and calculated correctly?
- N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- N N/A Are all detection limits below the CRDL?

Detected analyte results for Pb / Ba were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$  Recalculation: ii. Ba =

RD = Raw data concentration  
 FV = Final volume (ml)  
 In. Vol. = Initial volume (ml) or weight (G)  
 Dil = Dilution factor

i. Pb =  $\frac{100\text{ mL}(20)(3.4367\text{ mg/L})}{(1.88\text{ g})0.63(1000)} = 5.79\text{ mg/L}$

ii. Ba =  $\frac{100\text{ mL}(20)(2.621432\text{ mg/L})}{0.66(1.8\text{ g})(1000)} = 4.39\text{ mg/L}$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	I	Ba	3.3	3.3	Y
		Co	0.79	0.79	Y
		Cr	4.8	4.8	Y
		Cu	49.8	49.8	Y
		Pb	5.8	5.8	Y
		U	0.84	0.84	Y
		Zn	24.2	24.2	Y
	II	As	6.0	6.0	Y
		Ba	4.4	4.4	Y
		Co	1.4	1.4	Y
		Cr	8.4	8.4	Y
		Mn	4.8	4.8	Y
		Pb	3.6	3.6	Y
		Sc	2880	2880	Y
		U	1.2	1.2	Y

Note: \_\_\_\_\_



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 18, 2012  
**LDC Report Date:** November 7, 2012  
**Matrix:** Soil  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2G240418

### Sample Identification

ORD301S	ORD321S
ORD302S	ORD322S
ORD303S	ORD303SMS
ORD304S	ORD303SMSD
ORD305S	
ORD306S	
ORD307S	
ORD308S	
ORD309S	
ORD310S	
ORD311S	
ORD312S	
ORD313S	
ORD314S	
ORD315S	
ORD316S	
ORD317S	
ORD318S	
ORD319S	
ORD320S	

## Introduction

This data review covers 24 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD303SMS/MSD (ORD303S)	2,4-Dinitrophenol	65 (70-130)	67 (70-130)	. -	J (all detects) UJ (all non-detects)	A
	Picramic acid	20 (50-130)	15 (50-130)	-	J (all detects) UJ (all non-detects)	
ORD303SMS/MSD (ORD303S)	Picramic acid	-	-	29 (≤25)	J (all detects)	A

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD).

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD306S and ORD307S, ORD312S and ORD313S, ORD316S and ORD317S, and ORD319S and ORD322S were identified as field duplicates. No energetics were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD
	ORD312S	ORD313S	
2,4-Dinitrotoluene	0.063	0.24U	200



Compound	Concentration (mg/Kg)		RPD
	ORD319S	ORD322S	
2,4-Dinitrotoluene	0.051	0.25U	200

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2G240418**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G2G240418	ORD303S	2,4-Dinitrophenol Picramic acid	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)(m)
G2G240418	ORD303S	Picramic acid	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD)(d)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2G240418**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2G240418**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD301S

HPLC

Lot-Sample #...: G2G240418-001    Work Order #...: MVQJ01AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 37    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

*CE112-12*

University of Hawaii at Manoa

Client Sample ID: ORD302S

HPLC

Lot-Sample #....: G2G240418-002    Work Order #....: MVQJ11AA    Matrix.....: SOLID  
 Date Sampled....: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #....: 2210010  
 Dilution Factor: 0.99  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
3,4-Dinitrotoluene	93	(78 - 108)		

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD303S

HPLC

Lot-Sample #: G2G240418-003 Work Order #: MVQJ21AA Matrix: SOLID  
 Date Sampled: 07/17/12 Date Received: 07/24/12  
 Prep Date: 07/28/12 Analysis Date: 08/31/12  
 Prep Batch #: 2210010  
 Dilution Factor: 1  
 % Moisture: 30 Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND u	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND UJ (M)	0.50	mg/kg	0.20
Picramic Acid	ND UJ (M)	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND u	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
		PERCENT	RECOVERY	
		RECOVERY	LIMITS	
SURROGATE				
3,4-Dinitrotoluene	92		(78 - 108)	

10/11/12

University of Hawaii at Manoa

Client Sample ID: ORD304S

HPLC

Lot-Sample #...: G2G240418-004    Work Order #...: MVQJ31AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.99  
 % Moisture.....: 37    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	93	(78 - 108)		

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD305S

HPLC

Lot-Sample #...: G2G240418-005    Work Order #...: MVQJ41AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.99  
 % Moisture.....: 41    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD306S

HPLC

Lot-Sample #...: G2G240418-006 Work Order #...: MVQJ51AA Matrix.....: SOLID  
 Date Sampled...: 07/18/12 Date Received...: 07/24/12  
 Prep Date.....: 07/28/12 Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 1  
 % Moisture.....: 33 Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD307S

HPLC

Lot-Sample #...: G2G240418-007    Work Order #...: MVQJ61AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 37    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	
3,4-Dinitrotoluene		93	(78 - 108)	

02/12-12

University of Hawaii at Manoa

Client Sample ID: ORD308S

HPLC

Lot-Sample #...: G2G240418-008    Work Order #...: MVQJ81AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.96  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

0211212

University of Hawaii at Manoa

Client Sample ID: ORD309S

HPLC

Lot-Sample #...: G2G240418-009    Work Order #...: MVQJ91AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 1  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND <i>U</i>	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND <i>U</i>	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

*02/2-12*

University of Hawaii at Manoa

Client Sample ID: ORD310S

HPLC

Lot-Sample #...: G2G240418-010    Work Order #...: MVQKA1AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 37    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
3,4-Dinitrotoluene	93	(78 - 108)		

*0112-12*

University of Hawaii at Manoa

Client Sample ID: ORD311S

HPLC

Lot-Sample #...: G2G240418-011 Work Order #...: MVQKD1AA Matrix.....: SOLID  
 Date Sampled...: 07/18/12 Date Received...: 07/24/12  
 Prep Date.....: 07/28/12 Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 1  
 % Moisture.....: 34 Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD312S

HPLC

Lot-Sample #....: G2G240418-012    Work Order #....: MVQKE1AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #....: 2210010  
 Dilution Factor: 0.97  
 % Moisture.....: 32    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	0.063 J J	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND J	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE (S) :

J Estimated result Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD313S

HPLC

Lot-Sample #...: G2G240418-013    Work Order #...: MVQKF1AA    Matrix.....: SOLID  
 Date Sampled...: 07/18/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 33    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD314S

HPLC

Lot-Sample #: G2G240418-014 Work Order #: MVQKG1AA Matrix: SOLID  
 Date Sampled: 07/18/12 Date Received: 07/24/12  
 Prep Date: 07/28/12 Analysis Date: 08/31/12  
 Prep Batch #: 2210010  
 Dilution Factor: 1  
 % Moisture: 27 Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	92	(78 - 108)		

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD315S

HPLC

Lot-Sample #....: G2G240418-015    Work Order #....: MVQKH1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #....: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 36    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	93	(78 - 108)		

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD316S

HPLC

Lot-Sample #...: G2G240418-016    Work Order #...: MVQKJ1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.97  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

C211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD317S

HPLC

Lot-Sample #...: G2G240418-017    Work Order #...: MVQKK1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.96  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.096
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.077
3-Nitrotoluene	ND	0.24	mg/kg	0.067
4-Nitrotoluene	ND	0.24	mg/kg	0.077
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.96	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD318S

HPLC

Lot-Sample #...: G2G240418-018    Work Order #...: MVQKN1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.98  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD319S

HPLC

Lot-Sample #...: G2G240418-019    Work Order #...: MVQKP1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 08/31/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.99  
 % Moisture.....: 33    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
<b>2,4-Dinitrotoluene</b>	<b>0.051 J J</b>	<b>0.25</b>	<b>mg/kg</b>	<b>0.020</b>
2,6-Dinitrotoluene	ND U	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE(S) :

J Estimated result    Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD320S

HPLC

Lot-Sample #...: G2G240418-020    Work Order #...: MVQKQ1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #...: 2210010  
 Dilution Factor: 0.99  
 % Moisture.....: 29    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.053 J J	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND J	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

NOTE(S) :

J Estimated result Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD321S

HPLC

Lot-Sample #...: G2G240418-021    Work Order #...: MVQKX1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 1.01  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
<b>2,4-Dinitrotoluene</b>	<b>0.84</b>	<b>0.25</b>	<b>mg/kg</b>	<b>0.020</b>
2,6-Dinitrotoluene	ND ✓	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
<b>Nitroglycerin</b>	<b>0.59</b>	<b>0.50</b>	<b>mg/kg</b>	<b>0.13</b>
2-Nitrophenol	ND ✓	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.081
3-Nitrotoluene	ND	0.25	mg/kg	0.071
4-Nitrotoluene	ND	0.25	mg/kg	0.081
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

*C112-12*

University of Hawaii at Manoa

Client Sample ID: ORD322S

HPLC

Lot-Sample #...: G2G240418-022    Work Order #...: MVQK01AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/24/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 1  
 % Moisture.....: 35    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

*Q112-12*



LDC #: 28634A40  
 SDG #: G2G240418  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**

Level IV

Date: 11/5/12  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330B)

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: 7/16 - 7/18/12
II.	Initial calibration	A	% PSD ≤ 20
III.	Calibration verification/ICV	A	ICV = 75-125      CV ≤ 15
IV.	Blanks	A	
V.	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates	SW	ORD334S MS/P
VII.	Laboratory control samples	A	LC5
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	A	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	SW	D = 6, 7    12, 13    *16, 17    19, 22
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:  
SOIL

1	ORD301S	11	ORD311S	21 <sup>+</sup>	ORD321S	31	2210010
2	ORD302S	12 <sup>+</sup>	ORD312S	D <sub>2</sub> 22 <sup>-</sup>	ORD322S	D 32 <sup>2</sup>	2210011
3	ORD303S	13	ORD313S	D <sub>3</sub> 23	ORD303SMS	33	
4	ORD304S	14	ORD314S	24	ORD303SMSD	34	
5	ORD305S	15	ORD315S	25		35	
6	ORD306S	D <sub>1</sub> 16	ORD316S	D <sub>3</sub> 26		36	
7	ORD307S	D <sub>1</sub> 17	ORD317S	D <sub>3</sub> 27		37	
8	ORD308S	18	ORD318S	28		38	
9	ORD309S	19 <sup>+</sup>	ORD319S	D 29		39	
10	ORD310S	20 <sup>+</sup>	ORD320S	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_DC #: 2863440  
 SDG #: per cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2  
 Reviewer: FJ  
 2nd Reviewer: [Signature]

Method: GC — HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 20% or percent recoveries 80-120%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IX. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

LDC #: 28634 A1U  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2  
 Reviewer: FJ  
 2nd Reviewer: OL

Validation Area	Yes	No	NA	Findings/Comments
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XII. System performance</b>				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

## VALIDATION FINDINGS WORKSHEET

METHOD: GC  HPLC

8310	8330	8151	8141	8141(Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethylbenzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. o-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. m,p-Xylenes
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total xylenes
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotepp	BB. Famphur	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Phosmet	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L.. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O. 2,4-Dinitrophenol		O. Chlorpyrifos		
P. Pyrene	P. Picramic Acid		P. Fenthion		
Q.	Q.		Q. Parathion-ethyl		
R.			R. Trichloronate		
S.			S. Merphos		
			T. Stirophos		
			U. Tokuthion		

Notes: \_\_\_\_\_

LDC #: 28634A40  
 SDG #: \_\_\_\_\_

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

Page: 1 of 1  
 Reviewer: FT  
 2nd Reviewer: OR

METHOD: GC  HPLC

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

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

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	23 + 24	Ø	65 (70-130)	67 (70-130)	( )	3	J/W/A (m)
		P	20 (50-130)	15 (50-130)	<del>29 (25)</del>	↓	↓
		↓	( )	( )	20 (25)	↓	↓
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	ORD334S MS/P	P	39 (50-130)	( )	( )	no associated sample	no qual
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 2863440

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer: FT  
2nd reviewer: er

METHOD: GC  HPLC

Y N N/A Were field duplicate pairs identified in this SDG?

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

Compound	Concentration ( mg/kg )		%RPD Limit <u>/</u>	Qualification Parent only / All Samples <u>/</u>
	12	13		
J	0.063	0.24 u	200	

Compound	Concentration ( mg/kg )		%RPD Limit <u>/</u>	Qualification Parent only / All Samples <u>/</u>
	19	22		
J	0.051	0.25 u	200	

LDC #: 28634A40  
 SDG #: mu vau

**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: FJ  
 2nd Reviewer: OC

METHOD: GC \_\_\_\_\_ HPLC ✓

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)

A = Area of compound,  
 C = Concentration of compound,  
 S = Standard deviation of the CF  
 X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
				CF ( $\sum$ std)	CF ( $\sum$ std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD
1	ICAL A	8/30/12	HMX	97.02	97.02	95.317	95.317	12.665	12.665
			RDX	94.200	94.200	92.50538	92.505	12.565	12.565
2	ICAL A	6/11/12	HMX	61.4400	61.4400	61.49462	61.494	4.575	4.575
			RDX	49.48.00	49.48.0	50.62413	50.624	18.006	18.006
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.







LDC #: 2863414U

SDG #: see cover

# VALIDATION FINDINGS WORKSHEET

## Surrogate Results Verification

Page: 1 of 1

Reviewer: FT

2nd reviewer: SR

METHOD: GC  HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
SS = Surrogate Spiked

Sample ID: 12

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
<i>3,4-Dinitrotoluene</i>	<i>C18</i>	<i>1942</i>	<i>1813</i>	<i>93</i>	<i>93</i>	<i>0</i>

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18634170

SDG #: mu cones

## VALIDATION FINDINGS WORKSHEET

### Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1

Reviewer: F72nd Reviewer: ORMETHOD: GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$$

Where

SSC = Spiked sample concentration

SC = Sample concentration

SA = Spike added

MS = Matrix spike

MSD = Matrix spike duplicate

$$\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$$

MS/MSD samples: 23 + 24

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	1.0	0.990	ND	0.979	0.975	98	98	98	98	0.41	0.41
2,4,6-Trinitrotoluene (8330)	↓	↓	ND	0.788	0.780	79	79	79	79	1.0	1.0

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 286 3474U  
 SDG #: fu com

**VALIDATION FINDINGS WORKSHEET**  
**Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification**

Page: 1 of 1  
 Reviewer: FB  
 2nd Reviewer: ER

METHOD: GC HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery =  $100 * (SSC - SC) / SA$   
 RPD =  $|LCS - LCSD| * 2 / (LCS + LCSD)$

Where: SSC = Spiked sample concentration  
 SA = Spike added  
 LCS = Laboratory control sample percent recovery

SC = Concentration  
 LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 2210010 LCSD

Compound	Spike Added (mg/L)		Spiked Sample Concentration (mg/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	1.0	NA	0.981	NA	98	98				
2,4,6-Trinitrotoluene (8330)	1.0	↓	0.765	↓	76	76	NA			

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28634AD  
 SDG #: mu caner

VALIDATION FINDINGS WORKSHEET  
Sample Calculation Verification

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

METHOD: GC  HPLC

Y N N/A  
Y N N/A

Were all reported results recalculated and verified for all level IV samples?  
 Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

Example:

Sample ID #12 Compound Name 2,4-Dinitrotoluene

- A= Area or height of the compound to be measured
- Fv= Final Volume of extract
- Df= Dilution Factor
- RF= Average response factor of the compound in the initial calibration
- Vs= Initial volume of the sample
- Ws= Initial weight of the sample
- %S= Percent Solid

Concentration =  $\frac{407 (40)}{125 (2.06) (1000)}$   
 = 0.063 mg/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: \_\_\_\_\_

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

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16 through July 17, 2012  
**LDC Report Date:** November 2, 2012  
**Matrix:** Soil  
**Parameters:** Metals  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2G260422

**Sample Identification**

ORD323S  
ORD324S  
ORD325S  
ORD326S  
ORD327S  
ORD328S  
ORD329S  
ORD330S  
ORD331S  
ORD332S  
ORD333S  
ORD334S  
ORD335S  
ORD336S  
ORD337S  
ORD338S  
ORD339S  
ORD340S  
ORD334SMS  
ORD334SMSD

## Introduction

This data review covers 20 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Strontium, Thallium, Uranium, Vanadium, and Zinc.

This review follows 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.

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.

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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



## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

## **IX. Internal Standards (ICP-MS)**

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

## **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

## **XI. ICP Serial Dilution**

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## **XII. Sample Result Verification**

All sample result verifications were acceptable.

## **XIII. Overall Assessment of Data**

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

## **XIV. Field Duplicates**

Samples ORD328S and ORD329S were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD
	ORD328S	ORD329S	
Arsenic	4.3	4.1U	200
Barium	4.2	4.2	0
Chromium	13.2	13.1	1
Cobalt	1.3	1.3	0
Copper	13.3	11.4	15
Lead	7.0	3.0	80
Nickel	7.9	8.8	11
Strontium	2730	2740	0
Uranium	0.91	0.97	6
Zinc	185	197	6

**Ordnance Reef  
Metals - Data Qualification Summary - SDG G2G260422**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Laboratory Blank Data Qualification Summary - SDG G2G260422**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Metals - Field Blank Data Qualification Summary - SDG G2G260422**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD323S

TOTAL Metals

Lot-Sample #...: G2G260422-001

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received...: 07/26/12

% Moisture.....: 28

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND <i>U</i>	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AD
		Dilution Factor: 20		MDL.....: 4.2		
Barium	3.8	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND <i>U</i>	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.1 B <i>S</i>	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	7.1	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	192	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	7.2	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	12.7	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND <i>U</i>	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND <i>U</i>	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2430	13.9	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AM
		Dilution Factor: 20		MDL.....: 5.6		
Thallium	ND <i>U</i>	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.85 B <i>S</i>	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	ND <i>U</i>	27.9	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AQ
		Dilution Factor: 20		MDL.....: 8.4		

(Continued on next page)

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD323S

TOTAL Metals

Lot-Sample #...: G2G260422-001

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	105	27.9	mg/kg	SW846 6020	08/02-08/31/12	MVTC01AR
		Dilution Factor: 20		MDL.....: 16.7		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

ORD-12

University of Hawaii at Manoa

Client Sample ID: ORD324S

TOTAL Metals

Lot-Sample #...: G2G260422-002  
 Date Sampled...: 07/16/12  
 % Moisture.....: 30

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Prep Batch #...: 2215034							
Arsenic	ND ✓	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AD
		Dilution Factor: 20		MDL.....: 4.3			
Barium	3.6	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AC
		Dilution Factor: 20		MDL.....: 2.6			
Cadmium	ND ✓	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AE
		Dilution Factor: 20		MDL.....: 1.4			
Cobalt	1.1 B J	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AF
		Dilution Factor: 20		MDL.....: 0.29			
Chromium	7.5	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AG
		Dilution Factor: 20		MDL.....: 2.9			
Copper	190	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AH
		Dilution Factor: 20		MDL.....: 2.9			
Nickel	6.9	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AJ
		Dilution Factor: 20		MDL.....: 2.9			
Lead	8.3	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AT
		Dilution Factor: 20		MDL.....: 1.7			
Antimony	ND ✓	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AK
		Dilution Factor: 20		MDL.....: 2.9			
Selenium	ND ✓	5.7	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AL
		Dilution Factor: 20		MDL.....: 2.9			
Strontium	2480	14.3	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AM
		Dilution Factor: 20		MDL.....: 5.7			
Thallium	ND ✓	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AN
		Dilution Factor: 20		MDL.....: 1.4			
Uranium	0.81 B J	2.9	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AP
		Dilution Factor: 20		MDL.....: 0.29			
Vanadium	ND ✓	28.6	mg/kg	SW846 6020		08/02-08/31/12	MVTC31AQ
		Dilution Factor: 20		MDL.....: 8.6			

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD324S

TOTAL Metals

Lot-Sample #...: G2G260422-002

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	78.7	28.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC31AR
		Dilution Factor: 20		MDL.....: 17.2		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD325S

TOTAL Metals

Lot-Sample #...: G2G260422-003  
 Date Sampled...: 07/16/12  
 % Moisture.....: 27

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2215034					
Arsenic	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AD
		Dilution Factor: 20		MDL.....: 4.1		
Barium	4.0	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B S	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	9.8	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	1490	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	8.4	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	7.1	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	2640	13.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AM
		Dilution Factor: 20		MDL.....: 5.5		
Thallium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.90 B S	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	ND U	27.4	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AQ
		Dilution Factor: 20		MDL.....: 8.2		

(Continued on next page)



University of Hawaii at Manoa

Client Sample ID: ORD325S

TOTAL Metals

Lot-Sample #....: G2G260422-003

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	431	27.4	mg/kg	SW846 6020	08/02-08/31/12	MVTC41AR
		Dilution Factor: 20		MDL.....: 16.4		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD326S

TOTAL Metals

Lot-Sample #...: G2G260422-004  
 Date Sampled...: 07/16/12  
 % Moisture.....: 25

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS	METHOD		
Prep Batch #...: 2215034						
Arsenic	ND U	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AD
		Dilution Factor: 20		MDL.....: 4.0		
Barium	3.9	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AC
		Dilution Factor: 20		MDL.....: 2.4		
Cadmium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AE
		Dilution Factor: 20		MDL.....: 1.3		
Cobalt	1.3 B →	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	11.9	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	12.3	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	8.0	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	6.0	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND U	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND U	5.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	2480	13.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AM
		Dilution Factor: 20		MDL.....: 5.3		
Thallium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AN
		Dilution Factor: 20		MDL.....: 1.3		
Uranium	0.85 B ↗	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	ND U	26.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AQ
		Dilution Factor: 20		MDL.....: 8.0		

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*CE11-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD326S

TOTAL Metals

Lot-Sample #...: G2G260422-004

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	53.6	26.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC51AR
		Dilution Factor: 20		MDL.....: 15.9		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD327S

TOTAL Metals

Lot-Sample #: G2G260422-005  
 Date Sampled: 07/16/12  
 % Moisture: 27

Date Received: 07/26/12

Matrix: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #: 2215034						
Arsenic	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AD
		Dilution Factor: 20		MDL: 4.1		
Barium	4.1	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AC
		Dilution Factor: 20		MDL: 2.5		
Cadmium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AE
		Dilution Factor: 20		MDL: 1.4		
Cobalt	1.3 B J	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AF
		Dilution Factor: 20		MDL: 0.28		
Chromium	11.5	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AG
		Dilution Factor: 20		MDL: 2.8		
Copper	36.0	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AH
		Dilution Factor: 20		MDL: 2.8		
Nickel	10.5	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AJ
		Dilution Factor: 20		MDL: 2.8		
Lead	3.9	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AT
		Dilution Factor: 20		MDL: 1.7		
Antimony	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AK
		Dilution Factor: 20		MDL: 2.8		
Selenium	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AL
		Dilution Factor: 20		MDL: 2.8		
Strontium	2530	13.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AM
		Dilution Factor: 20		MDL: 5.5		
Thallium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AN
		Dilution Factor: 20		MDL: 1.4		
Uranium	0.86 B J	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AP
		Dilution Factor: 20		MDL: 0.28		
Vanadium	ND U	27.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AQ
		Dilution Factor: 20		MDL: 8.3		

(Continued on next page)

University of Hawaii at Manoa

Client Sample ID: ORD327S

TOTAL Metals

Lot-Sample #...: G2G260422-005

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	43.0	27.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC61AR
		Dilution Factor: 20		MDL.....: 16.5		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD328S

TOTAL Metals

Lot-Sample #...: G2G260422-006  
 Date Sampled...: 07/16/12  
 % Moisture.....: 29

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...	2215034					
Arsenic	4.3 B ↗	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AD
		Dilution Factor: 20		MDL.....: 4.2		
Barium	4.2	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.3 B ↗	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	13.2	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	13.3	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	7.9	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	7.0	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND U	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2730	14.0	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AM
		Dilution Factor: 20		MDL.....: 5.6		
Thallium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.91 B ↗	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	ND U	28.0	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AQ
		Dilution Factor: 20		MDL.....: 8.4		

(Continued on next page)

Q11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD328S

TOTAL Metals

Lot-Sample #...: G2G260422-006

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	185	28.0	mg/kg	SW846 6020	08/02-08/31/12	MVTC71AR
		Dilution Factor: 20		MDL.....: 16.8		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.  
B Estimated result. Result is less than RL.

02112-02

University of Hawaii at Manoa

Client Sample ID: ORD329S

TOTAL Metals

Lot-Sample #...: G2G260422-007  
 Date Sampled...: 07/16/12  
 % Moisture.....: 27

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AD
		Dilution Factor: 20		MDL.....: 4.1		
Barium	4.2	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.3 B J	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	13.1	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	11.4	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	8.8	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	3.0	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND U	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	2740	13.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AM
		Dilution Factor: 20		MDL.....: 5.5		
Thallium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.97 B J	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	ND U	27.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AQ
		Dilution Factor: 20		MDL.....: 8.2		

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0211-2-112



University of Hawaii at Manoa

Client Sample ID: ORD329S

TOTAL Metals

Lot-Sample #....: G2G260422-007

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Zinc	197	27.3	mg/kg	SW846 6020	08/02-08/31/12	MVTC81AR
		Dilution Factor: 20		MDL.....: 16.4		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD330S

TOTAL Metals

Lot-Sample #...: G2G260422-008  
 Date Sampled...: 07/16/12  
 % Moisture.....: 28

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND U	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AD
		Dilution Factor: 20		MDL.....: 4.2		
Barium	3.7	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B T	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AF
		Dilution Factor: 20		MDL.....: 0.28		
Chromium	9.3	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AG
		Dilution Factor: 20		MDL.....: 2.8		
Copper	52.6	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AH
		Dilution Factor: 20		MDL.....: 2.8		
Nickel	8.5	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AJ
		Dilution Factor: 20		MDL.....: 2.8		
Lead	17.5	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AK
		Dilution Factor: 20		MDL.....: 2.8		
Selenium	ND U	5.6	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AL
		Dilution Factor: 20		MDL.....: 2.8		
Strontium	2430	13.9	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AM
		Dilution Factor: 20		MDL.....: 5.6		
Thallium	ND U	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.78 B T	2.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AP
		Dilution Factor: 20		MDL.....: 0.28		
Vanadium	ND U	27.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AQ
		Dilution Factor: 20		MDL.....: 8.3		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD330S

TOTAL Metals

Lot-Sample #: G2G260422-008

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	84.0	27.8	mg/kg	SW846 6020	08/02-08/31/12	MVTC91AR
		Dilution Factor: 20		MDL.....: 16.7		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

08-2-12

University of Hawaii at Manoa

Client Sample ID: ORD331S

TOTAL Metals

Lot-Sample #...: G2G260422-009

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received...: 07/26/12

% Moisture.....: 31

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS			
Prep Batch #...: 2215034						
Arsenic	ND U	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	32.5	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.1 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	10.0	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	62.0	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	8.1	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	6.6	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND U	5.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2560	14.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AM
		Dilution Factor: 20		MDL.....: 5.8		
Thallium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.82 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND U	28.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDA1AQ
		Dilution Factor: 20		MDL.....: 8.6		

(Continued on next page)

021-2-12

University of Hawaii at Manoa

Client Sample ID: ORD331S

TOTAL Metals

Lot-Sample #...: G2G260422-009

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	60.6	28.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDALAR
		Dilution Factor: 20		MDL.....: 17.3		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

ORD-2-12

University of Hawaii at Manoa

Client Sample ID: ORD332S

TOTAL Metals

Lot-Sample #...: G2G260422-010  
 Date Sampled...: 07/16/12  
 % Moisture.....: 30

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND U	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AD
		Dilution Factor: 20		MDL.....: 4.3		
Barium	4.9	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	9.2	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	147	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	7.7	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	12.7	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AT
		Dilution Factor: 20		MDL.....: 1.7		
Antimony	ND U	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND U	5.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2810	14.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AM
		Dilution Factor: 20		MDL.....: 5.7		
Thallium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.97 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND U	28.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AQ
		Dilution Factor: 20		MDL.....: 8.6		

(Continued on next page)

02/17-12

University of Hawaii at Manoa

Client Sample ID: ORD332S

TOTAL Metals

Lot-Sample #...: G2G260422-010

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	117	28.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDC1AR
		Dilution Factor: 20		MDL.....: 17.2		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD333S

TOTAL Metals

Lot-Sample #...: G2G260422-011  
 Date Sampled...: 07/16/12  
 % Moisture.....: 27

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AD
		Dilution Factor: 20		MDL.....: 4.1		
Barium	4.0	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AC
		Dilution Factor: 20		MDL.....: 2.4		
Cadmium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B T	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	12.7	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	6.8	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	8.2	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	5.6	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	2820	13.6	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AM
		Dilution Factor: 20		MDL.....: 5.4		
Thallium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.90 B T	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	ND U	27.2	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AQ
		Dilution Factor: 20		MDL.....: 8.2		

(Continued on next page)

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD333S

TOTAL Metals

Lot-Sample #...: G2G260422-011

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	16.9 B J	27.2	mg/kg	SW846 6020	08/02-08/31/12	MVTDD1AR
		Dilution Factor: 20		MDL.....: 16.3		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD334S

TOTAL Metals

Lot-Sample #...: G2G260422-012

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received...: 07/26/12

% Moisture.....: 27

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND ✓	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AD
		Dilution Factor: 20		MDL.....: 4.1		
Barium	4.1	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AC
		Dilution Factor: 20		MDL.....: 2.5		
Cadmium	ND ✓	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AE
		Dilution Factor: 20		MDL.....: 1.4		
Cobalt	1.2 B ✓	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	9.7	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	6.9	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	7.7	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	5.0	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND ✓	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND ✓	5.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	3110	13.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AM
		Dilution Factor: 20		MDL.....: 5.5		
Thallium	ND ✓	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AN
		Dilution Factor: 20		MDL.....: 1.4		
Uranium	0.99 B ✓	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	8.4 B ✓	27.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDE1AQ
		Dilution Factor: 20		MDL.....: 8.2		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD334S

TOTAL Metals

Lot-Sample #: G2G260422-012

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	21.8 B J	27.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDELAR
		Dilution Factor: 20		MDL.....: 16.4		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD335S

TOTAL Metals

Lot-Sample #...: G2G260422-013  
 Date Sampled...: 07/16/12  
 % Moisture.....: 26

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS	METHOD		
Prep Batch #...: 2215034						
Arsenic	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AD
		Dilution Factor: 20		MDL.....: 4.0		
Barium	3.7	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AC
		Dilution Factor: 20		MDL.....: 2.4		
Cadmium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AE
		Dilution Factor: 20		MDL.....: 1.3		
Cobalt	1.2 B J	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AF
		Dilution Factor: 20		MDL.....: 0.27		
Chromium	10.7	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AG
		Dilution Factor: 20		MDL.....: 2.7		
Copper	5.6	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AH
		Dilution Factor: 20		MDL.....: 2.7		
Nickel	7.6	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AJ
		Dilution Factor: 20		MDL.....: 2.7		
Lead	4.8	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AT
		Dilution Factor: 20		MDL.....: 1.6		
Antimony	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AK
		Dilution Factor: 20		MDL.....: 2.7		
Selenium	ND U	5.4	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AL
		Dilution Factor: 20		MDL.....: 2.7		
Strontium	2700	13.5	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AM
		Dilution Factor: 20		MDL.....: 5.4		
Thallium	ND U	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AN
		Dilution Factor: 20		MDL.....: 1.3		
Uranium	0.85 B J	2.7	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AP
		Dilution Factor: 20		MDL.....: 0.27		
Vanadium	ND U	26.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AQ
		Dilution Factor: 20		MDL.....: 8.1		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD335S

TOTAL Metals

Lot-Sample #: G2G260422-013

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	ND ✓	26.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDF1AR
		Dilution Factor: 20		MDL.....: 16.1		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD336S

TOTAL Metals

Lot-Sample #...: G2G260422-014

Matrix.....: SOLID

Date Sampled...: 07/16/12

Date Received..: 07/26/12

% Moisture.....: 33

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...: 2215034							
Arsenic	ND <i>U</i>	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AD
		Dilution Factor: 20			MDL.....: 4.5		
Barium	8.0	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AC
		Dilution Factor: 20			MDL.....: 2.7		
Cadmium	ND <i>U</i>	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AE
		Dilution Factor: 20			MDL.....: 1.5		
Cobalt	1.2 B <i>J</i>	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AF
		Dilution Factor: 20			MDL.....: 0.30		
Chromium	8.2	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AG
		Dilution Factor: 20			MDL.....: 3.0		
Copper	687	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AH
		Dilution Factor: 20			MDL.....: 3.0		
Nickel	7.4	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AJ
		Dilution Factor: 20			MDL.....: 3.0		
Lead	7.0	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AT
		Dilution Factor: 20			MDL.....: 1.8		
Antimony	ND <i>U</i>	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AK
		Dilution Factor: 20			MDL.....: 3.0		
Selenium	ND <i>U</i>	6.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AL
		Dilution Factor: 20			MDL.....: 3.0		
Strontium	2720	14.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AM
		Dilution Factor: 20			MDL.....: 6.0		
Thallium	ND <i>U</i>	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AN
		Dilution Factor: 20			MDL.....: 1.5		
Uranium	1.1 B <i>S</i>	3.0	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AP
		Dilution Factor: 20			MDL.....: 0.30		
Vanadium	ND <i>U</i>	29.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDG1AQ
		Dilution Factor: 20			MDL.....: 8.9		

(Continued on next page)

*0211-2-12*

University of Hawaii at Manoa

Client Sample ID: ORD336S

TOTAL Metals

Lot-Sample #...: G2G260422-014

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	182	29.8	mg/kg	SW846 6020	08/02-08/31/12	MVTDGIAR
		Dilution Factor: 20		MDL.....: 17.9		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

02-11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD337S

TOTAL Metals

Lot-Sample #...: G2G260422-015

Date Sampled...: 07/16/12

% Moisture.....: 31

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...:	2215034						
Arsenic	ND U	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AD
		Dilution Factor: 20			MDL.....: 4.4		
Barium	37.8	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AC
		Dilution Factor: 20			MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AE
		Dilution Factor: 20			MDL.....: 1.5		
Cobalt	1.5 B J	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AF
		Dilution Factor: 20			MDL.....: 0.29		
Chromium	9.8	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AG
		Dilution Factor: 20			MDL.....: 2.9		
Copper	2000	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AH
		Dilution Factor: 20			MDL.....: 2.9		
Nickel	11.3	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AJ
		Dilution Factor: 20			MDL.....: 2.9		
Lead	30.0	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AT
		Dilution Factor: 20			MDL.....: 1.7		
Antimony	ND U	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AK
		Dilution Factor: 20			MDL.....: 2.9		
Selenium	ND U	5.8	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AL
		Dilution Factor: 20			MDL.....: 2.9		
Strontium	2530	14.6	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AM
		Dilution Factor: 20			MDL.....: 5.8		
Thallium	ND U	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AN
		Dilution Factor: 20			MDL.....: 1.5		
Uranium	0.82 B J	2.9	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AP
		Dilution Factor: 20			MDL.....: 0.29		
Vanadium	ND U	29.1	mg/kg		SW846 6020	08/02-08/31/12	MVTDH1AQ
		Dilution Factor: 20			MDL.....: 8.7		

(Continued on next page)

*0211-2-12*



University of Hawaii at Manoa

Client Sample ID: ORD337S

TOTAL Metals

Lot-Sample #...: G2G260422-015

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	184	29.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDH1AR
		Dilution Factor: 20		MDL.....: 17.5		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD338S

TOTAL Metals

Lot-Sample #...: G2G260422-016  
 Date Sampled...: 07/16/12  
 % Moisture.....: 32

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND U	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AD
		Dilution Factor: 20		MDL.....: 4.4		
Barium	3.7	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AC
		Dilution Factor: 20		MDL.....: 2.6		
Cadmium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.2 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AF
		Dilution Factor: 20		MDL.....: 0.29		
Chromium	10.6	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AG
		Dilution Factor: 20		MDL.....: 2.9		
Copper	1280	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AH
		Dilution Factor: 20		MDL.....: 2.9		
Nickel	8.5	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AJ
		Dilution Factor: 20		MDL.....: 2.9		
Lead	32.9	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND U	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AK
		Dilution Factor: 20		MDL.....: 2.9		
Selenium	ND U	5.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AL
		Dilution Factor: 20		MDL.....: 2.9		
Strontium	2610	14.6	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AM
		Dilution Factor: 20		MDL.....: 5.9		
Thallium	ND U	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.90 B J	2.9	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AP
		Dilution Factor: 20		MDL.....: 0.29		
Vanadium	ND U	29.3	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AQ
		Dilution Factor: 20		MDL.....: 8.8		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD338S

TOTAL Metals

Lot-Sample #: G2G260422-016

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	263	29.3	mg/kg	SW846 6020	08/02-08/31/12	MVTDJ1AR
		Dilution Factor: 20		MDL.....: 17.6		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD339S

TOTAL Metals

Lot-Sample #...: G2G260422-017

Date Sampled...: 07/17/12

% Moisture.....: 34

Date Received...: 07/26/12

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2215034						
Arsenic	ND <input checked="" type="checkbox"/>	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	3.4	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND <input checked="" type="checkbox"/>	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	0.98 B <input checked="" type="checkbox"/>	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	8.0	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	57.7	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	6.9	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	4.2	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND <input checked="" type="checkbox"/>	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND <input checked="" type="checkbox"/>	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2310	15.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AM
		Dilution Factor: 20		MDL.....: 6.1		
Thallium	ND <input checked="" type="checkbox"/>	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.60 B <input checked="" type="checkbox"/>	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	ND <input checked="" type="checkbox"/>	30.3	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AQ
		Dilution Factor: 20		MDL.....: 9.1		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD339S

TOTAL Metals

Lot-Sample #....: G2G260422-017

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Zinc	21.1 B <i>J</i>	30.3	mg/kg	SW846 6020	08/02-08/31/12	MVTDK1AR
		Dilution Factor: 20		MDL.....: 18.2		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight  
B Estimated result. Result is less than RL.

*02112-12*

University of Hawaii at Manoa

Client Sample ID: ORD340S

TOTAL Metals

Lot-Sample #...: G2G260422-018

Matrix.....: SOLID

Date Sampled...: 07/17/12

Date Received...: 07/26/12

% Moisture.....: 34

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...:	2215034					
Arsenic	ND ✓	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AD
		Dilution Factor: 20		MDL.....: 4.5		
Barium	3.4	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AC
		Dilution Factor: 20		MDL.....: 2.7		
Cadmium	ND ✓	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AE
		Dilution Factor: 20		MDL.....: 1.5		
Cobalt	1.1 B ✓	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AF
		Dilution Factor: 20		MDL.....: 0.30		
Chromium	9.3	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AG
		Dilution Factor: 20		MDL.....: 3.0		
Copper	80.3	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AH
		Dilution Factor: 20		MDL.....: 3.0		
Nickel	7.9	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AJ
		Dilution Factor: 20		MDL.....: 3.0		
Lead	15.1	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AT
		Dilution Factor: 20		MDL.....: 1.8		
Antimony	ND ✓	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AK
		Dilution Factor: 20		MDL.....: 3.0		
Selenium	ND ✓	6.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AL
		Dilution Factor: 20		MDL.....: 3.0		
Strontium	2460	15.1	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AM
		Dilution Factor: 20		MDL.....: 6.1		
Thallium	ND ✓	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AN
		Dilution Factor: 20		MDL.....: 1.5		
Uranium	0.71 B ✓	3.0	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AP
		Dilution Factor: 20		MDL.....: 0.30		
Vanadium	ND ✓	30.3	mg/kg	SW846 6020	08/02-08/31/12	MVTDL1AQ
		Dilution Factor: 20		MDL.....: 9.1		

(Continued on next page)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD340S

TOTAL Metals

Lot-Sample #: G2G260422-018

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Zinc	29.0 B <i>7</i>	30.3	mg/kg		SW846 6020	08/02-08/31/12	MVTDL1AR

Dilution Factor: 20      MDL.....: 18.2

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.  
B Estimated result Result is less than RL.

*02112-12*

LDC #: 28634B4

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: G2G260422

Level IV

Laboratory: Test America Inc.

Date: 10-29-12

Page: 1 of 1

Reviewer: OL

2nd Reviewer: **METHOD:** Metals (EPA SW 846 Method 6020A)

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: 7/16-17/12
II.	ICP/MS Tune	D	
III.	Calibration	A	
IV.	Blanks	SWA	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (SC > 4x)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(6,7)
XV.	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: 50

1	ORD323S	11	ORD333S	21		31	
2	ORD324S	12	ORD334S	22		32	
3	ORD325S	13	ORD335S	23		33	
4	ORD326S	14	ORD336S	24		34	
5	ORD327S	15	ORD337S	25		35	
6	ORD328S	16	ORD338S	26		36	
7	ORD329S	17	ORD339S	27		37	
8	ORD330S	18	ORD340S	28		38	
9	ORD331S	19	ORD334SMS	29		39	
10	ORD332S	20	ORD334SMSD	30		40	

Notes: \_\_\_\_\_



**Method:Metals (EPA SW 846 Method 6010B/7000/6020)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
<b>II. ICP/MS Tune</b>				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $> 0.995$ ?	/			
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
<b>V. ICP Interference Check Sample</b>				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
<b>VI. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	/			
<b>VII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
<b>VIII. Furnace Atomic Absorption QC</b>				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
<b>IX. ICP Serial Dilution</b>				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
<b>X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)</b>				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	/			
<b>XI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
<b>XII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	



LDC#: 28634B4

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 6 of 1  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

**METHOD:** Metals (EPA Method 6010B/7000)

Analyte	Concentration (mg/Kg)		RPD
	6	7	
Arsenic	4.3	4.1U	200
Barium	4.2	4.2	0
Chromium	13.2	13.1	1
Cobalt	1.3	1.3	0
Copper	13.3	11.4	15
Lead	7.0	3.0	80
Nickel	7.9	8.8	11
Strontium	2730	2740	0
Uranium	0.91	0.97	6
Zinc	185	197	6

LDC #: 28631B5

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Sb	39.091	40	97.7	97.7	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV10	ICP/MS (Continuing calibration)	Pb	101.14	100	101	101	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibration)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28834B4

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
Reviewer: QR  
2nd Reviewer: h

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$
 Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).  
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample concentration  
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$
 Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
ICSPB	ICP interference check	As	94.349	100	94.3	94.3	Y
LCS	Laboratory control sample	Cr	20.7	20	103	103	
19	Matrix spike	Cd	(SSR-SR) 25.1	27.4	91	91	
19/20	Duplicate	U	24.3	23.2	4.7	4.7	
12	ICP serial dilution	Se	23923	23423	2.1	2.1	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28634B-1

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: OR  
 2nd reviewer: [Signature]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

- N N/A Have results been reported and calculated correctly?
- Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Ba/Co were recalculated and verified using the following equation:

Concentration =  $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:

$11 \cdot Co =$

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor

$1 \cdot Ba = \frac{100mL(20)(2.619485ug/L)}{0.72(1.91g)(1000)} = 3.8 mg/kg$

$11 \cdot Co = \frac{100mL(20)(0.448134ug/L)}{0.73(1g)(1000)} = 1.23 mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	Ba	3.8	3.8	Y
		Co	1.1	1.1	
		Cr	7.1	7.1	
		Cu	19.2	19.2	
		Mn	7.2	7.2	
		Pb	12.7	12.7	
		Sr	2430	2430	
		V	0.85	0.85	
		Zn	105	105	
	11	Ba	4.0	4.0	
		Co	1.2	1.2	
		Cr	12.7	12.7	
		Cu	6.8	6.8	
		Mn	8.2	8.2	
		Pb	5.6	5.6	
		Sr	2820	2820	
		V	0.90	0.90	
		Zn	16.9	16.9	Y

Note: \_\_\_\_\_

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** Ordnance Reef  
**Collection Date:** July 16, 2012  
**LDC Report Date:** November 5, 2012  
**Matrix:** Soil  
**Parameters:** Energetics  
**Validation Level:** EPA Level IV  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** G2G260422

### Sample Identification

ORD323S  
ORD324S  
ORD325S  
ORD326S  
ORD327S  
ORD328S  
ORD329S  
ORD330S  
ORD331S  
ORD332S  
ORD333S  
ORD334S  
ORD335S  
ORD336S  
ORD337S  
ORD338S  
ORD339S  
ORD340S  
ORD334SMS  
ORD334SMSD



## Introduction

This data review covers 20 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Energetics.

This review follows 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.

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 Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- 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.

Retention time windows were evaluated and considered technically acceptable.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent recoveries (%R) of the second source calibration standard were between 75.0% to 125% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No energetics 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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
ORD334SMS/MSD (ORD334S)	Picramic acid	39 (50-130)	-	-	J (all detects) UJ (all non-detects)	A

## VII. Laboratory Control Samples

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

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
ORD326S	2,4-Dinitrotoluene	57	J (all detects)	A

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

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

## XII. Field Duplicates

Samples ORD328S and ORD329S were identified as field duplicates. No energetics were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD
	ORD328S	ORD329S	
2,4-Dinitrotoluene	0.067	0.12	57

**Ordnance Reef  
Energetics - Data Qualification Summary - SDG G2G260422**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G2G260422	ORD334S	Picramic acid	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
G2G260422	ORD326S	2,4-Dinitrotoluene	J (all detects)	A	Compound quantitation and RLs (RPD)(q)

**Ordnance Reef  
Energetics - Laboratory Blank Data Qualification Summary - SDG G2G260422**

No Sample Data Qualified in this SDG

**Ordnance Reef  
Energetics - Field Blank Data Qualification Summary - SDG G2G260422**

No Sample Data Qualified in this SDG

University of Hawaii at Manoa

Client Sample ID: ORD323S

HPLC

Lot-Sample #...: G2G260422-001    Work Order #...: MVTC01AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 0.98  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	0.14 J J	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND J	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD324S

HPLC

Lot-Sample #...: G2G260422-002    Work Order #...: MVTC31AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 30    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD325S

HPLC

Lot-Sample #....: G2G260422-003    Work Order #....: MVTC41AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.98  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	0.062 J J	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND U	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(78 - 108)

NOTE(S) :

J Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD326S

HPLC

Lot-Sample #: G2G260422-004    Work Order #: MVTC51AA    Matrix: SOLID  
 Date Sampled: 07/16/12    Date Received: 07/26/12  
 Prep Date: 07/28/12    Analysis Date: 09/01/12  
 Prep Batch #: 2210011  
 Dilution Factor: 1  
 % Moisture: 25    Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.028 J, PG J(q)	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND U	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	91	(78 - 108)

NOTE(S):

J Estimated result. Result is less than RL.  
 PG The percent difference between the original and confirmation analyses is greater than 40%.

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD327S

HPLC

Lot-Sample #: G2G260422-005 Work Order #: MVTC61AA Matrix: SOLID  
 Date Sampled: 07/16/12 Date Received: 07/26/12  
 Prep Date: 07/28/12 Analysis Date: 09/01/12  
 Prep Batch #: 2210011  
 Dilution Factor: 0.98  
 % Moisture: 27 Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	1.4	0.24	mg/kg	0.020
2,6-Dinitrotoluene	0.12 J	0.24	mg/kg	0.029
HMX	ND U	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE(S):

J Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD328S

HPLC

Lot-Sample #....: G2G260422-006    Work Order #....: MVTC71AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 29    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.067 J J	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND v	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

*0212-12*

University of Hawaii at Manoa

Client Sample ID: ORD329S

HPLC

Lot-Sample #....: G2G260422-007    Work Order #....: MVTC81AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.12 J J	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND U	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

02-11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD330S

HPLC

Lot-Sample #....: G2G260422-008    Work Order #....: MVTC91AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.98  
 % Moisture.....: 28    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND ✓	0.24	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD331S

HPLC

Lot-Sample #....: G2G260422-009    Work Order #....: MVTDA1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.98  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND J	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	2.2	0.24	mg/kg	0.020
2,6-Dinitrotoluene	0.10 J J	0.24	mg/kg	0.029
HMX	ND U	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

NOTE(S) :

J Estimated result. Result is less than RL.

02/11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD332S

HPLC

Lot-Sample #: G2G260422-010      Work Order #: MVTDC1AA      Matrix: SOLID  
 Date Sampled: 07/16/12      Date Received: 07/26/12  
 Prep Date: 07/28/12      Analysis Date: 09/01/12  
 Prep Batch #: 2210011  
 Dilution Factor: 0.98  
 % Moisture: 30      Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	0.42	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND ✓	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD333S

HPLC

Lot-Sample #....: G2G260422-011    Work Order #....: MVTDD1AA    Matrix.....: SOLID  
 Date Sampled....: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

02/12-12

University of Hawaii at Manoa

Client Sample ID: ORD334S

HPLC

Lot-Sample #....: G2G260422-012    Work Order #....: MVTDE1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.98  
 % Moisture.....: 27    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND ✓	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	0.034 J J	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND ✓	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	ND	0.49	mg/kg	0.13
2-Nitrophenol	ND	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(78 - 108)

NOTE (S) :

J Estimated result. Result is less than RL.

0211-2-12



University of Hawaii at Manoa

Client Sample ID: ORD335S

HPLC

Lot-Sample #....: G2G260422-013    Work Order #....: MVTDF1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/01/12  
 Prep Batch #....: 2210011  
 Dilution Factor: 0.97  
 % Moisture.....: 26    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
3,4-Dinitrotoluene	93	(78 - 108)		

02/12-12

University of Hawaii at Manoa

Client Sample ID: ORD336S

HPLC

Lot-Sample #: G2G260422-014 Work Order #: MVTDG1AA Matrix: SOLID  
 Date Sampled: 07/16/12 Date Received: 07/26/12  
 Prep Date: 07/28/12 Analysis Date: 09/01/12  
 Prep Batch #: 2210011  
 Dilution Factor: 0.98  
 % Moisture: 33 Method: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND U	0.24	mg/kg	0.098
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.020
3,5-Dinitroaniline	ND	0.49	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.049
2,4-Dinitrophenol	ND	0.49	mg/kg	0.20
Picramic Acid	ND	0.49	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.049
Nitroglycerin	1.7	0.49	mg/kg	0.13
2-Nitrophenol	ND U	0.49	mg/kg	0.20
4-Nitrophenol	ND	0.49	mg/kg	0.20
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.069
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.49	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.049
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.020
Picric Acid	ND	0.98	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

Q11-2-12

University of Hawaii at Manoa

Client Sample ID: ORD337S

HPLC

Lot-Sample #...: G2G260422-015    Work Order #...: MVTDH1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/02/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 0.97  
 % Moisture.....: 31    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.097
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
3,5-Dinitroaniline	ND	0.48	mg/kg	0.024
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4-Dinitrophenol	ND	0.48	mg/kg	0.19
Picramic Acid	ND	0.48	mg/kg	0.19
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.029
HMX	ND	0.24	mg/kg	0.029
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.13
2-Nitrophenol	ND	0.48	mg/kg	0.19
4-Nitrophenol	ND	0.48	mg/kg	0.19
2-Nitrotoluene	ND	0.24	mg/kg	0.078
3-Nitrotoluene	ND	0.24	mg/kg	0.068
4-Nitrotoluene	ND	0.24	mg/kg	0.078
PETN	ND	0.48	mg/kg	0.16
RDX	ND	0.24	mg/kg	0.039
Tetryl	ND	0.24	mg/kg	0.048
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
Picric Acid	ND	0.97	mg/kg	0.24
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD338S

HPLC

Lot-Sample #...: G2G260422-016    Work Order #...: MVTDJ1AA    Matrix.....: SOLID  
 Date Sampled...: 07/16/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/02/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 1  
 % Moisture.....: 32    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.10
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	0.038 J J	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.080
3-Nitrotoluene	ND	0.25	mg/kg	0.070
4-Nitrotoluene	ND	0.25	mg/kg	0.080
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	1.0	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

NOTE(S):

J Estimated result. Result is less than RL.

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD339S

HPLC

Lot-Sample #...: G2G260422-017    Work Order #...: MVTDK1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received..: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date..: 09/02/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 34    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

0211-2-12

University of Hawaii at Manoa

Client Sample ID: ORD340S

HPLC

Lot-Sample #...: G2G260422-018    Work Order #...: MVTDL1AA    Matrix.....: SOLID  
 Date Sampled...: 07/17/12    Date Received...: 07/26/12  
 Prep Date.....: 07/28/12    Analysis Date...: 09/02/12  
 Prep Batch #...: 2210011  
 Dilution Factor: 0.99  
 % Moisture.....: 34    Method.....: SW846 8330/8330A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Amino-4,6-dinitrotoluene	ND	0.25	mg/kg	0.099
4-Amino-2,6-dinitrotoluene	ND	0.25	mg/kg	0.020
3,5-Dinitroaniline	ND	0.50	mg/kg	0.025
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.050
2,4-Dinitrophenol	ND	0.50	mg/kg	0.20
Picramic Acid	ND	0.50	mg/kg	0.20
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.020
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.030
HMX	ND	0.25	mg/kg	0.030
Nitrobenzene	ND	0.25	mg/kg	0.050
Nitroglycerin	ND	0.50	mg/kg	0.13
2-Nitrophenol	ND	0.50	mg/kg	0.20
4-Nitrophenol	ND	0.50	mg/kg	0.20
2-Nitrotoluene	ND	0.25	mg/kg	0.079
3-Nitrotoluene	ND	0.25	mg/kg	0.069
4-Nitrotoluene	ND	0.25	mg/kg	0.079
PETN	ND	0.50	mg/kg	0.16
RDX	ND	0.25	mg/kg	0.040
Tetryl	ND	0.25	mg/kg	0.050
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.020
Picric Acid	ND	0.99	mg/kg	0.25
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.020

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

02/12-12

LDC #: 28634B40  
 SDG #: G2G260422  
 Laboratory: Test America Inc.

**VALIDATION COMPLETENESS WORKSHEET**  
 Level IV

Date: 11/5/12  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Energetics (EPA SW 846 Method 8330~~7~~)

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>7/16/12</u>
II	Initial calibration	A	<u>% RAD ≤ 20</u>
III.	Calibration verification/ICV	A	<u>100 = 75-125 CV ≤ 15</u>
IV.	Blanks	A	
V	Surrogate recovery	A	
VI.	Matrix spike/Matrix spike duplicates	SW	
VII.	Laboratory control samples	A	<u>LES</u>
VIII.	Target compound identification	A	
IX.	Compound quantitation/RL/LOQ/LODs	SW	
X.	System Performance	A	
XI.	Overall assessment of data	A	
XII.	Field duplicates	SW	<u>D = 6, 7</u>
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:

SOIL

1 <sup>+</sup>	ORD323S	11	ORD333S	21	<u>22100/1</u>	31	
2 <sup>-</sup>	ORD324S	12 <sup>+</sup>	ORD334S	22		32	
3 <sup>+</sup>	ORD325S	13 <sup>-</sup>	ORD335S	23		33	
4 <sup>+</sup>	ORD326S	14 <sup>+</sup>	ORD336S	24		34	
5 <sup>+</sup>	ORD327S	15 <sup>-</sup>	ORD337S	25		35	
6 <sup>+</sup>	ORD328S	16 <sup>+</sup>	ORD338S	26		36	
7 <sup>+</sup>	ORD329S	17 <sup>-</sup>	ORD339S	27		37	
8 <sup>-</sup>	ORD330S	18	ORD340S	28		38	
9 <sup>+</sup>	ORD331S	19	ORD334SMS	29		39	
10 <sup>+</sup>	ORD332S	20	ORD334SMSD	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC #: 28034134V  
 SDG #: per owner

VALIDATION FINDINGS CHECKLIST

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

Method: GC  HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>II. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < <sup>15</sup> 20% or percent recoveries <sup>85-115</sup> 80-120%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IX. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	



LDC #: 78 634134U  
 SDG #: see comment

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2  
 Reviewer: FJ  
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	/			
<b>XI. Compound quantitation/CRQLs</b>				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
<b>XII. System performance</b>				
System performance was found to be acceptable.	/			
<b>XIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	/			
<b>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.	/			
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

## VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

8310	8330	8151	8141	8141(Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethylbenzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. o-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. m,p-Xylenes
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total xylenes
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotepp	BB. Famphur	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Phosmet	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos		
P. Pyrene	P.		P. Fenthion		
Q.	Q		Q. Parathion-ethyl		
R.			R. Trichloronate		
S.			S. Merphos		
			T. Stirophos		
			U. Tokuthion		

Notes: \_\_\_\_\_



LDC #: 28634B4U

**VALIDATION FINDINGS WORKSHEET**  
**Compound Quantitation and Reported CRQLs**

Page: 1 of 7  
 Reviewer: FT  
 2nd Reviewer: OR

METHOD: GC  HPLC

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

**Level IV/D Only**

- Y  N  N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
- Y  N  N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	% RPD <u>± 20%</u> Finding <u>≤ 40</u>	Associated Samples	Qualifications
	<u>J</u>	<u>57</u>	<u>4</u>	<u>J/A det 9</u>

Comments: See sample calculation verification worksheet for recalculations

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LDC #: 286 341340

### VALIDATION FINDINGS WORKSHEET

#### Field Duplicates

Reviewer: FT  
2nd reviewer: OR

METHOD: GC  HPLC   
Y N N/A Were field duplicate pairs identified in this SDG?  
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration ( <u>mg/kg</u> )		%RPD Limit <u>/</u>	Qualification Parent only / All Samples
	<u>6</u>	<u>7</u>		
<u>J</u>	<u>0.067</u>	<u>0.12</u>	<u>57</u>	<u>/</u>

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 78634B40  
 SDG #: see work

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1  
 Reviewer: FJ  
 2nd Reviewer: OL

METHOD: GC \_\_\_\_\_ HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C  
 average CF = sum of the CF/number of standards  
 %RSD = 100 \* (S/X)

A = Area of compound,  
 C = Concentration of compound,  
 S = Standard deviation of the CF  
 X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
				CF ( $\sum$ std)	CF ( $\sum$ std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD
1	1CAL A	8/30/12	HMX	97.02	97.02	95.317	95.317	12.665	12.665
			RDX	94.200	94.200	92.52538	92.525	12.565	12.565
2	1CAL A	6/11/12	HMX	61.4400	61.4400	61.49462	61.494	4.575	4.575
			RDX	49.48.00	49.48.00	50.62413	50.624	18.006	18.006
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.







LDC #: 28634 BYU  
 SDG #: see cover

VALIDATION FINDINGS WORKSHEET  
Surrogate Results Verification

Page: 1 of 1  
 Reviewer: FT  
 2nd reviewer: OR

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found  
 SS = Surrogate Spiked

Sample ID: # 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
<u>3,4 Dinitrotoluene</u>	<u>C18</u>	<u>1970</u>	<u>1827</u>	<u>93</u>	<u>93</u>	<u>0</u>

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

Sample ID: \_\_\_\_\_

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	

LDC #: 786 34 BYU  
 SDG #: for cones

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates Results Verification**

Page: 1 of 1  
 Reviewer: F7  
 2nd Reviewer: 52

METHOD: GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

$\% \text{Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$       Where      SSC = Spiked sample concentration      SC = Sample concentration  
 $\text{RPD} = ((\text{SSCMS} - \text{SSCMSD}) * 2) / (\text{SSCMS} + \text{SSCMSD}) * 100$       SA = Spike added      MS = Matrix spike  
 MSD = Matrix spike duplicate

MS/MSD samples: 19 + 20

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	0.995	0.976	ND	0.957	0.951	96	96	98	98	0.62	0.62
2,4,6-Trinitrotoluene (8330)	0.995	0.976	ND	0.766	0.782	77	77	80	80	2.2	2.2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 286 3434  
 SDG #: mu cover

**VALIDATION FINDINGS WORKSHEET**

**Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification**

Page: 1 of 7  
 Reviewer: PS  
 2nd Reviewer: SR

METHOD: GC HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery =  $100 * (SSC - SC) / SA$   
 RPD =  $|LCS - LCSD| * 2 / (LCS + LCSD)$

Where: SSC = Spiked sample concentration  
 SA = Spike added  
 LCS = Laboratory control sample percent recovery

SC = Concentration  
 LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 2210011 LCS

Compound	Spike Added (mg/L)		Spiked Sample Concentration (mg/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	1.0	NA	0.971	NA	97	97				
2,4,6-Trinitrotoluene (8330)	1.0	↓	0.765	↓	77	77	NT			

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28634B4U  
 SDG #: mu sewer

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 1  
 Reviewer: F  
 2nd Reviewer: OR

METHOD: GC  HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?  
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration =  $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

Example:

Sample ID: # 1 Compound Name: 2, 4-Dinitro toluene

- A= Area or height of the compound to be measured
- Fv= Final Volume of extract
- Df= Dilution Factor
- RF= Average response factor of the compound  
in the initial calibration
- Vs= Initial volume of the sample
- Ws= Initial weight of the sample
- %S= Percent Solid

Concentration =  $\frac{883 (40)}{125 (2.03) (1000)}$   
 = 0.14 mg/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: \_\_\_\_\_  
 \_\_\_\_\_

TABLE G-1: DATA QUALITY ASSESSMENT FOR ENERGETICS IN SEDIMENT

Sample			Analytical Method																							
Sample ID No.	Location <sup>1</sup>	Date	Picric Acid	Nitroglycerin	PETN	2-Am-4,6-DNT	4-Am-2,6-DNT	1,3-DNB	2,4-DNT	2,6-DNT	HMX	Nitrobenzene	2-NT	3-NT	4-NT	RDX	Tetryl	1,3,5-TNB	2,4,6-TNT	2,4-Dinitrophenol	Picramic Acid	3-5 Dinitroaniline	2-Nitrophenol	4-Nitrophenol		
Units:			(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	
Analytical Method:			EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	
Range of Reporting Limits (RLs):			0.94-1.0	0.47-0.51	0.47-0.51	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	0.24-0.26	
Project Screening Level <sup>2</sup> :			N/A	6.1	120	150	150	6.1	1.6	61	3800	4.8	2.9	6.1	30	5.6	240	2200	19	120	6.1	N/A	N/A	N/A	N/A	
Eco Tox Number <sup>3</sup> :			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
ORD201S (P)	DMM-31	6-Aug-11	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	1.1	0.25	0.12 <sup>J</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
ORD202S (D)	DMM-31	6-Aug-11	ND <sup>U</sup>	0.94	ND <sup>U</sup>	0.47	ND <sup>U</sup>	0.47	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	1.4	0.24	0.18 <sup>J</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.47
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD217S (P)	WWT-31	6-Aug-11	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
ORD218S (D)	WWT-31	6-Aug-11	ND <sup>U</sup>	0.96	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD223S (P)	CON-43	6-Aug-11	ND <sup>U</sup>	0.96	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
ORD224S (D)	CON-43	6-Aug-11	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD230S (P)	NPS-43	7-Aug-11	ND <sup>U</sup>	0.97	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
ORD231S (D)	NPS-44	7-Aug-11	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.51	ND <sup>U</sup>	0.51	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.26	ND <sup>U</sup>	0.51
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD306S (P)	CON-49	18-Jul-12	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
ORD307S (D)	CON-49	18-Jul-12	ND <sup>U</sup>	0.98	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.49
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD312S (P)	NPS-49	18-Jul-12	ND <sup>U</sup>	0.97	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	0.063 <sup>J</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
ORD313S (D)	NPS-49	18-Jul-12	ND <sup>U</sup>	0.98	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.49	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.49
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD316S (P)	WWT-37	17-Jul-12	ND <sup>U</sup>	0.97	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
ORD317S (D)	WWT-37	17-Jul-12	ND <sup>U</sup>	0.96	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.48	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.24	ND <sup>U</sup>	0.48
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD319S (P)	DMM-52	16-Jul-12	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	0.051 <sup>J</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
ORD322S (D)	DMM-52	16-Jul-12	ND <sup>U</sup>	1.0	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD328S (P)	DMM-58	16-Jul-12	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	0.067 <sup>J</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
ORD329S (D)	DMM-58	16-Jul-12	ND <sup>U</sup>	0.99	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.50	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	0.12 <sup>J</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.25	ND <sup>U</sup>	0.50
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD403S <sup>4</sup> (P)	DMM-76	3-Jun-13	ND	0.98	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	0.60	0.24	0.069 <sup>J</sup>	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49
ORD404S <sup>4</sup> (D)	DMM-76	3-Jun-13	ND	0.97	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	2.1	0.24	0.26	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111.1	116.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD411S <sup>4</sup> (P)	DMM-73	3-Jun-13	ND	0.97	ND	0.48	ND <sup>**</sup>	0.48	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.48
ORD412S <sup>4</sup> (D)	DMM-73	3-Jun-13	ND	0.97	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ORD420S <sup>4</sup> (P)	CON-53	7-Jun-13	ND	0.97	ND	0.49	ND <sup>**</sup>	0.49	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.24	ND	0.49
ORD421S <sup>4</sup> (D)	CON-53	7-Jun-13	ND	0.99	ND	0.50	ND <sup>**</sup>	0.50	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.50
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**NOTES:**  
 PETN = pentaerythritol tetranitrate; Am = amino; DNT = dinitrotoluene; DNB = dinitrobenzene; HMX = high melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); NT = nitrotoluene;  
 RDX = royal demolition explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine); Tetryl = methyl-2,4,6-trinitrophenylamine; TNB = trinitrobenzene; TNT = trinitrotoluene  
<sup>1</sup>Sample locations were designated by the sample field identification (ID) numbers of the first sediment sample collected at a study site.  
<sup>2</sup>Environmental Protection Agency (EPA) Regional Screening Level (RSL) Summary Table June 2011  
<sup>3</sup>National Oceanic and Atmospheric Administration (NOAA's) Office of Response and Restoration (OR&R) Screening Quick Reference Tables (SQUIRTS)  
<sup>4</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.  
 \*\* = Results indicated that laboratory control samples (LCS) or laboratory control sample duplicates (LCS D) exceeded the control limits.  
 (P) = primary sample  
 (D) = duplicate sample

mg/kg-dry = milligrams per kilogram-dry weight  
 N/A = not applicable  
 ND = not detected at or above the method detection limit (MDL)  
 RL = reporting limit  
 RPD = relative percent difference  
<sup>J</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.  
<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.



TABLE G-2: DATA QUALITY ASSESSMENT FOR ENERGETICS IN BIOTA

Sample ID No.	Sample Location	Date	Picric Acid		Nitroglycerin		PETN		2-Am-4,6-DNT		4-Am-2,6-DNT		1,3-DNB		2,4-DNT		2,6-DNT		HMX		Nitrobenzene		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT		2,4-Dinitrophenol		Picramic Acid		3,5-Dinitroaniline		2-Nitrophenol		4-Nitrophenol	
Units:			(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)		
Analytical Method:			EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	EPA 8330	
Project Screening Level <sup>1</sup> :			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
SEAWEED (LIMU)			Range of Reporting Limits:		1.9	1.9	N/A	N/A	0.93-0.97	0.93-0.97	N/A	N/A	0.93-0.97	0.93-0.97	0.93-0.97	N/A	N/A	0.93-0.97	0.93-0.97	0.93-0.97	N/A	N/A	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	N/A	N/A	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97	0.93-0.97				
ORD404L <sup>2</sup>	DMM-82	3-Jun-13	ND	1.9	ND	1.9	--	--	ND	0.93	ND	0.93	--	--	ND	0.93	ND	0.93	ND	0.93	--	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	ND	0.93	
ORD404L DUP <sup>2</sup>	DMM-82	3-Jun-13	ND	1.9	ND	1.9	--	--	ND	0.94	ND	0.94	--	--	ND	0.94	ND	0.94	ND	0.94	--	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	ND	0.94	
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
ORD410L <sup>2</sup>	CON-57	7-Jun-13	ND	1.9	ND	1.9	--	--	ND	0.97	ND	0.97	--	--	ND	0.97	ND	0.97	ND	0.97	--	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	
ORD410L DUP <sup>2</sup>	CON-57	7-Jun-13	ND	1.9	ND	1.9	--	--	ND	0.97	ND	0.97	--	--	ND	0.97	ND	0.97	ND	0.97	--	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	ND	0.97	
RPD			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

NOTES:

PETN = pentaerythritol tetranitrate; Am = amino; DNT = dinitrotoluene; DNB = dinitrobenzene; HMX = high melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); NT = nitrotoluene; RDX = royal demolition explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine); Tetryl = methyl-2,4,6-trinitrophenylnitramine; TNB = trinitrobenzene; TNT = trinitrotoluene

<sup>1</sup>Refer to Ordnance Reef (HI-06) Follow-Up Investigation Final Sample Analysis Plan for project screening levels.

<sup>2</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

\ = Result was qualified by validator as "Do Not Use;" or the result was provided by the analytical laboratory as "ND" or "NR" (not reportable) and was deemed by the validator as not usable ( <sup>R</sup> ).

<sup>R</sup> = According to the case narrative (320-3338-1), for the 2013 limu samples, the 2,4-dinitrophenol results could not be reported by the laboratory due to there being no reportable recoveries in either the laboratory control sample or the matrix spikes. The loss of this analyte is most likely due to the special cleanup procedures utilized in the processing of the limu extracts.

-- = not analyzed

DUP = duplicate sample

mg/kg-wet = milligrams per kilogram-wet weight

N/A = not applicable

ND = not detected at or above the method detection limit (MDL)

RL = reporting limit

RPD = relative percent difference

<sup>R</sup> = Quality control indicates the data is not usable

<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.

TABLE G-3: DATA QUALITY ASSESSMENT FOR ELEMENTS IN SEDIMENT

Sample ID No.	Sample Location <sup>1</sup>	Date	Antimony		Arsenic		Barium		Cadmium		Chromium		Cobalt		Copper		Lead		Nickel		Selenium		Strontium		Thallium		Uranium		Vanadium		Zinc	
			Units:	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)
Analytical Method:			EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020		EPA 6020	
Range of Reporting Limits (RLs):			0.16-6.4		0.29-6.4		0.079-3.2		0.079-3.2		0.16-6.4		0.079-3.2		0.16-6.4		0.079-3.2		0.16-6.4		0.16-6.4		2.0-16.0		0.079-3.2		0.079-3.2		0.79-31.9		0.79-31.9	
Project Screening Level <sup>2</sup> :			N/A		7.24		N/A		N/A		N/A		N/A		18.7		30.2		N/A		N/A		N/A		N/A		N/A		N/A		124	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
ORD201S (P)	DMM-31	6-Aug-11	ND <sup>U</sup>	1.3	1.9	1.3	3.9	0.64	ND <sup>U</sup>	0.64	8.2	1.3	0.58 <sup>J</sup>	0.64	8.5 <sup>J</sup>	1.3	3.1	0.64	ND <sup>U</sup>	6.4	0.87 <sup>J</sup>	1.3	2790	3.2	ND <sup>U</sup>	0.64	0.61 <sup>J</sup>	0.64	3.2 <sup>J</sup>	6.4	18.6 <sup>J</sup>	6.4
ORD202S (D)	DMM-31	6-Aug-11	ND <sup>U</sup>	1.3	1.8	1.3	3.8	0.64	ND <sup>U</sup>	0.64	10.8	1.3	0.61 <sup>J</sup>	0.64	8.3 <sup>J</sup>	1.3	2.2	0.64	ND <sup>U</sup>	6.4	1.0 <sup>J</sup>	1.3	2820	3.2	ND <sup>U</sup>	0.64	0.58 <sup>J</sup>	0.64	4.8 <sup>J</sup>	6.4	14.1 <sup>J</sup>	6.4
RPD			N/A		5.4		2.6		N/A		27.4		5.0		2.4		34.0		N/A		13.9		1.1		N/A		5.0		40.0		27.5	
ORD217S (P)	WWT-31	6-Aug-11	ND <sup>U</sup>	1.3	1.9	1.3	4.6	0.67	ND <sup>U</sup>	0.67	23.6	1.3	3.3	0.67	10.7 <sup>J</sup>	1.3	1.4	0.67	20.1	1.3	1.0 <sup>J</sup>	1.3	3070	3.4	ND <sup>U</sup>	0.67	0.83	0.67	13.0	6.7	7.6 <sup>J</sup>	6.7
ORD218S (D)	WWT-31	6-Aug-11	ND <sup>U</sup>	1.3	3.0	1.3	4.6	0.66	ND <sup>U</sup>	0.66	21.1	1.3	2.3	0.66	5.0 <sup>J</sup>	1.3	1.9	0.66	9.0	1.3	1.1 <sup>J</sup>	1.3	3310	3.3	ND <sup>U</sup>	0.66	0.92	0.66	12.0	6.6	7.2 <sup>J</sup>	6.6
RPD			N/A		44.9		0.0		N/A		11.2		35.7		72.6		30.3		76.3		9.5		7.5		N/A		10.3		8.0		5.4	
ORD223S (P)	CON-43	6-Aug-11	ND <sup>U</sup>	1.4	<b>17.8</b>	1.4	6.5	0.71	ND <sup>U</sup>	0.71	30.3 <sup>J</sup>	1.4	6.6	0.71	7.4 <sup>J</sup>	1.4	4.6 <sup>J</sup>	0.71	30.8 <sup>J</sup>	1.4	1.7	1.4	3470	3.6	ND <sup>UJ</sup>	0.71	0.80 <sup>J</sup>	0.71	41.5 <sup>J</sup>	7.1	15.4 <sup>J</sup>	7.1
ORD224S (D)	CON-43	6-Aug-11	ND <sup>U</sup>	1.5	<b>17.0</b>	1.5	6.7	0.75	ND <sup>U</sup>	0.75	32.4 <sup>J</sup>	1.5	6.6	0.75	7.2 <sup>J</sup>	1.5	4.8 <sup>J</sup>	0.75	32.2 <sup>J</sup>	1.5	1.8	1.5	3290	3.7	ND <sup>UJ</sup>	0.75	0.79 <sup>J</sup>	0.75	40.3 <sup>J</sup>	7.5	16.2 <sup>J</sup>	7.5
RPD			N/A		4.6		3.0		N/A		6.7		0.0		2.7		4.3		4.4		5.7		5.3		N/A		1.3		2.9		5.1	
ORD230S (P)	NPS-43	7-Aug-11	ND <sup>U</sup>	1.4	3.6	1.4	5.1	0.72	ND <sup>U</sup>	0.72	13.0 <sup>J</sup>	1.4	1.4	0.72	1.5 <sup>J</sup>	1.4	3.2 <sup>J</sup>	0.72	ND <sup>U</sup>	1.4	1.0 <sup>J</sup>	1.4	3610	3.6	ND <sup>UJ</sup>	0.72	0.88 <sup>J</sup>	0.72	10.4 <sup>J</sup>	7.2	8.8 <sup>J</sup>	7.2
ORD231S (D)	NPS-44	7-Aug-11	ND <sup>U</sup>	1.5	3.3	1.5	7.7	0.73	ND <sup>U</sup>	0.73	13.2 <sup>J</sup>	1.5	1.8	0.73	1.5 <sup>J</sup>	1.5	3.8 <sup>J</sup>	0.73	1.1 <sup>J</sup>	1.5	1.3 <sup>J</sup>	1.5	3460	3.6	ND <sup>UJ</sup>	0.73	0.84 <sup>J</sup>	0.73	10.6 <sup>J</sup>	7.3	5.1 <sup>J</sup>	7.3
RPD			N/A		8.7		40.6		N/A		1.5		25.0		0.0		17.1		200		26.1		4.2		N/A		4.7		1.9		53.2	
ORD306S (P)	CON-49	18-Jul-12	ND <sup>UJ</sup>	6.0	<b>19.9</b>	6.0	6.6	3.0	ND <sup>U</sup>	3.0	23.3	6.0	6.8	3.0	6.5 <sup>J</sup>	6.0	4.3	3.0	40.9	6.0	ND <sup>U</sup>	6.0	2790	14.9	ND <sup>U</sup>	3.0	1.2 <sup>J</sup>	3.0	32.3	29.8	21.4 <sup>J</sup>	29.8
ORD307S (D)	CON-49	18-Jul-12	ND <sup>UJ</sup>	6.4	<b>16.7</b>	6.4	5.9	3.2	ND <sup>U</sup>	3.2	26.4	6.4	6.3	3.2	7.1 <sup>J</sup>	6.4	5.5	3.2	35.3	6.4	ND <sup>U</sup>	6.4	2680	16.0	ND <sup>U</sup>	3.2	1.1 <sup>J</sup>	3.2	30.0 <sup>J</sup>	31.9	ND <sup>U</sup>	31.9
RPD			N/A		17.5		11.2		N/A		12.5		7.6		8.8		24.5		14.7		N/A		4.0		N/A		8.7		7.4		200	
ORD306S-2 <sup>3</sup> (P)	CON-49	18-Jul-12	ND <sup>H</sup>	1.0	<b>20<sup>H</sup></b>	1.0	7.0 <sup>H</sup>	0.52	0.50 <sup>JH</sup>	0.52	29 <sup>H</sup>	1.0	7.1 <sup>H</sup>	0.52	6.3 <sup>H</sup>	1.0	4.2 <sup>H</sup>	0.52	39 <sup>H</sup>	1.0	1.1 <sup>H</sup>	1.0	2800 <sup>H</sup>	2.6	ND <sup>H</sup>	0.52	1.3 <sup>H</sup>	0.52	38 <sup>H</sup>	5.2	20 <sup>H</sup>	5.2
ORD307S-2 <sup>3</sup> (D)	CON-49	18-Jul-12	ND <sup>H</sup>	1.0	<b>17<sup>H</sup></b>	1.0	7.1 <sup>H</sup>	0.52	0.52 <sup>H</sup>	0.52	28 <sup>H</sup>	1.0	6.0 <sup>H</sup>	0.52	6.6 <sup>H</sup>	1.0	4.9 <sup>H</sup>	0.52	30 <sup>H</sup>	1.0	0.80 <sup>JH</sup>	1.0	2700 <sup>H</sup>	2.6	ND <sup>H</sup>	0.52	1.3 <sup>H</sup>	0.52	35 <sup>H</sup>	5.2	17 <sup>H</sup>	5.2
RPD			N/A		16.2		1.4		3.9		3.5		16.8		4.7		15.4		26.1		31.6		3.6		N/A		0.0		8.2		16.2	
ORD312S (P)	NPS-49	18-Jul-12	ND <sup>U</sup>	5.9	ND <sup>U</sup>	0.29	3.7	2.9	ND <sup>U</sup>	2.9	7.3	5.9	1.3 <sup>J</sup>	2.9	3.2 <sup>J</sup>	5.9	2.8 <sup>J</sup>	2.9	5.7 <sup>J</sup>	5.9	ND <sup>U</sup>	5.9	2450	14.6	ND <sup>U</sup>	2.9	0.88 <sup>J</sup>	2.9	ND <sup>U</sup>	29.3	ND <sup>UJ</sup>	29.3
ORD313S (D)	NPS-49	18-Jul-12	ND <sup>U</sup>	6.0	ND <sup>U</sup>	6.0	3.7	3.0	ND <sup>U</sup>	3.0	7.6	6.0	1.5 <sup>J</sup>	3.0	3.5 <sup>J</sup>	6.0	2.1 <sup>J</sup>	3.0	6.8 <sup>J</sup>	6.0	ND <sup>U</sup>	6.0	2510	15.0	ND <sup>U</sup>	3.0	0.97 <sup>J</sup>	3.0	ND <sup>U</sup>	29.9	ND <sup>UJ</sup>	29.9
RPD			N/A		N/A		0.0		N/A		4.0		14.3		9.0		28.6		17.6		N/A		2.4		N/A		9.7		N/A		N/A	
ORD312S-2 <sup>3</sup> (P)	NPS-49	18-Jul-12	ND <sup>H</sup>	1.0	3.1 <sup>H</sup>	1.0	3.9 <sup>H</sup>	0.50	ND <sup>H</sup>	0.50	8.1 <sup>H</sup>	1.0	1.1 <sup>H</sup>	0.50	3.5 <sup>H</sup>	1.0	2.9 <sup>H</sup>	0.50	ND <sup>H</sup>	1.0	1.2 <sup>H</sup>	1.0	2000 <sup>H</sup>	2.5	ND <sup>H</sup>	0.50	0.93 <sup>H</sup>	0.50	5.6 <sup>H</sup>	5.0	11 <sup>H</sup>	5.0
ORD313S-2 <sup>3</sup> (D)	NPS-49	18-Jul-12	ND <sup>H</sup>	1.0	3.2 <sup>H</sup>	1.0	4.0 <sup>H</sup>	0.51	ND <sup>H</sup>	0.51	9.9 <sup>H</sup>	1.0	1.3 <sup>H</sup>	0.51	3.8 <sup>H</sup>	1.0	2.3 <sup>H</sup>	0.51	2.4 <sup>H</sup>	1.0	1.3 <sup>H</sup>	1.0	2000 <sup>H</sup>	2.6	ND <sup>H</sup>	0.51	0.94 <sup>H</sup>	0.51	6.3 <sup>H</sup>	5.1	12 <sup>H</sup>	5.1
RPD			N/A		3.2		2.5		N/A		20.0		16.7		8.2		23.1		200		8.0		0.0		N/A		1.1		11.8		8.7	
ORD316S (P)	WWT-37	17-Jul-12	ND <sup>U</sup>	5.7	4.9 <sup>J</sup>	5.7	5.3	2.9	ND <sup>U</sup>	2.9	15.9	5.7	3.7	2.9	7.1 <sup>J</sup>	5.7	4.5	2.9	24.4 <sup>J</sup>	5.7	ND <sup>U</sup>	5.7	2590	14.4	ND <sup>U</sup>	2.9	1.2 <sup>J</sup>	2.9	19.2 <sup>J</sup>	28.7	ND <sup>UJ</sup>	28.7
ORD317S (D)	WWT-37	17-Jul-12	ND <sup>U</sup>	5.8	4.5 <sup>J</sup>	5.8	5.1	2.9	ND <sup>U</sup>	2.9	14.8	5.8	3.6	2.9	6.8 <sup>J</sup>	5.8	5.0	2.9	22.5 <sup>J</sup>	5.8	ND <sup>UJ</sup>	5.8	2540	14.5	ND <sup>U</sup>	2.9	1.1 <sup>J</sup>	2.9	16.4 <sup>J</sup>	29.0	ND <sup>UJ</sup>	29.0
RPD			N/A		8.5		3.8		N/A		7.2		2.7		4.3		10.5		8.1		N/A		1.9		N/A		8.7		15.7		N/A	
ORD316S-2 <sup>3</sup> (P)	WWT-37	17-Jul-12	ND <sup>H</sup>	0.95	4.5 <sup>H</sup>	0.95	5.2 <sup>H</sup>	0.48	ND <sup>H</sup>	0.48	18 <sup>H</sup>	0.95	3.4 <sup>H</sup>	0.48	7.8 <sup>H</sup>	0.95	3.2 <sup>H</sup>	0.48	19 <sup>H</sup>	0.95	ND <sup>H</sup>	0.95	2500 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	1.2 <sup>H</sup>	0.48	13 <sup>H</sup>	4.8	8.7 <sup>H</sup>	4.8
ORD317S-2 <sup>3</sup> (D)	WWT-37	17-Jul-12	ND <sup>H</sup>	0.96	3.8 <sup>H</sup>	0.96	5.7 <sup>H</sup>	0.48	0.25 <sup>JH</sup>	0.48	18 <sup>H</sup>	0.96	3.6 <sup>H</sup>	0.48	4.9 <sup>H</sup>	0.96	4.4 <sup>H</sup>	0.48	14 <sup>H</sup>	0.96	0.51 <sup>JH</sup>	0.96	2600 <sup>H</sup>	2.4	ND <sup>H</sup>	0.48	1.3 <sup>H</sup>	0.48	22 <sup>H</sup>	4.8	11 <sup>H</sup>	4.8
RPD			N/A		16.9		9.2		200		0.0		5.7		45.7		31.6		30.3		200		3.9		N/A		8.0		51.4		23.4	
ORD319S (P)	DMM-52	16-Jul-12	ND <sup>U</sup>	6.0	ND <sup>U</sup>	6.0	3.5	3.0	ND <sup>U</sup>	3.0	9.0	6.0	1.1 <sup>J</sup>	3.0	7.0 <sup>J</sup>	6.0	4.0	3.0	4.6 <sup>J</sup>	6.0	ND <sup>U</sup>	6.0	2080	15.0	ND <sup>U</sup>	3.0	0.76 <sup>J</sup>	3.0	ND <sup>U</sup>	30.0	ND <sup>UJ</sup>	30.0
ORD322S (D)	DMM-52	16-Jul-12	ND <sup>U</sup>	6.2	ND <sup>U</sup>	6.2	3.8	3.1	ND <sup>U</sup>	3.1	10	6.2	1.1 <sup>J</sup>	3.1	7.0 <sup>J</sup>	6.2	5.1	3.1	7.5 <sup>J</sup>	6.2	ND <sup>U</sup>	6.2	2120	15.4	ND <sup>U</sup>	3.1	0.79 <sup>J</sup>	3.1	ND <sup>U</sup>	30.8	ND <sup>UJ</sup>	30.8
RPD			N/A		N/A		8.2		N/A		10.5		0.0		0.0		24.2		47.9		N/A		1.9		N/A		3.9		N/A			



TABLE G-3: DATA QUALITY ASSESSMENT FOR ELEMENTS IN SEDIMENT

Sample ID No.	Sample Location <sup>1</sup>	Date	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc															
			Units:	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)	(mg/kg-dry)															
			Analytical Method:	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020															
			Range of Reporting Limits (RLs):	0.16-6.4	0.29-6.4	0.079-3.2	0.079-3.2	0.16-6.4	0.079-3.2	0.16-6.4	0.079-3.2	0.16-6.4	2.0-16.0	0.079-3.2	0.079-3.2	0.79-31.9	0.79-31.9															
			Project Screening Level <sup>2</sup> :	N/A	7.24	N/A	N/A	N/A	18.7	30.2	N/A	N/A	N/A	N/A	N/A	N/A	124															
ORD403S <sup>5</sup> (P)	DMM-76	3-Jun-13	0.095 <sup>J</sup>	0.17	1.9	0.85	4.4	0.085	0.096	0.085	12	0.17	1.5	0.085	7.2	0.17	3.7	0.085	15	0.17	1.9	0.17	2400	2.1	ND	0.085	0.87	0.085	7.3	0.85	22	0.85
ORD404S <sup>5</sup> (D)	DMM-76	3-Jun-13	0.11 <sup>J</sup>	0.16	1.3	0.80	4.4	0.080	0.089	0.080	14	0.16	1.6	0.080	11	0.16	3.5	0.080	16	0.16	1.8	0.16	2500	2.0	ND	0.080	0.96	0.080	7.6	0.80	16	0.80
RPD			14.6	37.5	0.0	7.6	15.4	6.5	41.8	5.6	6.5	5.4	4.1	N/A	9.8	4.0	31.6															
ORD411S <sup>5</sup> (P)	DMM-73	3-Jun-13	0.27	0.18	2.8	0.92	4.3	0.092	0.10	0.092	13	0.18	1.2	0.092	<b>320</b>	0.18	<b>450</b>	0.092	9.2	0.18	1.3	0.18	2500	2.3	ND	0.092	1.1	0.092	9.1	0.92	47	0.92
ORD412S <sup>5</sup> (D)	DMM-73	3-Jun-13	0.10 <sup>J</sup>	0.17	2.5	0.86	6.0	0.086	0.095	0.086	12	0.86	0.96	0.43	<b>390</b>	0.86	5.1	0.086	7.4	0.86	0.68 <sup>J</sup>	0.86	2500	2.1	ND	0.086	1.2	0.086	7.1	4.3	55	4.3
RPD			91.9	11.3	33.0	5.1	8.0	22.2	19.7	195.5	21.7	62.6	0.0	N/A	8.7	24.7	15.7															
ORD420S <sup>5</sup> (P)	CON-53	7-Jun-13	0.093 <sup>J</sup>	0.16	ND	0.79	3.5	0.079	0.11	0.079	6.9	0.16	1.4	0.079	1.5	0.16	1.5	0.079	11	0.16	1.4	0.16	2500	2.0	ND	0.079	0.69	0.079	5.3	0.79	3.2	0.79
ORD421S <sup>5</sup> (D)	CON-53	7-Jun-13	ND	0.19	ND	0.93	3.6	0.093	0.12	0.093	6.5	0.19	1.3	0.093	1.6	0.19	1.2	0.093	9.6	0.19	1.2	0.19	2400	2.3	ND	0.093	0.70	0.093	6.0	0.93	3.2	0.93
RPD			200	N/A	2.8	8.7	6.0	7.4	6.5	22.2	13.6	15.4	4.1	N/A	1.4	12.4	0.0															

NOTES:

<sup>1</sup>Sample locations were designated by the sample field identification (ID) number of the first sediment sample collected at a location.

<sup>2</sup>Project Sediment Screening Level. Only chemicals of potential concern (COPCs) (i.e., arsenic, copper, lead, and zinc) were examined.

<sup>3</sup>Re-reported/re-do results. Samples ORD306S-2, ORD307S-2, ORD312S-2, ORD313S-2, ORD316S-2, ORD317S-2, ORD319S-2, and ORD322S-2 were originally analyzed and reported under TestAmerica project G2G240418.

The results in G2G240418 were reported from 20X dilutions. In order to meet the program requirements, a second aliquot of all samples analyzed in the original report was provided to the laboratory. These aliquots were digested, analyzed, and reported from a 5X dilution. Samples ORD328S and ORD329S were initially reported from a 20X dilution in the analytical laboratory (TestAmerica) project G2G260422. In order to meet the program requirements, the data was re-reported by the laboratory from a 5X dilution that was also acquired at the time of analysis (320-2258-1). Data has not been validated by a third-party data validator.

The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

<sup>4</sup>For sample ORD317S, the laboratory estimated detection of selenium (3.4 mg/kg-dry) was qualified by the validator as "U" due to method blank contamination. For consistency, the result is presented in this table as "ND."

<sup>5</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

**bold** = result is above the project screening level

(D) = duplicate sample

(P) = primary sample

mg/kg-dry = milligrams per kilogram-dry weight

N/A = not applicable

ND = not detected at or above the method detection limit (MDL)

RPD = relative percent difference

<sup>H</sup> = Sample was prepped or analyzed beyond the specified holding time

<sup>J</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.

<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.

<sup>UJ</sup> = The analytical result is qualified as not detected, but the MDL is an estimated value.

TABLE G-4: DATA QUALITY ASSESSMENT FOR ELEMENTS IN BIOTA

Sample ID No.	Sample Location	Date	Antimony	Arsenic Total	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc	
			Units:	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	
			Analytical Method:	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	
			Project Screening Level:	0.2	0.00327	34.4	0.25	1.47	9.83	0.17	1.5	9.83	2.457	N/A	0.032	N/A	0.492	2.8
<b>OCTOPUS (HE'E)</b>																		
			<b>Range of Reporting Limits:</b>	0.20	0.20	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.50	0.10	0.50	1.0	1.0	
ORD3020	CON-46	17-Jul-12	ND <sup>U</sup> 0.20	<b>24.6</b> 0.20	0.15 0.10	ND <sup>U</sup> 0.10	0.58 0.20	ND <sup>U</sup> 0.10	<b>6.3</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.19 <sup>J</sup> 0.20	3.3 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>12.8</b> 1.0	
ORD3020 DUP	CON-46	17-Jul-12	ND <sup>U</sup> 0.20	<b>23.3</b> 0.20	0.17 0.10	ND <sup>U</sup> 0.10	0.63 0.20	ND <sup>U</sup> 0.10	<b>5.5</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.19 <sup>J</sup> 0.20	3.1 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>12.6</b> 1.0	
RPD			N/A	5.4	12.5	N/A	8.3	N/A	13.6	N/A	N/A	0.0	6.3	N/A	N/A	N/A	1.6	
ORD3150	DMM-64	16-Jul-12	ND <sup>U</sup> 0.20	<b>21.4</b> 0.20	0.099 <sup>J</sup> 0.10	ND <sup>U</sup> 0.10	0.74 0.20	ND <sup>U</sup> 0.10	<b>4.5</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.10 <sup>J</sup> 0.20	4.1 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>12.1</b> 1.0	
ORD3150 DUP	DMM-64	16-Jul-12	ND <sup>U</sup> 0.20	<b>22.7</b> 0.20	0.14 0.10	ND <sup>U</sup> 0.10	0.72 0.20	ND <sup>U</sup> 0.10	<b>7.5</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.15 <sup>J</sup> 0.20	4.3 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>12.9</b> 1.0	
RPD			N/A	5.9	34.3	N/A	2.7	N/A	50.0	N/A	N/A	40.0	4.8	N/A	N/A	N/A	6.4	
<b>FISH (WEKE)</b>																		
			<b>Range of Reporting Limits:</b>	0.20	0.20	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.50	0.10	0.50	1.0	1.0	
ORD303F	CON	18-Jul-12	ND <sup>U</sup> 0.20	<b>10.5</b> 0.20	0.11 0.10	ND <sup>U</sup> 0.10	0.66 0.20	ND <sup>U</sup> 0.10	<b>0.23</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.15 <sup>J</sup> 0.20	1.5 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>4.2</b> 1.0	
ORD303F DUP	CON	18-Jul-12	ND <sup>U</sup> 0.20	<b>10.4</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.10	0.68 0.20	ND <sup>U</sup> 0.10	<b>0.23</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.14 <sup>J</sup> 0.20	0.38 <sup>J</sup> 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>4.0</b> 1.0	
RPD			N/A	1.0	200	N/A	3.0	N/A	0.0	N/A	N/A	6.9	119.1	N/A	N/A	N/A	4.9	
ORD327F	DMM	19-Jul-12	ND <sup>U</sup> 0.20	<b>16.1</b> 0.20	0.11 0.10	ND <sup>U</sup> 0.10	0.60 0.20	ND <sup>U</sup> 0.10	<b>0.28</b> 0.20	0.095 <sup>J</sup> 0.10	ND <sup>U</sup> 0.20	0.22 0.20	3.9 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>11.5</b> 1.0	
ORD327F DUP	DMM	19-Jul-12	ND <sup>U</sup> 0.20	<b>17.8</b> 0.20	0.12 0.10	ND <sup>U</sup> 0.10	0.70 0.20	ND <sup>U</sup> 0.10	<b>0.29</b> 0.20	0.15 0.10	ND <sup>U</sup> 0.20	0.21 0.20	4.0 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>6.5</b> 1.0	
RPD			N/A	10.0	8.7	N/A	15.4	N/A	3.5	44.9	N/A	4.7	2.5	N/A	N/A	N/A	55.6	
<b>CRAB</b>																		
			<b>Range of Reporting Limits:</b>	0.20	0.20	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.50	0.10	0.50	1.0	1.0	
ORD307C	DMM	31-Jul-12	ND <sup>U</sup> 0.20	<b>57.0</b> 0.20	0.14 0.10	0.060 <sup>J</sup> 0.10	0.66 0.20	0.018 <sup>J</sup> 0.10	<b>9.8</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.39 0.20	16.5 <sup>J</sup> 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>52.5</b> <sup>J</sup> 1.0	
ORD307C DUP	DMM	31-Jul-12	ND <sup>U</sup> 0.20	<b>59.4</b> 0.20	0.12 0.10	0.067 <sup>J</sup> 0.10	0.64 0.20	0.018 <sup>J</sup> 0.10	<b>10.2</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.43 0.20	14.4 <sup>J</sup> 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>50.9</b> <sup>J</sup> 1.0	
RPD			N/A	4.1	15.4	11.0	3.1	0.0	4.0	N/A	N/A	9.8	13.6	N/A	N/A	N/A	3.1	
ORD311C	CON	2-Aug-12	ND <sup>U</sup> 0.20	<b>64.9</b> 0.20	0.16 0.10	ND <sup>U</sup> 0.10	0.64 0.20	0.031 <sup>J</sup> 0.10	<b>8.6</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.81 0.20	12.7 <sup>J</sup> 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>47.0</b> <sup>J</sup> 1.0	
ORD311C DUP	CON	2-Aug-12	ND <sup>U</sup> 0.20	<b>66.6</b> 0.20	0.11 0.10	0.066 <sup>J</sup> 0.10	0.68 0.20	0.048 <sup>J</sup> 0.10	<b>10.5</b> 0.20	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.20	0.95 0.20	5.7 <sup>J</sup> 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	ND <sup>U</sup> 1.0	<b>52.6</b> <sup>J</sup> 1.0	
RPD			N/A	2.6	37.0	200	6.1	43.0	19.9	N/A	N/A	15.9	76.1	N/A	N/A	N/A	11.2	
<b>SEAWEED (LIMU)</b>																		
			<b>Range of Reporting Limits:</b>	0.20	0.20	0.10	0.10	0.20	0.10	0.20	0.10	0.20	0.30	0.50	0.10	0.50	1.0	1.0
ORD301L	CON-46	17-Jul-12	ND <sup>U</sup> 0.20	<b>0.86</b> 0.20	1.0 0.10	ND <sup>U</sup> 0.10	0.84 0.20	0.13 0.10	<b>0.48</b> 0.20	0.26 0.10	0.80 0.20	ND <sup>U</sup> 0.30	76.5 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	<b>1.9</b> 1.0	2.7 1.0	
ORD301L DUP	CON-46	17-Jul-12	ND <sup>U</sup> 0.20	<b>0.75</b> 0.20	0.99 0.10	ND <sup>U</sup> 0.10	0.87 0.20	0.14 0.10	<b>0.50</b> 0.20	0.29 0.10	1.0 0.20	ND <sup>U</sup> 0.30	79.0 0.50	ND <sup>U</sup> 0.10	ND <sup>U</sup> 0.50	<b>2.0</b> 1.0	1.2 1.0	
RPD			N/A	13.7	1.0	N/A	3.5	7.4	4.1	10.9	22.2	N/A	3.2	N/A	N/A	5.1	76.9	
ORD306L	DMM-52	16-Jul-12	ND <sup>U</sup> 0.20	<b>1.0</b> 0.20	1.2 0.10	ND <sup>U</sup> 0.10	0.95 0.20	0.11 0.10	<b>1.2</b> 0.20	0.55 0.10	1.6 0.20	ND <sup>U</sup> 0.30	343 0.50	ND <sup>U</sup> 0.10	0.16 <sup>J</sup> 0.50	<b>1.8</b> 1.0	1.9 1.0	
ORD306L DUP	DMM-52	16-Jul-12	ND <sup>U</sup> 0.20	<b>1.1</b> 0.20	1.4 0.10	ND <sup>U</sup> 0.10	1.0 0.20	0.13 0.10	<b>1.2</b> 0.20	0.55 0.10	1.7 0.20	ND <sup>U</sup> 0.30	298 0.50	ND <sup>U</sup> 0.10	0.13 <sup>J</sup> 0.50	<b>1.7</b> 1.0	1.9 1.0	
RPD			N/A	9.5	15.4	N/A	5.1	16.7	0.0	0.0	6.1	N/A	14.0	N/A	20.7	5.7	0.0	
<b>OCTOPUS (HE'E)</b>																		
			<b>Range of Reporting Limits:</b>	0.19-0.20	0.19-0.20	0.096-0.10	0.096-0.10	0.19-0.20	0.096-0.10	0.19-0.20	0.096-0.10	0.19-0.20	0.19-0.20	0.48-0.51	0.096-0.10	0.48-0.51	0.95-1.0	0.96-1.0
ORD4020 <sup>1</sup>	DMM-76	3-Jun-13	ND 0.19	<b>23</b> 0.19	ND 0.096	ND 0.096	0.49 0.19	ND 0.096	<b>5.6</b> 0.19	ND 0.096	ND 0.19	0.16 <sup>J</sup> 0.19	4.0 0.48	ND 0.096	ND 0.48	ND 0.96	<b>11</b> 0.96	
ORD4020 <sup>1</sup> DUP	DMM-76	3-Jun-13	ND 0.20	<b>24.3</b> 0.20	ND 0.10	ND 0.10	0.597 0.20	ND 0.10	<b>6.56</b> 0.20	ND 0.10	0.104 <sup>J</sup> 0.20	0.179 <sup>J</sup> 0.20	4.26 0.51	ND 0.10	ND 0.51	ND 1.0	<b>11.3</b> 1.0	
RPD			N/A	5.5	N/A	N/A	19.7	N/A	15.8	N/A	200	11.2	6.3	N/A	N/A	N/A	2.7	
ORD4070 <sup>1</sup>	CON-53	7-Jun-13	ND 0.20	<b>19</b> 0.20	ND 0.10	ND 0.10	0.78 0.20	0.010 <sup>J</sup> 0.10	<b>9.3</b> 0.20	ND 0.10	0.19 <sup>J</sup> 0.20	ND 0.20	4.1 0.51	ND 0.10	ND 0.51	ND 1.0	<b>12</b> 1.0	
ORD4070 <sup>1</sup> DUP	CON-53	7-Jun-13	ND 0.20	<b>18.9</b> 0.20	ND 0.10	ND 0.099	0.624 0.20	ND 0.099	<b>8.17</b> 0.2	ND 0.099	ND 0.20	0.185 <sup>J</sup> 0.2	4.03 0.50	ND 0.099	ND 0.50	ND 0.99	<b>13.6</b> 0.99	
RPD			N/A	0.5	N/A	N/A	22.2	200	12.9	N/A	200	200	1.7	N/A	N/A	N/A	12.5	
<b>FISH (WEKE)</b>																		
			<b>Range of Reporting Limits:</b>	0.19-0.21	0.19-0.21	0.095-0.10	0.095-0.10	0.19-0.21	0.095-0.10	0.19-0.21	0.095-0.10	0.19-0.21	0.19-0.21	0.48-0.52	0.095-0.10	0.48-0.52	0.95-1.0	0.95-1.0
ORD405F <sup>1</sup>	CON	11-Jun-13	ND 0.20	<b>7.3</b> 0.20	0.094 <sup>J</sup> 0.10	ND 0.10	0.54 0.20	ND 0.10	<b>0.32</b> 0.20	ND 0.10	ND 0.20	ND 0.20	12 0.51	ND 0.10	ND 0.51	ND 1.0	<b>12</b> 1.0	
ORD405F <sup>1</sup> DUP	CON	11-Jun-13	ND 0.19	<b>7.19</b> 0.19	ND 0.096	ND 0.096	0.461 0.19	ND 0.096	<b>0.241</b> 0.19	ND 0.096	ND 0.19	ND 0.19	1.19 0.48	ND 0.096	ND 0.48	ND 0.96	<b>6.56</b> 0.96	
RPD			N/A	1.5	200	N/A	15.8	N/A	28.2	N/A	N/A	N/A	163.9	N/A	N/A	N/A	58.6	
ORD415F <sup>1</sup>	CON	11-Jun-13	ND 0.20	<b>13</b> 0.20	ND 0.098	ND 0.098	0.49 0.20	ND 0.098	<b>0.60</b> 0.20	ND 0.098	ND 0.20	0.35 0.20	0.41 <sup>J</sup> 0.49	ND 0.098	ND 0.49	ND 0.98	<b>6.9</b> 0.98	
ORD415F <sup>1</sup> DUP	CON	11-Jun-13	ND 0.19	<b>13.1</b> 0.19	ND 0.095	ND 0.095	0.523 0.19	0.0107 <sup>J</sup> 0.095	<b>0.728</b> 0.19	ND 0.095	ND 0.19	0.322 0.19	0.817 0.48	ND 0.095	ND 0.48	ND 0.95	<b>6.63</b> 0.95	
RPD			N/A	0.8	N/A	N/A	6.5	200	19.3	N/A	N/A	8.3	66.3	N/A	N/A	N/A	4.0	
ORD429F <sup>1</sup>	DMM	19-Jun-13	ND 0.20	<b>9.7</b> 0.20	ND 0.10	ND 0.10	0.59 0.20	ND 0.10	<b>0.39</b> 0.20	ND 0.10	ND 0.20	0.12 <sup>J</sup> 0.20	1.2 0.50	ND 0.10	ND 0.50	ND 1.0	<b>6.0</b> 1.0	
ORD429F <sup>1</sup> DUP	DMM	19-Jun-13	ND 0.21	<b>9.79</b> 0.21	ND 0.10	ND 0.10	0.599 0.21	ND 0.10	<b>0.420</b> 0.21	ND 0.10	ND 0.21	ND 0.21	0.772 0.52	ND 0.10	ND 0.52	ND 1.0	<b>5.76</b> 1.0	
RPD			N/A	0.9	N/A	N/A	1.5	N/A	7.4	N/A	N/A	200	43.4	N/A	N/A	N/A	4.1	
ORD433F <sup>1</sup>	DMM	19-Jun-13	ND 0.20	<b>21</b> 0.20	ND 0.098	ND 0.098	0.68 0.20	ND 0.098	<b>0.53</b> 0.20	ND 0.098	ND 0.20	0.39 0.20	0.73 0.49	ND 0.098	ND 0.49	ND 0.98	<b>9.9</b> 0.98	
ORD433F <sup>1</sup> DUP	DMM	19-Jun-13	ND 0.19	<b>19.6</b> 0.19	ND 0.097	ND 0.097	0.553 0.19	ND 0.097	<b>0.500</b> 0.19	0.0668 <sup>J</sup> 0.097	ND 0.19	0.335 0.19	3.43 0.49	ND 0.097	ND 0.49	ND 0.97	<b>19.2</b> 0.97	
RPD			N/A	6.9	N/A	N/A	20.6	N/A	5.8	200	N/A	15.2	129.8	N/A	N/A	N/A	63.9	

TABLE G-4: DATA QUALITY ASSESSMENT FOR ELEMENTS IN BIOTA

Sample ID No.	Sample Location	Date	Antimony	Arsenic Total	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Strontium	Thallium	Uranium	Vanadium	Zinc															
			Units:	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)	(mg/kg-wet)															
Analytical Method:			EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020	EPA 6020															
Project Screening Level:			0.2	0.00327	34.4	0.25	1.47	9.83	0.17	1.5	9.83	2.457	N/A	0.032	N/A	0.492	2.8															
<b>SEAWEED (LIMU)</b>																																
Range of Reporting Limits:			0.20	0.20	0.099-0.10	0.099-0.10	0.20	0.099-0.10	0.20	0.099-1.0	0.20	0.20	0.50-0.51	0.099-0.10	0.50-0.51	0.99-1.0	0.99-1.0															
ORD404L <sup>1</sup>	DMM-82	3-Jun-13	ND	0.20	<b>0.89</b>	0.20	0.87	0.099	ND	0.099	0.90	0.20	0.068 <sup>J</sup>	0.099	<b>0.68</b>	0.20	0.45	0.099	0.41	0.20	0.20	0.20	180	0.50	ND	0.099	ND	0.50	<b>3.6</b>	0.99	2.3	0.99
ORD404L <sup>1</sup> DUP	DMM-82	3-Jun-13	ND	0.20	<b>0.930</b>	0.20	1.36	0.10	ND	0.10	0.982	0.20	0.0747 <sup>J</sup>	0.10	<b>0.738</b>	0.20	0.427	0.10	0.461	0.20	0.141 <sup>J</sup>	0.20	198	0.50	ND	0.10	ND	0.50	<b>3.72</b>	1.0	2.36	1.0
RPD			N/A		4.4		43.9		N/A		8.7		9.4		8.2		5.2		11.7		34.6		9.5		N/A		N/A		3.3		2.6	
ORD410L <sup>1</sup>	CON-57	7-Jun-13	ND	0.20	<b>2.7</b>	0.20	1.4	0.099	0.059 <sup>J</sup>	0.099	<b>4.0</b>	0.20	0.80	0.10	<b>0.87</b>	0.20	0.81	0.099	6.3	0.20	0.19 <sup>J</sup>	0.20	350	0.50	ND	0.099	0.16 <sup>J</sup>	0.50	<b>5.0</b>	0.99	<b>4.1</b>	0.99
ORD410L <sup>1</sup> DUP	CON-57	7-Jun-13	ND	0.20	<b>2.63</b>	0.20	1.63	0.10	0.0624 <sup>J</sup>	0.10	<b>3.94</b>	0.20	0.971	0.10	<b>0.807</b>	0.20	0.804	1.0	7.52	0.20	0.228	0.20	472	0.51	ND	0.10	0.181 <sup>J</sup>	0.51	<b>5.28</b>	1.0	<b>3.08</b>	1.0
RPD			N/A		2.6		15.2		5.6		1.5		19.3		7.5		0.7		17.7		18.2		29.7		N/A		12.3		5.4		28.4	

**NOTES:**

<sup>1</sup>Refer to Ordinance Reef (HI-06) Follow-Up Investigation Final Sample Analysis Plan for project screening levels.

<sup>2</sup>Results from the 2013 sampling event were not validated by a third-party data validator. The corresponding qualifiers come from the laboratory (TestAmerica) rather than the validator.

DUP = duplicate sample

mg/kg-wet = milligrams per kilogram-wet weight

N/A = not applicable

ND = not detected at or above the method detection limit (MDL)

RPD = relative percent difference

RL = reporting limit

<sup>J</sup> = Estimated value. The analytical result is less than the RL, but greater than or equal to the MDL.

<sup>U</sup> = The analytical result is qualified as not detected at or above the MDL.

**bold** = result is above the project screening level

Duplicate metal sample results were presented in the laboratory reports on the Sample Duplicate Evaluation report:

Sample ORD3020 DUP corresponds with the laboratory Lot-Sample #: G2HI60472-002.

Sample ORD3150 DUP corresponds with the laboratory Lot-Sample #: G2HI60472-013.

Sample ORD4020 DUP corresponds with the Lab Sample ID 320-3334-2 DU.

Sample ORD4070 DUP corresponds with the Lab Sample ID 320-3334-9 DU.

Sample ORD303F DUP corresponds with the laboratory Lot-Sample #: G2HI60455-001.

Sample ORD327F DUP corresponds with the laboratory Lot-Sample #: G2HI60455-017.

Sample ORD405F DUP corresponds with the Lab Sample ID 320-3331-3 DU.

Sample ORD415F DUP corresponds with the Lab Sample ID 320-3331-5 DU.

Sample ORD429F DUP corresponds with the Lab Sample ID 320-3331-18 DU.

Sample ORD433F DUP corresponds with the Lab Sample ID 320-3331-22 DU.

Sample ORD307C DUP corresponds with the laboratory Lot-Sample #: G2HI60446-007.

Sample ORD311C DUP corresponds with the laboratory Lot-Sample #: G2HI60446-011

Sample ORD301L DUP corresponds with the laboratory Lot-Sample #: G2HI60464-001.

Sample ORD306L DUP corresponds with the laboratory Lot-Sample #: G2HI60464-006.

Sample ORD404L DUP corresponds with the Lab Sample ID 320-3338-4 DU.

Sample ORD410L DUP corresponds with the Lab Sample ID 320-3338-11 DU.

**TABLE G-5: COMPLETENESS OF DATA: SEDIMENT**

<b>Analytical Method / Parameter</b>	<b>Validation</b>	<b>Total Number of Records</b>	<b>Number of Rejected Records<sup>1</sup></b>	<b>Percent Completeness</b>
EPA 8330 / Energetics	Validated	1,584	1	99.9%
	Non-Validated <sup>2</sup>	616	0	100%
	<i>Total<sup>3</sup></i>	<i>2,200</i>	<i>1</i>	<i>99.95%</i>
EPA 6020 / Metals	Validated	1,080	0	100%
	Non-Validated <sup>2</sup>	1,020	0	100%
	<i>Total<sup>3</sup></i>	<i>2,100</i>	<i>0</i>	<i>100%</i>
<b>Total<sup>3</sup></b>		<b>4,300</b>	<b>1</b>	<b>99.98%</b>

**Notes:**

The counts presented on this table include all sediment samples, both primary and duplicate, that were analyzed by the laboratory. The counts do not include both dilution factor energetic results for ORD214S. Refer to Table F-1 for a summary of the energetics results and Table F-3 for a summary of the metals results.

<sup>1</sup> For validated results, rejected records include results qualified by the validator as "Do Not Use" or results deemed by the validator as not usable (R-qualified).

For non-validated results, rejected records include results qualified by the laboratory as not reportable (NR) or not usable (R-qualified).

Rejected records do not include rejected results with replacement values (i.e., rejected records from both dilutions of ORD214S are not included).

<sup>2</sup> The 2012 re-do/re-reported metal results and results from the 2013 sampling event were not validated by a third-party data validator.

<sup>3</sup> Total includes both validated and non-validated results.

**TABLE G-6: COMPLETENESS OF DATA: BIOTA**

<b>Analytical Method / Parameter</b>	<b>Validation</b>	<b>Total Number of Records</b>	<b>Number of Rejected Records<sup>1</sup></b>	<b>Percent Completeness</b>
EPA 8330 / Energetics	Validated	1,361	29	97.9%
	Non-Validated <sup>2</sup>	1,192	14	98.8%
	<i>Total</i> <sup>3</sup>	2,553	43	98.3%
EPA 6020 / Metals	Validated	990	0	100%
	Non-Validated <sup>2</sup>	870	0	100%
	<i>Total</i> <sup>3</sup>	1,860	0	100%
EPA 1632 mod., 1638 mod. / Arsenic Speciation	Non-Validated <sup>2</sup>	144	0	100%
<b>Total<sup>3</sup></b>		<b>4,557</b>	<b>43</b>	<b>99.1%</b>

**Notes:**

The counts presented on this table include all biota samples, both primary and duplicate, that were analyzed by the laboratory (i.e., the counts do not include samples with insufficient volume). Refer to Table F-2 for a summary of the energetics results and Table F-4 for a summary of the metals results.

<sup>1</sup> For validated results, rejected records include results qualified by the validator as "Do Not Use" or results deemed by the validator as not usable (R-qualified).

For non-validated results, rejected records include results qualified by the laboratory as not reportable (NR) or not usable (R-qualified).

<sup>2</sup> Arsenic speciation results and results from the 2013 sampling event were not validated by a third-party data validator.

<sup>3</sup> Total includes both validated and non-validated results.

*Appendix H*  
*Biota Arsenic Speciation Data*

Table 1. Post-ROUMRS (FUI2 and FUI3) biota total arsenic concentrations from TestAmerica (TA) and Brooks Rand Laboratories (BRL) and inorganic and organic arsenic concentrations from BRL; all units are in mg/kg wet weight

UHM ID	TA ID	Organism	Strata	Event	Sampling Date	TA - Arsenic (As)				BRL - Total As				BRL - Inorganic As				BRL - Organic As			
						Result	DL	RL	LF	Result	DL	RL	LF	Result*	DL	RL	LF	Result	DL	RL	LF
					Max	61.2	0.16	0.21		68.7	0.14	0.39		2.26	0.154	0.385		68.7	0.154	0.386	
					Q3	23.9				25.5				0.323				25.5			
					Median	8.60				8.84				0.014				8.84			
					Q1	0.920				1.79				0.004				1.41			
					Min	0.580	0.14	0.19		0.670	0.04	0.14		0.001	0.003	0.008		0.526	0.043	0.138	
					Mean	13.7				15.6				0.250				15.3			
					SD	15.3				16.4				0.491				16.5			
					n	48	48	48		48	48	48		48	48	48		48	48	48	
					# Q   ND   <RL *	48	0	0		48	0	0		22	23	26		48	0	0	
					% Q   ND   <RL *	100%	0%	0%		100%	0%	0%		46%	48%	54%		100%	0%	0%	
UHM_ID	TA_ID	Organism	Strata	Event	Date	As_TA	As_TADL	As_TARL	As_TAlf	As_Tot	As_TotDL	As_TotRL	As_Totlf	As_Inorg	As_InorgDL	As_InorgRL	As_Inorglf	As_Org	As_OrgDL	As_OrgRL	As_Orglf
CON-CCB	ORD312C	Crab	CON	FUI2	08/02/12	61.2	0.15	0.20		68.7	0.05	0.16		0.004	0.003	0.009	J	68.7	0.049	0.158	
CON-CEE	ORD315C	Crab	CON	FUI2	08/02/12	55.4	0.15	0.20		59.5	0.05	0.16		ND	0.004	0.009	U	59.5	0.050	0.158	
DMM-CCA	ORD305C	Crab	DMM	FUI2	07/31/12	28.5	0.15	0.20		32.0	0.05	0.14		0.005	0.003	0.009	J	32.0	0.045	0.145	
DMM-CCD	ORD308C	Crab	DMM	FUI2	07/31/12	46.0	0.15	0.20		49.9	0.05	0.16		ND	0.004	0.009	U	49.9	0.049	0.157	
WWT-WCT	ORD302C	Crab	WWT	FUI2	07/31/12	33.2	0.15	0.20		38.4	0.04	0.14		ND	0.004	0.009	U	38.4	0.044	0.142	
CON-FCB	ORD305F	Fish	CON	FUI2	07/18/12	19.1	0.15	0.20		21.6	0.05	0.15		ND	0.004	0.009	U	21.6	0.048	0.153	
CON-FCE	ORD312F	Fish	CON	FUI2	07/18/12	11.8	0.15	0.20		13.5	0.04	0.14		ND	0.004	0.009	U	13.5	0.043	0.139	
CON-FDA	ORD401F	Fish	CON	FUI3	06/11/13	8.70	0.15	0.20		9.14	0.12	0.33		ND	0.004	0.010	U	9.14	0.121	0.330	
CON-FDF	ORD417F	Fish	CON	FUI3	06/11/13	24.0	0.14	0.19		24.8	0.13	0.34		ND	0.004	0.010	U	24.8	0.125	0.342	
DMM-FCF	ORD323F	Fish	DMM	FUI2	07/19/12	21.8	0.15	0.20		24.5	0.05	0.16		ND	0.004	0.009	U	24.5	0.048	0.155	
DMM-FCF	ORD326F	Fish	DMM	FUI2	07/19/12	8.50	0.15	0.20		8.54	0.05	0.16		ND	0.004	0.009	U	8.53	0.049	0.157	
DMM-FDC	ORD420F	Fish	DMM	FUI3	06/19/13	12.0	0.15	0.20		13.9	0.11	0.31		ND	0.004	0.010	U	13.9	0.114	0.310	
DMM-FDH	ORD425F	Fish	DMM	FUI3	06/19/13	21.0	0.15	0.19		24.0	0.14	0.39		ND	0.004	0.009	U	24.0	0.141	0.386	
DMM-FDJ	ORD427F	Fish	DMM	FUI3	06/19/13	10.0	0.15	0.20		10.5	0.12	0.33		ND	0.004	0.009	U	10.5	0.120	0.328	
DMM-FDS	ORD436F	Fish	DMM	FUI3	06/19/13	6.90	0.15	0.21		7.53	0.12	0.34		0.013	0.004	0.010		7.52	0.124	0.338	
WWT-FCC	ORD315F	Fish	WWT	FUI2	07/19/12	10.4	0.15	0.20		12.5	0.04	0.14		ND	0.004	0.010	U	12.5	0.044	0.140	
WWT-FCE	ORD317F	Fish	WWT	FUI2	07/19/12	5.40	0.15	0.20		5.91	0.05	0.16		ND	0.004	0.009	U	5.91	0.050	0.161	
CON-46	ORD301L	Limu	CON	FUI2	07/17/12	0.81	0.15	0.20		1.06	0.05	0.17		0.220	0.014	0.036		0.844	0.053	0.168	
CON-47	ORD303L	Limu	CON	FUI2	07/17/12	1.00	0.15	0.20		1.56	0.05	0.15		0.498	0.016	0.040		1.06	0.048	0.152	
CON-48	ORD302L	Limu	CON	FUI2	07/18/12	0.65	0.15	0.20		0.800	0.05	0.15		0.154	0.004	0.009		0.650	0.046	0.147	
CON-49	ORD304L	Limu	CON	FUI2	07/18/12	0.93	0.15	0.20		1.37	0.05	0.14		0.581	0.016	0.039		0.787	0.045	0.145	
CON-51	ORD305L	Limu	CON	FUI2	07/18/12	1.20	0.15	0.20		1.31	0.05	0.16		0.339	0.034	0.084		0.969	0.050	0.160	
CON-52	ORD406L	Limu	CON	FUI3	06/07/13	2.30	0.15	0.20		6.10	0.11	0.30		2.03	0.147	0.367		4.06	0.147	0.367	
CON-53	ORD407L	Limu	CON	FUI3	06/07/13	1.20	0.15	0.20		4.28	0.10	0.27		0.634	0.038	0.095		3.65	0.100	0.274	
CON-56	ORD409L	Limu	CON	FUI3	06/07/13	2.10	0.14	0.19		6.53	0.11	0.29		1.61	0.154	0.385		4.92	0.154	0.385	
CON-57	ORD410L DUP	Limu	CON	FUI3	06/07/13	2.67	0.15	0.20		6.89	0.11	0.29		2.26	0.038	0.095		4.47	0.107	0.291	
DMM-52A	ORD306L	Limu	DMM	FUI2	07/16/12	1.05	0.15	0.20		1.32	0.05	0.15		0.357	0.038	0.096		0.966	0.048	0.152	
DMM-55A	ORD307L	Limu	DMM	FUI2	07/16/12	0.80	0.15	0.20		1.12	0.05	0.15		0.122	0.014	0.036		0.996	0.046	0.146	
DMM-61A	ORD308L	Limu	DMM	FUI2	07/16/12	0.75	0.15	0.20		0.920	0.05	0.14		0.154	0.014	0.035		0.768	0.045	0.145	
DMM-64A	ORD309L	Limu	DMM	FUI2	07/16/12	0.58	0.15	0.20		0.740	0.04	0.14		0.182	0.014	0.036		0.562	0.044	0.141	
DMM-67A	ORD310L	Limu	DMM	FUI2	07/16/12	0.80	0.15	0.20		0.970	0.05	0.16		0.192	0.016	0.040		0.780	0.050	0.159	
DMM-70A	ORD311L	Limu	DMM	FUI2	07/17/12	0.59	0.15	0.20		0.670	0.05	0.15		0.149	0.016	0.040		0.526	0.047	0.149	
DMM-73A	ORD401L	Limu	DMM	FUI3	06/03/13	0.74	0.15	0.20		2.34	0.10	0.28		0.138	0.015	0.037		2.21	0.104	0.285	
DMM-76A	ORD402L	Limu	DMM	FUI3	06/03/13	0.72	0.15	0.20		1.82	0.10	0.28		0.452	0.016	0.039		1.37	0.104	0.283	
DMM-79A	ORD403L	Limu	DMM	FUI3	06/03/13	0.85	0.15	0.21		2.04	0.11	0.29		0.503	0.014	0.035		1.54	0.107	0.291	
DMM-82A	ORD404L DUP	Limu	DMM	FUI3	06/03/13	0.91	0.15	0.20		2.20	0.10	0.26		0.598	0.016	0.039		1.65	0.097	0.264	
DMM-85A	ORD405L	Limu	DMM	FUI3	06/03/13	0.65	0.16	0.21		1.78	0.10	0.27		0.275	0.015	0.037		1.51	0.098	0.268	
DMM-91A	ORD413L	Limu	DMM	FUI3	06/07/13	1.00	0.16	0.21		4.51	0.11	0.29		0.386	0.015	0.038		4.12	0.107	0.292	
CON-48	ORD303O	Octopus	CON	FUI2	07/18/12	27.7	0.15	0.20		29.2	0.05	0.16		ND	0.004	0.009	U	29.2	0.049	0.156	
CON-51	ORD304O	Octopus	CON	FUI2	07/18/12	26.5	0.15	0.20		27.8	0.04	0.14		0.004	0.003	0.008	J	27.8	0.044	0.141	
CON-55	ORD409O	Octopus	CON	FUI3	06/11/13	37.0	0.16	0.21		37.7	0.10	0.27		ND	0.004	0.010	U	37.7	0.099	0.270	
CON-56	ORD408O	Octopus	CON	FUI3	06/07/13	26.0	0.15	0.20		26.5	0.10	0.27		ND	0.003	0.008	U	26.5	0.099	0.269	
DMM-55A	ORD311O	Octopus	DMM	FUI2	07/16/12	20.7	0.15	0.20		25.5	0.05	0.15		ND	0.004	0.010	U	25.5	0.047	0.152	
DMM-67A	ORD310O	Octopus	DMM	FUI2	07/16/12	20.9	0.15	0.20		26.4	0.04	0.14		ND	0.004	0.009	U	26.4	0.043	0.138	
DMM-76A	ORD402O DUP	Octopus	DMM	FUI3	06/03/13	23.7	0.15	0.20		23.1	0.11	0.30		ND	0.004	0.010	U	23.1	0.109	0.297	
DMM-85A	ORD405O	Octopus	DMM	FUI3	06/03/13	27.0	0.14	0.19		25.4	0.10	0.28		ND	0.004	0.009	U	25.4	0.102	0.279	
NPS-OCA	ORD307O	Octopus	NPS	FUI2	07/17/12	16.9	0.15	0.20		18.3	0.04	0.14		ND	0.004	0.009	U	18.3	0.043	0.139	
WWT-OCA	ORD309O	Octopus	WWT	FUI2	07/17/12	24.9	0.15	0.20		31.1	0.04	0.14		ND	0.003	0.009	U	31.1	0.044	0.142	

# or % quantified (Q), not detected (ND), and < reporting level (RL)

DL = detection limit, RL = reporting level, ND = nondetected (<DL)

\* Statistics calculated with regression on order statistics (ROS)

Lab flags: U = nontect, J = estimated value (≥DL and <RL), B = blank contains analyte a reportable level, F = MS/MSD Recovery and/or RPD exceeds the control limits

*Appendix I*  
*Hydrocast (Water Column) Data*



**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
1	514	0.659	0.576	25.794	35.168	5.4125	153	0.01	0.08	25.794	1023.22	23.22
1	502	0.616	0.582	25.731	35.072	5.3921	175	0.00	0.15	25.731	1023.17	23.16
1	518	0.668	0.587	25.860	35.124	5.4133	160	0.03	0.10	25.860	1023.17	23.17
1	516	0.661	0.600	25.828	35.145	5.4123	163	0.00	0.09	25.828	1023.19	23.19
1	509	0.654	0.606	25.654	35.263	5.4085	142	0.02	0.10	25.654	1023.33	23.32
1	504	0.638	0.619	25.700	35.171	5.4023	161	0.01	0.12	25.700	1023.25	23.25
1	511	0.657	0.630	25.715	35.213	5.4108	150	0.02	0.09	25.715	1023.28	23.28
1	512	0.659	0.637	25.726	35.207	5.4095	152	0.02	0.09	25.726	1023.27	23.26
1	506	0.649	0.643	25.666	35.216	5.4062	157	0.01	0.11	25.666	1023.30	23.30
1	537	0.726	0.647	25.729	35.139	5.4034	157	0.02	0.11	25.729	1023.23	23.23
1	530	0.713	0.654	25.735	35.124	5.4023	162	0.00	0.09	25.735	1023.22	23.22
1	505	0.644	0.655	25.687	35.198	5.4054	159	0.01	0.12	25.687	1023.28	23.28
1	507	0.652	0.655	25.645	35.237	5.4065	150	0.02	0.11	25.645	1023.32	23.32
1	535	0.720	0.659	25.725	35.163	5.4045	150	0.01	0.10	25.725	1023.24	23.24
1	533	0.714	0.666	25.712	35.150	5.4020	159	0.03	0.10	25.712	1023.24	23.24
1	508	0.654	0.673	25.636	35.260	5.4080	144	0.02	0.11	25.636	1023.34	23.34
1	519	0.677	0.679	25.882	35.130	5.4159	156	0.02	0.09	25.882	1023.16	23.16
1	523	0.713	0.679	25.751	35.207	5.4161	140	0.01	0.09	25.751	1023.28	23.28
1	520	0.690	0.685	25.889	35.134	5.4194	153	0.02	0.09	25.889	1023.18	23.17
1	503	0.629	0.686	25.713	35.141	5.4000	166	0.01	0.14	25.713	1023.23	23.22
1	528	0.715	0.691	25.781	35.188	5.4151	148	0.01	0.09	25.780	1023.25	23.25
1	510	0.656	0.692	25.695	35.261	5.4124	145	0.02	0.09	25.695	1023.31	23.31
1	515	0.659	0.703	25.807	35.153	5.4115	158	0.00	0.09	25.807	1023.21	23.20
1	539	0.753	0.708	25.698	35.172	5.4030	160	0.02	0.09	25.698	1023.26	23.25
1	521	0.702	0.709	25.854	35.153	5.4205	148	0.02	0.08	25.854	1023.21	23.21
1	527	0.716	0.709	25.790	35.203	5.4179	147	0.01	0.09	25.790	1023.26	23.25
1	532	0.714	0.709	25.713	35.141	5.4007	165	0.02	0.10	25.712	1023.23	23.23
1	538	0.735	0.714	25.706	35.147	5.4023	160	0.02	0.09	25.705	1023.25	23.24
1	541	0.825	0.720	25.728	35.159	5.4052	150	0.01	0.08	25.727	1023.24	23.24
1	517	0.664	0.721	25.846	35.131	5.4130	164	0.02	0.10	25.846	1023.18	23.18
1	525	0.718	0.721	25.747	35.239	5.4153	141	0.01	0.09	25.746	1023.28	23.28
1	526	0.717	0.721	25.781	35.219	5.4175	145	0.01	0.09	25.781	1023.26	23.26
1	540	0.781	0.721	25.716	35.176	5.4047	156	0.01	0.08	25.716	1023.25	23.25
1	542	0.894	0.726	25.701	35.123	5.3997	149	0.01	0.09	25.701	1023.24	23.23
1	524	0.716	0.727	25.726	35.212	5.4119	139	0.01	0.10	25.726	1023.28	23.28
1	513	0.661	0.734	25.764	35.213	5.4133	151	0.02	0.08	25.764	1023.25	23.25

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
1	531	0.714	0.745	25.717	35.129	5.4000	167	0.00	0.10	25.717	1023.22	23.22
1	529	0.714	0.751	25.761	35.141	5.4073	153	0.01	0.10	25.761	1023.22	23.22
1	522	0.710	0.752	25.800	35.199	5.4205	143	0.01	0.09	25.799	1023.26	23.26
1	534	0.716	0.757	25.714	35.159	5.4031	151	0.02	0.10	25.714	1023.24	23.24
1	536	0.723	0.787	25.735	35.150	5.4042	153	0.02	0.11	25.735	1023.23	23.23
1	543	0.999	0.860	25.642	35.064	5.3864	159	0.01	0.09	25.642	1023.22	23.21
1	544	1.137	1.018	25.592	35.057	5.3782	179	0.02	0.09	25.591	1023.22	23.21
1	545	1.303	1.219	25.577	35.081	5.3780	192	0.02	0.09	25.577	1023.23	23.22
1	546	1.485	1.468	25.582	35.082	5.3786	192	0.02	0.08	25.581	1023.23	23.22
1	547	1.676	1.614	25.585	35.081	5.3790	188	0.04	0.08	25.585	1023.23	23.22
1	549	2.037	1.986	25.587	35.079	5.3792	187	0.04	0.08	25.587	1023.23	23.22
1	548	1.864	2.016	25.587	35.080	5.3792	187	0.05	0.08	25.586	1023.23	23.22
1	551	2.352	2.284	25.586	35.079	5.3792	187	0.02	0.09	25.585	1023.23	23.22
1	550	2.198	2.290	25.587	35.079	5.3792	187	0.02	0.09	25.587	1023.23	23.22
1	552	2.505	2.491	25.580	35.078	5.3787	187	0.01	0.08	25.579	1023.23	23.22
1	553	2.662	2.637	25.570	35.076	5.3775	187	0.01	0.08	25.569	1023.24	23.23
1	555	2.950	2.911	25.559	35.080	5.3764	186	0.02	0.09	25.559	1023.24	23.23
1	554	2.813	2.917	25.561	35.076	5.3764	187	0.02	0.08	25.561	1023.24	23.23
1	556	3.088	2.978	25.561	35.081	5.3767	186	0.01	0.09	25.560	1023.24	23.23
1	557	3.250	3.045	25.558	35.078	5.3764	186	0.00	0.09	25.557	1023.24	23.23
1	558	3.441	3.416	25.551	35.078	5.3757	186	0.00	0.09	25.551	1023.25	23.23
1	559	3.646	3.593	25.547	35.079	5.3753	186	0.01	0.09	25.546	1023.25	23.23
1	560	3.855	3.836	25.544	35.080	5.3751	186	0.01	0.09	25.543	1023.25	23.24
1	561	4.073	3.933	25.540	35.080	5.3748	186	0.02	0.09	25.539	1023.25	23.24
1	562	4.306	4.262	25.536	35.079	5.3742	186	0.03	0.09	25.535	1023.26	23.24
1	563	4.548	4.518	25.535	35.081	5.3741	187	0.04	0.09	25.534	1023.26	23.24
1	564	4.795	4.713	25.538	35.082	5.3744	187	0.03	0.09	25.537	1023.26	23.24
1	565	5.047	5.041	25.547	35.084	5.3752	186	0.02	0.09	25.546	1023.25	23.23
1	566	5.296	5.309	25.560	35.085	5.3768	186	0.02	0.09	25.559	1023.25	23.23
1	567	5.537	5.510	25.571	35.083	5.3779	186	0.01	0.08	25.570	1023.25	23.23
1	568	5.771	5.796	25.577	35.079	5.3784	187	0.01	0.08	25.576	1023.25	23.22
1	569	5.996	5.985	25.579	35.078	5.3786	187	0.01	0.08	25.578	1023.25	23.22
1	570	6.210	6.222	25.578	35.078	5.3786	186	0.01	0.08	25.577	1023.25	23.22
1	571	6.414	6.411	25.577	35.078	5.3784	186	0.02	0.09	25.576	1023.25	23.22
1	572	6.603	6.673	25.576	35.078	5.3783	187	0.01	0.09	25.575	1023.25	23.22
1	573	6.779	6.697	25.576	35.078	5.3784	187	0.02	0.09	25.574	1023.25	23.22

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
1	574	6.963	6.746	25.574	35.077	5.3782	187	0.02	0.09	25.572	1023.26	23.23
1	575	7.179	7.038	25.568	35.076	5.3775	186	0.01	0.09	25.567	1023.26	23.23
1	576	7.417	7.367	25.561	35.076	5.3768	186	0.01	0.09	25.559	1023.26	23.23
1	577	7.661	7.635	25.553	35.077	5.3761	187	0.01	0.08	25.551	1023.26	23.23
1	578	7.904	7.811	25.548	35.078	5.3754	187	0.02	0.08	25.546	1023.27	23.23
1	579	8.161	7.963	25.544	35.078	5.3752	187	0.02	0.08	25.542	1023.27	23.24
1	580	8.437	8.426	25.537	35.077	5.3745	186	0.02	0.08	25.535	1023.27	23.24
1	581	8.717	8.675	25.529	35.078	5.3736	186	0.02	0.08	25.527	1023.28	23.24
1	582	8.988	8.992	25.525	35.080	5.3733	186	0.02	0.08	25.523	1023.28	23.24
1	583	9.246	9.254	25.524	35.081	5.3733	186	0.02	0.08	25.522	1023.28	23.24
1	584	9.501	9.315	25.523	35.081	5.3733	186	0.01	0.08	25.521	1023.28	23.24
1	585	9.764	9.759	25.520	35.080	5.3730	186	0.02	0.08	25.518	1023.29	23.24
1	586	10.031	9.917	25.513	35.079	5.3724	186	0.02	0.09	25.511	1023.29	23.25
1	587	10.293	10.349	25.502	35.079	5.3713	186	0.02	0.10	25.500	1023.29	23.25
1	588	10.541	10.526	25.492	35.082	5.3704	186	0.03	0.11	25.490	1023.30	23.25
1	589	10.772	10.751	25.487	35.085	5.3701	186	0.03	0.11	25.485	1023.30	23.26
1	590	11.000	10.836	25.485	35.086	5.3699	186	0.02	0.10	25.482	1023.31	23.26
1	591	11.239	11.147	25.481	35.085	5.3696	186	0.02	0.10	25.479	1023.31	23.26
1	592	11.491	11.348	25.478	35.086	5.3693	186	0.03	0.10	25.476	1023.31	23.26
1	593	11.753	11.683	25.479	35.088	5.3694	186	0.04	0.10	25.476	1023.31	23.26
1	594	12.011	12.072	25.481	35.088	5.3697	186	0.05	0.09	25.478	1023.31	23.26
1	595	12.252	12.175	25.483	35.087	5.3699	186	0.04	0.09	25.480	1023.31	23.26
1	596	12.482	12.431	25.483	35.086	5.3699	185	0.04	0.09	25.481	1023.31	23.26
1	597	12.708	12.656	25.483	35.086	5.3698	185	0.04	0.09	25.480	1023.31	23.26
1	598	12.925	12.917	25.482	35.086	5.3697	185	0.04	0.09	25.479	1023.31	23.26
1	599	13.129	13.076	25.483	35.087	5.3699	185	0.04	0.09	25.481	1023.31	23.26
1	600	13.321	13.301	25.486	35.086	5.3701	185	0.04	0.09	25.483	1023.31	23.26
1	601	13.503	13.411	25.487	35.085	5.3702	185	0.04	0.09	25.484	1023.31	23.26
1	602	13.686	13.551	25.484	35.084	5.3700	185	0.04	0.10	25.481	1023.32	23.26
1	603	13.875	13.807	25.480	35.084	5.3695	186	0.04	0.10	25.477	1023.32	23.26
1	604	14.067	13.923	25.476	35.086	5.3693	186	0.05	0.10	25.473	1023.32	23.26
1	605	14.260	14.263	25.474	35.088	5.3693	186	0.04	0.10	25.471	1023.32	23.26
1	606	14.444	14.367	25.471	35.087	5.3689	186	0.04	0.10	25.468	1023.33	23.26
1	608	14.781	14.500	25.466	35.088	5.3686	185	0.04	0.10	25.463	1023.33	23.27
1	607	14.614	14.634	25.469	35.087	5.3686	186	0.04	0.10	25.466	1023.33	23.27
1	609	14.965	14.865	25.458	35.087	5.3679	186	0.04	0.10	25.455	1023.33	23.27

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
1	610	15.158	15.127	25.448	35.088	5.3669	186	0.04	0.10	25.444	1023.34	23.27
1	612	15.518	15.170	25.445	35.094	5.3668	186	0.04	0.11	25.441	1023.34	23.28
1	611	15.338	15.334	25.443	35.093	5.3666	186	0.04	0.10	25.440	1023.34	23.28
1	613	15.733	15.481	25.450	35.094	5.3671	186	0.04	0.10	25.447	1023.34	23.27
1	614	15.983	15.901	25.459	35.095	5.3681	186	0.04	0.09	25.456	1023.34	23.27
1	615	16.239	16.162	25.466	35.091	5.3687	186	0.03	0.09	25.462	1023.34	23.27
1	616	16.483	16.503	25.466	35.088	5.3685	186	0.03	0.09	25.462	1023.34	23.27
1	617	16.710	16.607	25.464	35.088	5.3684	185	0.04	0.10	25.460	1023.34	23.27
1	618	16.927	16.844	25.461	35.088	5.3682	186	0.04	0.10	25.457	1023.34	23.27
1	619	17.149	16.929	25.459	35.089	5.3680	186	0.04	0.11	25.455	1023.34	23.27
1	620	17.384	17.258	25.459	35.090	5.3681	186	0.04	0.11	25.455	1023.34	23.27
1	621	17.629	17.520	25.460	35.090	5.3682	186	0.04	0.11	25.456	1023.34	23.27
1	622	17.881	17.659	25.463	35.091	5.3684	186	0.04	0.11	25.459	1023.34	23.27
1	623	18.141	18.134	25.466	35.090	5.3686	186	0.04	0.11	25.462	1023.34	23.27
1	624	18.393	18.299	25.468	35.089	5.3689	186	0.05	0.11	25.464	1023.34	23.27
1	625	18.639	18.469	25.468	35.088	5.3689	186	0.04	0.10	25.464	1023.35	23.27
1	626	18.900	18.627	25.463	35.087	5.3685	186	0.04	0.09	25.459	1023.35	23.27
1	627	19.189	18.999	25.452	35.086	5.3677	186	0.04	0.09	25.448	1023.36	23.27
1	628	19.493	19.425	25.429	35.085	5.3657	186	0.04	0.09	25.425	1023.37	23.28
1	629	19.790	19.735	25.404	35.091	5.3636	186	0.04	0.10	25.400	1023.38	23.29
1	630	20.080	19.881	25.385	35.098	5.3621	187	0.04	0.10	25.380	1023.39	23.30
1	631	20.377	20.204	25.369	35.100	5.3607	187	0.04	0.11	25.365	1023.40	23.31
1	632	20.675	20.715	25.359	35.105	5.3599	188	0.05	0.10	25.354	1023.40	23.31
1	633	20.950	20.873	25.358	35.110	5.3600	188	0.05	0.10	25.353	1023.40	23.31
1	634	21.213	21.013	25.359	35.110	5.3604	188	0.05	0.10	25.355	1023.41	23.32
1	635	21.485	21.281	25.356	35.107	5.3600	188	0.06	0.10	25.351	1023.41	23.32
1	636	21.762	21.756	25.348	35.107	5.3591	188	0.06	0.10	25.343	1023.41	23.32
1	637	22.011	22.133	25.343	35.110	5.3588	188	0.06	0.10	25.339	1023.41	23.32
1	638	22.210	22.200	25.342	35.112	5.3589	188	0.06	0.11	25.338	1023.42	23.32
1	639	22.367	22.395	25.343	35.112	5.3589	189	0.06	0.11	25.338	1023.42	23.32
1	640	22.491	22.395	25.342	35.112	5.3590	189	0.05	0.11	25.338	1023.42	23.32
1	641	22.600	22.456	25.341	35.112	5.3590	189	0.05	0.12	25.336	1023.42	23.32
1	642	22.702	22.620	25.339	35.113	5.3588	189	0.05	0.12	25.334	1023.42	23.32
1	643	22.795	22.669	25.338	35.114	5.3587	189	0.05	0.11	25.333	1023.42	23.33
1	645	22.942	22.773	25.338	35.114	5.3588	189	0.07	0.11	25.333	1023.42	23.33
1	644	22.876	22.852	25.338	35.114	5.3587	189	0.06	0.11	25.333	1023.42	23.33

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
1	646	23.002	22.907	25.339	35.114	5.3589	189	0.07	0.11	25.334	1023.42	23.32
1	648	23.088	22.925	25.340	35.114	5.3590	189	0.06	0.13	25.335	1023.42	23.32
1	647	23.051	22.992	25.339	35.114	5.3589	189	0.07	0.12	25.334	1023.42	23.32
1	649	23.121	22.998	25.340	35.114	5.3590	189	0.06	0.14	25.335	1023.42	23.32
1	650	23.152	23.010	25.340	35.113	5.3590	189	0.06	0.15	25.335	1023.42	23.32
1	651	23.180	23.041	25.340	35.113	5.3590	189	0.07	0.15	25.335	1023.42	23.32
1	652	23.207	23.089	25.340	35.113	5.3589	189	0.08	0.15	25.335	1023.42	23.32
1	653	23.226	23.138	25.339	35.114	5.3589	189	0.08	0.15	25.334	1023.42	23.32
2	12	0.798	0.905	25.893	35.246	5.4320	204	-0.01	0.08	25.893	1023.24	23.24
2	13	0.893	0.979	25.894	35.189	5.4247	198	-0.01	0.07	25.894	1023.20	23.20
2	16	1.049	1.027	25.902	35.210	5.4290	156	0.00	0.06	25.902	1023.22	23.22
2	60	1.146	1.027	25.717	35.080	5.3921	188	-0.01	0.07	25.716	1023.18	23.18
2	15	1.012	1.046	25.896	35.210	5.4282	165	0.00	0.06	25.896	1023.22	23.22
2	32	1.128	1.051	26.116	35.166	5.4469	167	-0.02	0.07	26.115	1023.13	23.12
2	57	1.139	1.051	25.763	35.062	5.3943	191	-0.03	0.06	25.763	1023.15	23.15
2	40	1.136	1.057	26.260	35.163	5.4619	161	-0.03	0.07	26.260	1023.08	23.08
2	14	0.963	1.064	25.895	35.192	5.4253	182	0.00	0.07	25.894	1023.21	23.20
2	38	1.134	1.064	26.178	35.164	5.4532	157	-0.02	0.08	26.177	1023.11	23.10
2	51	1.133	1.064	26.428	35.150	5.4777	159	-0.02	0.06	26.428	1023.02	23.01
2	35	1.132	1.069	26.200	35.148	5.4535	157	-0.02	0.07	26.199	1023.09	23.08
2	66	1.458	1.070	25.858	35.072	5.4067	189	-0.01	0.07	25.857	1023.14	23.13
2	24	1.150	1.076	26.026	35.150	5.4350	161	0.02	0.07	26.026	1023.14	23.14
2	30	1.131	1.076	26.118	35.152	5.4452	159	-0.02	0.07	26.117	1023.12	23.11
2	19	1.117	1.082	25.956	35.148	5.4268	153	-0.03	0.12	25.956	1023.16	23.16
2	45	1.136	1.082	26.420	35.147	5.4769	154	-0.02	0.07	26.420	1023.02	23.02
2	42	1.141	1.088	26.356	35.114	5.4655	158	-0.02	0.07	26.356	1023.02	23.01
2	18	1.101	1.094	25.972	35.170	5.4315	154	-0.02	0.12	25.972	1023.17	23.17
2	55	1.132	1.094	25.851	35.059	5.4030	192	-0.03	0.07	25.851	1023.12	23.12
2	49	1.135	1.100	26.576	35.095	5.4863	157	-0.01	0.06	26.576	1022.93	22.93
2	63	1.207	1.100	25.809	35.089	5.4038	189	-0.02	0.06	25.809	1023.16	23.16
2	53	1.131	1.106	26.131	35.057	5.4327	170	-0.03	0.07	26.130	1023.04	23.03
2	54	1.129	1.106	25.943	35.052	5.4118	182	-0.03	0.07	25.942	1023.09	23.08
2	27	1.144	1.113	26.100	35.139	5.4417	150	-0.01	0.07	26.100	1023.11	23.11
2	47	1.135	1.118	26.533	35.120	5.4852	153	-0.02	0.06	26.533	1022.96	22.96
2	28	1.139	1.131	26.115	35.136	5.4428	151	-0.02	0.07	26.115	1023.11	23.10

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
2	43	1.140	1.131	26.324	35.153	5.4674	155	-0.01	0.07	26.324	1023.05	23.05
2	34	1.132	1.136	26.132	35.178	5.4503	161	-0.01	0.07	26.131	1023.13	23.13
2	62	1.178	1.136	25.763	35.094	5.3993	189	-0.02	0.06	25.763	1023.18	23.18
2	21	1.144	1.137	25.963	35.154	5.4286	158	-0.03	0.06	25.963	1023.16	23.16
2	22	1.151	1.137	25.982	35.140	5.4289	164	0.00	0.07	25.982	1023.15	23.14
2	46	1.134	1.137	26.488	35.121	5.4805	154	-0.02	0.07	26.488	1022.98	22.97
2	39	1.132	1.143	26.175	35.192	5.4567	159	-0.02	0.08	26.174	1023.13	23.12
2	29	1.135	1.149	26.121	35.141	5.4441	154	-0.02	0.07	26.121	1023.11	23.10
2	48	1.135	1.149	26.579	35.101	5.4875	154	-0.02	0.06	26.579	1022.94	22.93
2	65	1.331	1.149	25.854	35.076	5.4068	189	-0.01	0.07	25.854	1023.14	23.14
2	25	1.150	1.155	26.034	35.164	5.4378	155	-0.01	0.07	26.033	1023.15	23.15
2	36	1.137	1.155	26.228	35.133	5.4545	155	-0.03	0.07	26.228	1023.07	23.06
2	17	1.081	1.167	25.936	35.204	5.4321	154	-0.01	0.09	25.935	1023.21	23.20
2	31	1.129	1.167	26.117	35.156	5.4458	165	-0.02	0.06	26.117	1023.12	23.11
2	33	1.131	1.167	26.105	35.178	5.4474	165	-0.01	0.07	26.105	1023.14	23.13
2	61	1.159	1.167	25.729	35.087	5.3945	188	-0.01	0.07	25.729	1023.18	23.18
2	64	1.255	1.167	25.842	35.080	5.4060	189	-0.01	0.06	25.841	1023.15	23.14
2	59	1.145	1.173	25.717	35.076	5.3915	189	-0.02	0.07	25.716	1023.18	23.17
2	44	1.139	1.179	26.335	35.182	5.4725	154	-0.01	0.07	26.335	1023.07	23.07
2	50	1.135	1.179	26.510	35.131	5.4840	159	-0.01	0.06	26.510	1022.98	22.97
2	52	1.133	1.179	26.319	35.104	5.4595	161	-0.03	0.07	26.318	1023.02	23.01
2	20	1.133	1.185	25.937	35.160	5.4266	153	-0.03	0.08	25.937	1023.17	23.17
2	58	1.144	1.185	25.729	35.071	5.3920	189	-0.03	0.06	25.729	1023.17	23.16
2	26	1.149	1.186	26.061	35.159	5.4401	151	-0.01	0.06	26.060	1023.14	23.13
2	37	1.138	1.197	26.209	35.147	5.4544	156	-0.03	0.08	26.209	1023.09	23.08
2	56	1.136	1.198	25.810	35.059	5.3986	194	-0.03	0.06	25.809	1023.13	23.13
2	23	1.153	1.228	26.000	35.145	5.4314	165	0.03	0.07	26.000	1023.15	23.14
2	41	1.142	1.240	26.345	35.115	5.4644	160	-0.03	0.07	26.344	1023.02	23.01
2	67	1.654	1.471	25.853	35.071	5.4060	189	-0.02	0.06	25.853	1023.14	23.13
2	68	1.918	1.557	25.847	35.070	5.4053	189	-0.02	0.07	25.847	1023.14	23.13
2	69	2.251	2.013	25.839	35.067	5.4040	189	-0.03	0.07	25.838	1023.14	23.13
2	70	2.636	2.592	25.813	35.060	5.4004	189	-0.02	0.07	25.813	1023.15	23.14
2	71	3.039	3.018	25.770	35.058	5.3955	189	-0.01	0.07	25.770	1023.16	23.15
2	72	3.445	3.402	25.735	35.069	5.3933	189	0.00	0.08	25.734	1023.18	23.17
2	73	3.853	3.840	25.725	35.077	5.3934	189	0.00	0.08	25.724	1023.19	23.18
2	74	4.260	4.248	25.724	35.072	5.3926	189	0.00	0.07	25.723	1023.19	23.17

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
2	75	4.648	4.875	25.706	35.066	5.3900	189	0.00	0.07	25.705	1023.19	23.17
2	76	4.981	5.313	25.677	35.069	5.3872	189	0.00	0.08	25.676	1023.21	23.18
2	77	5.243	5.344	25.660	35.078	5.3866	188	0.01	0.08	25.658	1023.22	23.20
2	78	5.466	5.435	25.661	35.081	5.3873	188	0.01	0.08	25.660	1023.22	23.20
2	79	5.679	5.654	25.666	35.080	5.3876	188	0.00	0.08	25.664	1023.22	23.20
2	80	5.886	5.934	25.670	35.082	5.3884	188	0.00	0.07	25.669	1023.22	23.20
2	81	6.081	6.044	25.679	35.082	5.3894	188	0.00	0.07	25.677	1023.22	23.19
2	82	6.273	6.196	25.687	35.079	5.3900	188	0.00	0.07	25.686	1023.22	23.19
2	83	6.479	6.288	25.691	35.079	5.3904	189	0.01	0.07	25.690	1023.22	23.19
2	84	6.708	6.653	25.699	35.081	5.3914	189	0.01	0.07	25.697	1023.22	23.19
2	85	6.942	6.994	25.711	35.081	5.3929	188	0.01	0.07	25.710	1023.21	23.18
2	86	7.166	7.103	25.718	35.076	5.3929	188	0.01	0.07	25.716	1023.21	23.18
2	87	7.383	7.396	25.713	35.072	5.3918	189	0.01	0.07	25.711	1023.21	23.18
2	88	7.602	7.408	25.702	35.074	5.3910	189	0.01	0.07	25.701	1023.21	23.18
2	89	7.837	7.780	25.699	35.078	5.3912	188	0.01	0.08	25.697	1023.22	23.19
2	90	8.082	8.035	25.704	35.078	5.3917	188	0.00	0.08	25.702	1023.22	23.19
2	91	8.325	8.322	25.705	35.075	5.3914	188	0.00	0.08	25.703	1023.22	23.18
2	92	8.560	8.510	25.700	35.074	5.3908	188	0.01	0.08	25.698	1023.22	23.18
2	93	8.792	8.748	25.693	35.076	5.3902	188	0.01	0.08	25.691	1023.22	23.19
2	94	9.014	9.076	25.689	35.077	5.3900	188	0.01	0.08	25.687	1023.23	23.19
2	95	9.216	9.235	25.688	35.077	5.3900	188	0.01	0.07	25.686	1023.23	23.19
2	96	9.399	9.375	25.689	35.078	5.3901	188	0.01	0.07	25.687	1023.23	23.19
2	97	9.581	9.405	25.691	35.078	5.3905	188	0.00	0.07	25.689	1023.23	23.19
2	98	9.775	9.710	25.693	35.077	5.3906	189	0.00	0.07	25.691	1023.23	23.19
2	100	10.129	10.063	25.693	35.077	5.3906	188	0.00	0.07	25.691	1023.23	23.19
2	101	10.290	10.075	25.697	35.080	5.3914	188	-0.01	0.07	25.694	1023.23	23.19
2	99	9.964	10.105	25.693	35.077	5.3905	189	0.00	0.07	25.691	1023.23	23.19
2	102	10.476	10.318	25.709	35.082	5.3930	188	-0.01	0.07	25.706	1023.23	23.19
2	103	10.679	10.690	25.727	35.079	5.3946	189	-0.01	0.07	25.725	1023.22	23.18
2	104	10.876	10.830	25.729	35.067	5.3931	189	-0.01	0.07	25.727	1023.22	23.17
2	105	11.069	10.958	25.695	35.059	5.3884	189	0.00	0.08	25.693	1023.22	23.17
2	106	11.263	11.232	25.652	35.068	5.3850	188	0.00	0.08	25.650	1023.24	23.19
2	107	11.456	11.378	25.632	35.079	5.3842	188	0.01	0.08	25.629	1023.26	23.21
2	108	11.647	11.573	25.628	35.080	5.3840	188	0.01	0.08	25.625	1023.26	23.21
2	110	11.993	11.749	25.627	35.081	5.3840	187	0.01	0.08	25.624	1023.26	23.21
2	109	11.826	11.938	25.626	35.081	5.3840	188	0.01	0.09	25.624	1023.26	23.21

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
2	111	12.178	11.975	25.626	35.079	5.3838	187	0.01	0.08	25.623	1023.26	23.21
2	112	12.387	12.352	25.623	35.079	5.3835	187	0.00	0.08	25.620	1023.26	23.21
2	114	12.765	12.565	25.619	35.079	5.3832	187	0.01	0.07	25.617	1023.27	23.21
2	113	12.586	12.705	25.621	35.080	5.3833	187	0.01	0.07	25.618	1023.26	23.21
2	115	12.953	12.772	25.617	35.079	5.3829	187	0.01	0.07	25.614	1023.27	23.21
2	116	13.167	12.979	25.615	35.079	5.3826	188	0.01	0.08	25.612	1023.27	23.21
2	117	13.400	13.345	25.607	35.074	5.3811	188	0.02	0.08	25.604	1023.27	23.21
2	119	13.801	13.704	25.568	35.075	5.3772	188	0.01	0.07	25.565	1023.28	23.22
2	118	13.618	13.807	25.588	35.071	5.3787	188	0.01	0.08	25.585	1023.27	23.21
2	120	13.973	13.813	25.558	35.079	5.3767	188	0.01	0.07	25.555	1023.29	23.23
2	121	14.151	14.130	25.555	35.080	5.3765	188	0.01	0.08	25.552	1023.29	23.23
2	122	14.328	14.179	25.553	35.080	5.3764	188	0.01	0.09	25.550	1023.29	23.23
2	124	14.677	14.404	25.549	35.080	5.3759	188	0.01	0.08	25.546	1023.30	23.23
2	123	14.501	14.514	25.552	35.080	5.3762	188	0.01	0.09	25.548	1023.29	23.23
2	125	14.874	14.715	25.544	35.079	5.3753	188	0.01	0.08	25.541	1023.30	23.23
2	126	15.087	15.056	25.539	35.080	5.3749	188	0.01	0.08	25.536	1023.30	23.24
2	127	15.294	15.226	25.536	35.082	5.3749	188	0.02	0.08	25.533	1023.30	23.24
2	128	15.493	15.415	25.534	35.081	5.3746	188	0.03	0.08	25.531	1023.31	23.24
2	129	15.687	15.598	25.530	35.080	5.3740	188	0.03	0.08	25.526	1023.31	23.24
2	130	15.875	15.853	25.523	35.081	5.3734	188	0.03	0.08	25.520	1023.31	23.24
2	131	16.053	15.933	25.518	35.083	5.3731	188	0.03	0.08	25.515	1023.31	23.25
2	133	16.366	16.231	25.523	35.086	5.3741	188	0.03	0.08	25.519	1023.32	23.25
2	132	16.218	16.286	25.516	35.085	5.3733	188	0.03	0.08	25.513	1023.32	23.25
2	135	16.650	16.340	25.533	35.081	5.3745	188	0.04	0.08	25.530	1023.31	23.24
2	134	16.504	16.456	25.532	35.083	5.3748	188	0.04	0.08	25.529	1023.31	23.24
2	136	16.818	16.712	25.526	35.080	5.3737	188	0.04	0.08	25.523	1023.31	23.24
2	137	16.998	16.919	25.519	35.081	5.3731	188	0.04	0.08	25.515	1023.32	23.24
2	138	17.172	17.089	25.514	35.083	5.3728	188	0.04	0.08	25.510	1023.32	23.25
2	139	17.340	17.272	25.511	35.084	5.3727	188	0.04	0.08	25.507	1023.32	23.25
2	140	17.506	17.314	25.510	35.085	5.3727	188	0.04	0.08	25.507	1023.32	23.25
2	141	17.672	17.692	25.511	35.085	5.3727	188	0.04	0.09	25.507	1023.32	23.25
2	142	17.824	17.759	25.510	35.085	5.3727	188	0.04	0.09	25.506	1023.33	23.25
2	144	18.095	17.796	25.508	35.084	5.3724	188	0.05	0.09	25.504	1023.33	23.25
2	143	17.958	17.899	25.510	35.084	5.3726	188	0.04	0.09	25.506	1023.33	23.25
2	145	18.254	18.106	25.505	35.085	5.3722	188	0.05	0.09	25.501	1023.33	23.25
2	147	18.613	18.325	25.503	35.086	5.3721	188	0.05	0.08	25.499	1023.33	23.25



**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (μmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
2	146	18.428	18.331	25.503	35.086	5.3721	188	0.05	0.09	25.499	1023.33	23.25
2	149	18.949	18.885	25.501	35.087	5.3720	189	0.06	0.09	25.496	1023.33	23.25
2	150	19.074	18.922	25.501	35.087	5.3720	189	0.05	0.09	25.497	1023.34	23.25
2	151	19.208	18.965	25.502	35.087	5.3721	188	0.04	0.08	25.497	1023.34	23.25
2	148	18.798	19.007	25.501	35.086	5.3720	188	0.06	0.09	25.497	1023.33	23.25
2	152	19.363	19.202	25.503	35.086	5.3723	189	0.04	0.08	25.499	1023.34	23.25
2	153	19.527	19.464	25.504	35.086	5.3723	189	0.04	0.08	25.500	1023.34	23.25
2	154	19.690	19.500	25.505	35.086	5.3725	189	0.05	0.09	25.501	1023.34	23.25
2	156	20.022	19.726	25.506	35.086	5.3725	189	0.05	0.08	25.502	1023.34	23.25
2	155	19.853	19.799	25.506	35.086	5.3726	189	0.05	0.09	25.502	1023.34	23.25
2	158	20.362	20.103	25.505	35.086	5.3725	189	0.05	0.08	25.500	1023.34	23.25
2	157	20.196	20.274	25.505	35.086	5.3724	189	0.05	0.08	25.501	1023.34	23.25
2	159	20.525	20.523	25.505	35.087	5.3726	189	0.05	0.09	25.500	1023.34	23.25
2	160	20.682	20.523	25.506	35.088	5.3729	189	0.06	0.08	25.502	1023.34	23.25
2	161	20.838	20.657	25.510	35.088	5.3733	190	0.07	0.08	25.505	1023.34	23.25
2	162	21.014	20.706	25.513	35.087	5.3735	190	0.06	0.09	25.508	1023.34	23.25
2	163	21.207	21.193	25.514	35.086	5.3735	191	0.05	0.09	25.509	1023.34	23.25
2	164	21.389	21.388	25.512	35.086	5.3733	191	0.06	0.09	25.508	1023.34	23.25
2	165	21.543	21.461	25.510	35.086	5.3731	191	0.06	0.09	25.505	1023.34	23.25
2	166	21.686	21.492	25.509	35.087	5.3732	191	0.05	0.10	25.505	1023.34	23.25
2	168	21.915	21.845	25.516	35.088	5.3740	190	0.06	0.10	25.511	1023.34	23.25
2	172	22.124	21.869	25.527	35.085	5.3748	191	0.07	0.12	25.522	1023.34	23.25
2	169	21.986	21.894	25.520	35.088	5.3744	190	0.06	0.11	25.515	1023.34	23.25
2	167	21.817	21.936	25.512	35.088	5.3736	191	0.05	0.10	25.507	1023.35	23.25
2	170	22.044	21.960	25.525	35.087	5.3748	190	0.06	0.11	25.520	1023.34	23.25
2	171	22.087	22.027	25.527	35.085	5.3748	191	0.07	0.12	25.522	1023.34	23.25
2	173	22.168	22.082	25.529	35.087	5.3752	191	0.06	0.12	25.524	1023.34	23.25
2	174	22.207	22.168	25.532	35.087	5.3755	191	0.06	0.12	25.527	1023.34	23.25
2	175	22.221	22.210	25.534	35.086	5.3756	191	0.06	0.12	25.529	1023.34	23.24
3	12	0.495	0.520	25.584	35.052	5.3734	178	0.07	0.36	25.584	1023.19	23.19
3	13	0.534	0.539	25.589	35.086	5.3794	176	0.01	0.25	25.589	1023.22	23.22
3	16	0.639	0.545	25.577	35.143	5.3850	167	0.17	-0.05	25.577	1023.26	23.26
3	14	0.571	0.569	25.580	35.102	5.3816	172	0.02	0.16	25.580	1023.24	23.24
3	15	0.604	0.636	25.569	35.125	5.3830	167	0.17	0.04	25.569	1023.26	23.26
3	19	0.743	0.703	25.589	35.138	5.3878	166	0.12	0.24	25.588	1023.27	23.27

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	17	0.679	0.733	25.600	35.139	5.3871	170	-0.15	-0.03	25.599	1023.26	23.25
3	18	0.714	0.752	25.603	35.127	5.3877	169	-0.24	0.05	25.602	1023.26	23.25
3	24	0.833	0.764	25.583	35.130	5.3860	169	27.23	0.04	25.583	1023.27	23.26
3	22	0.808	0.776	25.592	35.138	5.3880	165	12.12	0.02	25.592	1023.27	23.26
3	29	0.884	0.788	25.606	35.121	5.3868	169	-0.24	-0.06	25.606	1023.25	23.25
3	50	0.942	0.788	25.680	34.595	5.3267	177	0.06	-0.07	25.680	1022.85	22.85
3	26	0.856	0.800	25.580	35.129	5.3850	170	20.93	0.10	25.579	1023.26	23.26
3	48	0.920	0.801	25.903	34.008	5.2719	159	0.12	0.04	25.903	1022.35	22.35
3	20	0.771	0.806	25.588	35.152	5.3883	166	0.39	0.29	25.588	1023.27	23.27
3	43	0.899	0.819	26.026	34.102	5.2900	155	0.10	0.08	26.026	1022.35	22.34
3	21	0.793	0.837	25.596	35.141	5.3883	166	0.25	0.12	25.595	1023.27	23.26
3	31	0.889	0.837	25.637	35.112	5.3877	165	27.27	-0.03	25.637	1023.23	23.22
3	41	0.903	0.849	25.988	34.252	5.3081	156	-0.03	0.08	25.988	1022.48	22.48
3	23	0.821	0.861	25.588	35.137	5.3870	167	27.21	0.01	25.588	1023.27	23.26
3	27	0.868	0.861	25.588	35.135	5.3862	171	5.64	0.07	25.588	1023.26	23.26
3	34	0.894	0.861	25.758	34.957	5.3797	155	0.04	0.08	25.758	1023.07	23.07
3	39	0.901	0.861	25.947	34.470	5.3324	154	-0.16	0.09	25.947	1022.65	22.64
3	52	0.957	0.861	25.555	34.919	5.3561	178	0.04	0.02	25.554	1023.13	23.12
3	45	0.902	0.880	26.091	33.924	5.2719	145	-0.07	0.07	26.091	1022.19	22.19
3	69	0.975	0.880	25.486	35.099	5.3713	187	-0.02	0.09	25.485	1023.27	23.27
3	46	0.906	0.886	26.094	33.819	5.2607	144	-0.03	0.09	26.094	1022.13	22.12
3	71	0.980	0.886	25.485	35.099	5.3713	187	0.00	0.12	25.485	1023.27	23.27
3	32	0.889	0.892	25.676	35.101	5.3892	164	18.26	-0.01	25.675	1023.20	23.20
3	33	0.891	0.892	25.723	35.043	5.3866	161	3.12	0.04	25.723	1023.14	23.14
3	37	0.901	0.892	25.873	34.702	5.3554	155	-0.14	0.05	25.873	1022.84	22.84
3	36	0.900	0.898	25.823	34.811	5.3652	153	-0.08	0.05	25.823	1022.94	22.93
3	62	0.959	0.904	25.485	35.099	5.3710	187	0.03	0.08	25.484	1023.27	23.27
3	38	0.901	0.910	25.914	34.597	5.3464	155	-0.21	0.09	25.914	1022.75	22.75
3	25	0.846	0.916	25.578	35.130	5.3851	170	27.17	0.10	25.578	1023.27	23.26
3	35	0.898	0.916	25.784	34.894	5.3736	152	-0.03	0.08	25.784	1023.02	23.01
3	44	0.899	0.922	26.057	34.028	5.2826	149	-0.03	0.06	26.057	1022.28	22.28
3	67	0.971	0.922	25.486	35.099	5.3713	187	0.06	0.08	25.486	1023.27	23.27
3	73	1.001	0.922	25.484	35.099	5.3712	187	-0.21	0.08	25.484	1023.27	23.27
3	65	0.967	0.928	25.485	35.099	5.3711	187	0.01	0.10	25.485	1023.27	23.27
3	58	0.963	0.929	25.485	35.100	5.3709	187	0.04	0.09	25.484	1023.27	23.27
3	47	0.911	0.934	26.025	33.810	5.2564	149	0.05	0.08	26.025	1022.16	22.16

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (μmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	56	0.967	0.934	25.484	35.100	5.3708	189	0.04	0.10	25.484	1023.27	23.27
3	40	0.902	0.940	25.975	34.341	5.3180	154	-0.09	0.06	25.975	1022.54	22.54
3	59	0.962	0.941	25.485	35.100	5.3710	187	0.01	0.10	25.485	1023.27	23.27
3	54	0.966	0.953	25.487	35.097	5.3707	186	0.12	0.07	25.487	1023.27	23.26
3	61	0.960	0.953	25.485	35.099	5.3710	187	0.09	0.07	25.485	1023.27	23.27
3	75	1.066	0.953	25.486	35.100	5.3714	187	-0.05	0.11	25.486	1023.27	23.27
3	28	0.879	0.959	25.600	35.129	5.3868	170	-0.37	0.03	25.599	1023.26	23.25
3	42	0.902	0.971	26.001	34.186	5.2992	157	0.10	0.09	26.001	1022.42	22.42
3	55	0.966	0.977	25.485	35.101	5.3708	190	0.05	0.12	25.484	1023.27	23.27
3	63	0.963	0.977	25.484	35.099	5.3711	187	0.03	0.09	25.484	1023.27	23.27
3	74	1.025	0.977	25.485	35.099	5.3712	187	-0.21	0.10	25.485	1023.27	23.27
3	30	0.888	0.983	25.615	35.120	5.3870	167	12.01	-0.07	25.615	1023.24	23.24
3	64	0.966	0.983	25.484	35.099	5.3711	187	0.04	0.10	25.484	1023.27	23.27
3	66	0.968	0.989	25.485	35.100	5.3712	187	0.01	0.09	25.485	1023.27	23.27
3	60	0.963	0.990	25.485	35.099	5.3710	187	0.06	0.09	25.485	1023.27	23.27
3	72	0.987	1.002	25.485	35.099	5.3712	187	-0.03	0.08	25.485	1023.27	23.27
3	57	0.966	1.008	25.484	35.100	5.3708	188	0.06	0.10	25.484	1023.27	23.27
3	53	0.962	1.014	25.508	35.032	5.3657	180	0.12	0.01	25.508	1023.22	23.22
3	76	1.129	1.026	25.486	35.100	5.3715	187	0.01	0.13	25.486	1023.27	23.27
3	68	0.974	1.044	25.486	35.099	5.3714	187	0.07	0.08	25.486	1023.27	23.27
3	70	0.977	1.056	25.485	35.099	5.3713	187	-0.09	0.12	25.485	1023.27	23.27
3	49	0.932	1.081	25.781	34.355	5.3057	169	0.13	-0.05	25.781	1022.65	22.64
3	51	0.951	1.087	25.609	34.767	5.3410	179	0.01	-0.01	25.609	1022.99	22.99
3	77	1.213	1.166	25.486	35.099	5.3715	187	-0.07	0.14	25.486	1023.27	23.27
3	78	1.310	1.282	25.486	35.099	5.3714	187	-0.10	0.12	25.485	1023.27	23.27
3	80	1.486	1.428	25.485	35.099	5.3713	187	0.00	0.08	25.485	1023.27	23.27
3	79	1.403	1.519	25.485	35.099	5.3714	187	-0.04	0.09	25.485	1023.27	23.27
3	82	1.611	1.562	25.483	35.099	5.3712	187	0.00	0.09	25.483	1023.28	23.27
3	84	1.689	1.586	25.482	35.099	5.3711	187	0.00	0.08	25.482	1023.28	23.27
3	85	1.733	1.678	25.482	35.099	5.3710	187	0.00	0.08	25.482	1023.28	23.27
3	87	1.880	1.690	25.482	35.099	5.3710	187	-0.01	0.08	25.482	1023.28	23.27
3	86	1.794	1.696	25.482	35.099	5.3710	187	-0.01	0.08	25.481	1023.28	23.27
3	81	1.556	1.708	25.484	35.099	5.3713	187	0.00	0.08	25.484	1023.27	23.27
3	83	1.653	1.757	25.483	35.099	5.3711	187	0.00	0.08	25.482	1023.28	23.27
3	88	1.996	1.933	25.482	35.099	5.3710	187	0.00	0.08	25.481	1023.28	23.27
3	89	2.129	2.140	25.482	35.099	5.3711	187	0.02	0.09	25.482	1023.28	23.27

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	90	2.261	2.268	25.483	35.099	5.3711	187	0.02	0.09	25.482	1023.28	23.27
3	91	2.387	2.414	25.483	35.099	5.3712	187	0.01	0.09	25.483	1023.28	23.27
3	92	2.502	2.530	25.483	35.099	5.3712	187	0.00	0.09	25.483	1023.28	23.27
3	93	2.611	2.579	25.483	35.099	5.3711	187	0.00	0.09	25.482	1023.28	23.27
3	95	2.824	2.731	25.481	35.098	5.3709	187	-0.01	0.08	25.480	1023.28	23.27
3	94	2.717	2.737	25.483	35.098	5.3711	187	-0.01	0.08	25.482	1023.28	23.27
3	96	2.938	2.914	25.479	35.098	5.3707	187	0.00	0.08	25.479	1023.28	23.27
3	97	3.056	3.066	25.479	35.100	5.3708	187	0.02	0.08	25.479	1023.28	23.27
3	98	3.171	3.139	25.482	35.100	5.3711	187	0.02	0.08	25.481	1023.28	23.27
3	100	3.427	3.188	25.484	35.099	5.3712	187	0.00	0.09	25.483	1023.28	23.27
3	99	3.289	3.224	25.483	35.099	5.3711	187	0.01	0.09	25.482	1023.28	23.27
3	101	3.602	3.468	25.484	35.100	5.3714	187	0.00	0.08	25.483	1023.28	23.27
3	102	3.811	3.681	25.482	35.099	5.3713	187	0.00	0.08	25.481	1023.29	23.27
3	103	4.044	3.961	25.479	35.099	5.3710	187	0.00	0.08	25.478	1023.29	23.27
3	104	4.291	4.266	25.477	35.100	5.3708	187	0.00	0.08	25.476	1023.29	23.27
3	105	4.545	4.461	25.477	35.101	5.3708	187	0.00	0.08	25.476	1023.29	23.27
3	106	4.809	4.747	25.479	35.101	5.3710	187	0.01	0.08	25.478	1023.29	23.27
3	107	5.083	4.996	25.480	35.100	5.3711	188	0.01	0.08	25.478	1023.29	23.27
3	108	5.363	5.386	25.480	35.100	5.3711	188	0.00	0.09	25.478	1023.29	23.27
3	109	5.647	5.508	25.481	35.100	5.3711	188	0.00	0.09	25.479	1023.29	23.27
3	110	5.938	5.922	25.483	35.100	5.3714	188	0.01	0.09	25.481	1023.29	23.27
3	111	6.229	6.269	25.483	35.099	5.3714	188	0.01	0.08	25.482	1023.30	23.27
3	112	6.503	6.537	25.481	35.098	5.3712	187	0.00	0.09	25.480	1023.30	23.27
3	113	6.764	6.713	25.478	35.099	5.3709	187	0.00	0.09	25.476	1023.30	23.27
3	114	7.019	7.012	25.476	35.100	5.3707	187	0.00	0.09	25.474	1023.30	23.27
3	115	7.269	7.231	25.476	35.101	5.3708	188	0.00	0.08	25.474	1023.30	23.27
3	117	7.781	7.432	25.478	35.100	5.3710	188	0.01	0.08	25.476	1023.30	23.27
3	116	7.516	7.475	25.478	35.101	5.3710	188	0.00	0.08	25.476	1023.30	23.27
3	118	8.081	8.059	25.478	35.100	5.3710	187	0.01	0.08	25.476	1023.31	23.27
3	119	8.394	8.394	25.476	35.099	5.3708	187	0.02	0.08	25.474	1023.31	23.27
3	120	8.694	8.711	25.473	35.099	5.3706	187	0.01	0.08	25.472	1023.31	23.27
3	121	8.983	8.906	25.470	35.099	5.3703	187	0.01	0.08	25.468	1023.31	23.27
3	122	9.271	9.192	25.466	35.100	5.3700	188	0.00	0.08	25.464	1023.32	23.28
3	123	9.564	9.496	25.460	35.102	5.3697	188	0.00	0.08	25.458	1023.32	23.28
3	124	9.852	9.910	25.456	35.103	5.3694	188	0.01	0.09	25.454	1023.32	23.28
3	125	10.125	10.068	25.454	35.105	5.3693	188	0.02	0.09	25.452	1023.33	23.28

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	126	10.389	10.342	25.443	35.102	5.3687	188	0.01	0.08	25.441	1023.33	23.29
3	127	10.648	10.617	25.413	35.102	5.3666	188	0.01	0.09	25.411	1023.35	23.30
3	128	10.897	10.903	25.371	35.110	5.3634	188	0.00	0.09	25.369	1023.37	23.32
3	129	11.133	11.079	25.326	35.120	5.3600	189	0.01	0.09	25.323	1023.39	23.35
3	130	11.361	11.311	25.278	35.130	5.3562	190	0.01	0.08	25.275	1023.41	23.37
3	131	11.584	11.548	25.243	35.146	5.3535	190	0.02	0.08	25.241	1023.43	23.38
3	132	11.797	11.773	25.229	35.159	5.3530	190	0.02	0.07	25.226	1023.44	23.39
3	133	11.995	12.035	25.220	35.160	5.3524	190	0.02	0.08	25.218	1023.45	23.40
3	134	12.167	12.224	25.210	35.160	5.3514	191	0.02	0.08	25.208	1023.45	23.40
3	135	12.314	12.273	25.200	35.163	5.3508	190	0.01	0.07	25.197	1023.46	23.41
3	136	12.448	12.358	25.190	35.166	5.3500	190	0.02	0.07	25.187	1023.46	23.41
3	137	12.578	12.553	25.181	35.168	5.3494	191	0.02	0.07	25.179	1023.47	23.41
3	138	12.708	12.553	25.176	35.171	5.3490	191	0.02	0.08	25.174	1023.47	23.42
3	140	12.959	12.730	25.180	35.173	5.3493	191	0.02	0.08	25.178	1023.47	23.41
3	139	12.835	12.894	25.176	35.172	5.3490	191	0.02	0.08	25.173	1023.47	23.42
3	142	13.229	13.022	25.185	35.169	5.3498	190	0.01	0.08	25.182	1023.47	23.41
3	141	13.089	13.071	25.185	35.171	5.3498	190	0.01	0.08	25.182	1023.47	23.41
3	143	13.375	13.369	25.180	35.168	5.3493	190	0.01	0.08	25.177	1023.47	23.41
3	144	13.523	13.387	25.177	35.170	5.3490	190	0.02	0.08	25.174	1023.47	23.42
3	146	13.814	13.631	25.174	35.171	5.3489	190	0.03	0.08	25.171	1023.48	23.42
3	145	13.668	13.649	25.175	35.171	5.3490	190	0.03	0.08	25.172	1023.48	23.42
3	147	13.965	13.917	25.174	35.171	5.3489	191	0.03	0.08	25.171	1023.48	23.42
3	148	14.119	14.015	25.173	35.170	5.3488	191	0.03	0.08	25.170	1023.48	23.42
3	150	14.410	14.246	25.171	35.172	5.3487	191	0.04	0.07	25.167	1023.48	23.42
3	149	14.267	14.264	25.171	35.170	5.3486	191	0.03	0.07	25.168	1023.48	23.42
3	151	14.557	14.465	25.170	35.171	5.3487	191	0.04	0.07	25.167	1023.48	23.42
3	152	14.709	14.611	25.168	35.170	5.3484	191	0.03	0.07	25.164	1023.48	23.42
3	154	14.998	14.763	25.164	35.172	5.3480	190	0.03	0.08	25.161	1023.48	23.42
3	153	14.856	14.867	25.165	35.170	5.3480	191	0.02	0.07	25.162	1023.48	23.42
3	155	15.143	15.189	25.166	35.172	5.3481	190	0.04	0.08	25.162	1023.49	23.42
3	156	15.277	15.220	25.167	35.172	5.3483	190	0.04	0.08	25.164	1023.49	23.42
3	157	15.402	15.232	25.168	35.171	5.3484	190	0.04	0.08	25.164	1023.49	23.42
3	158	15.530	15.500	25.167	35.170	5.3483	190	0.04	0.08	25.164	1023.49	23.42
3	159	15.658	15.512	25.166	35.170	5.3482	190	0.04	0.08	25.163	1023.49	23.42
3	160	15.788	15.677	25.165	35.171	5.3481	190	0.03	0.08	25.162	1023.49	23.42
3	161	15.929	15.731	25.164	35.171	5.3481	190	0.03	0.08	25.160	1023.49	23.42

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	162	16.078	16.048	25.163	35.171	5.3480	190	0.03	0.08	25.159	1023.49	23.42
3	163	16.226	16.109	25.163	35.172	5.3481	191	0.03	0.08	25.160	1023.49	23.42
3	164	16.369	16.322	25.164	35.173	5.3482	190	0.03	0.08	25.160	1023.49	23.42
3	165	16.507	16.377	25.164	35.172	5.3482	190	0.03	0.08	25.161	1023.49	23.42
3	166	16.652	16.432	25.164	35.172	5.3482	190	0.03	0.08	25.160	1023.49	23.42
3	167	16.811	16.736	25.163	35.172	5.3481	191	0.04	0.08	25.159	1023.49	23.42
3	168	16.975	16.858	25.163	35.172	5.3480	191	0.04	0.08	25.159	1023.49	23.42
3	169	17.139	17.017	25.161	35.171	5.3479	191	0.04	0.08	25.157	1023.50	23.42
3	170	17.306	17.193	25.157	35.171	5.3476	191	0.04	0.08	25.154	1023.50	23.42
3	171	17.475	17.346	25.155	35.172	5.3474	191	0.04	0.08	25.151	1023.50	23.43
3	172	17.650	17.510	25.152	35.173	5.3473	190	0.03	0.08	25.148	1023.50	23.43
3	173	17.833	17.662	25.146	35.172	5.3467	190	0.02	0.08	25.142	1023.51	23.43
3	174	18.018	18.033	25.137	35.173	5.3460	190	0.02	0.08	25.134	1023.51	23.43
3	176	18.348	18.119	25.133	35.178	5.3457	190	0.03	0.09	25.129	1023.51	23.44
3	175	18.187	18.131	25.133	35.177	5.3456	190	0.03	0.09	25.129	1023.51	23.44
3	177	18.528	18.283	25.135	35.178	5.3459	190	0.03	0.08	25.131	1023.51	23.44
3	178	18.734	18.587	25.136	35.178	5.3460	191	0.03	0.07	25.132	1023.51	23.44
3	179	18.949	18.868	25.137	35.178	5.3461	190	0.04	0.08	25.133	1023.52	23.43
3	180	19.151	19.202	25.138	35.178	5.3463	190	0.04	0.08	25.134	1023.52	23.43
3	181	19.328	19.209	25.139	35.177	5.3463	190	0.02	0.09	25.135	1023.52	23.43
3	182	19.500	19.300	25.139	35.177	5.3463	190	0.02	0.09	25.135	1023.52	23.43
3	183	19.688	19.452	25.141	35.178	5.3465	191	0.02	0.08	25.137	1023.52	23.43
3	184	19.895	19.793	25.144	35.178	5.3469	190	0.03	0.08	25.140	1023.52	23.43
3	186	20.287	20.085	25.139	35.174	5.3464	190	0.04	0.08	25.135	1023.52	23.43
3	185	20.098	20.104	25.145	35.176	5.3469	190	0.04	0.08	25.140	1023.52	23.43
3	187	20.487	20.219	25.131	35.174	5.3456	190	0.04	0.08	25.127	1023.52	23.44
3	188	20.714	20.487	25.119	35.174	5.3447	190	0.03	0.08	25.115	1023.53	23.44
3	189	20.966	20.798	25.094	35.169	5.3423	190	0.04	0.08	25.089	1023.54	23.45
3	190	21.217	21.249	25.059	35.169	5.3385	190	0.04	0.08	25.055	1023.55	23.46
3	191	21.452	21.291	25.034	35.178	5.3362	191	0.04	0.09	25.029	1023.56	23.47
3	192	21.677	21.608	25.013	35.181	5.3348	191	0.03	0.09	25.009	1023.57	23.48
3	193	21.903	21.620	24.992	35.185	5.3329	191	0.03	0.09	24.988	1023.58	23.49
3	194	22.147	21.955	24.979	35.192	5.3317	191	0.03	0.08	24.974	1023.59	23.49
3	195	22.406	22.284	24.969	35.191	5.3309	192	0.03	0.08	24.964	1023.59	23.50
3	196	22.662	22.588	24.954	35.190	5.3294	192	0.02	0.08	24.949	1023.60	23.50
3	197	22.899	22.898	24.943	35.194	5.3282	192	0.02	0.08	24.938	1023.60	23.51

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	198	23.113	22.990	24.942	35.198	5.3283	192	0.03	0.08	24.937	1023.61	23.51
3	199	23.322	23.075	24.940	35.197	5.3284	192	0.03	0.08	24.935	1023.61	23.51
3	200	23.547	23.325	24.927	35.195	5.3274	192	0.04	0.08	24.921	1023.62	23.52
3	201	23.776	23.812	24.911	35.202	5.3263	192	0.04	0.09	24.906	1023.63	23.52
3	202	23.988	23.818	24.903	35.208	5.3259	192	0.04	0.09	24.898	1023.63	23.53
3	203	24.186	24.116	24.899	35.208	5.3256	192	0.04	0.09	24.894	1023.63	23.53
3	204	24.373	24.256	24.897	35.209	5.3253	192	0.04	0.09	24.891	1023.63	23.53
3	205	24.555	24.335	24.895	35.209	5.3252	192	0.04	0.08	24.890	1023.64	23.53
3	206	24.732	24.756	24.892	35.210	5.3251	192	0.03	0.08	24.886	1023.64	23.53
3	207	24.888	24.762	24.888	35.213	5.3252	192	0.03	0.08	24.882	1023.64	23.54
3	209	25.136	24.920	24.883	35.217	5.3251	193	0.04	0.09	24.877	1023.65	23.54
3	208	25.020	25.011	24.885	35.216	5.3252	192	0.03	0.09	24.879	1023.65	23.54
3	210	25.253	25.036	24.881	35.216	5.3248	193	0.04	0.08	24.876	1023.65	23.54
3	211	25.382	25.212	24.881	35.216	5.3246	193	0.04	0.08	24.875	1023.65	23.54
3	213	25.602	25.486	24.883	35.217	5.3249	193	0.03	0.08	24.878	1023.65	23.54
3	215	25.742	25.517	24.889	35.212	5.3250	192	0.04	0.08	24.884	1023.65	23.54
3	212	25.504	25.523	24.881	35.217	5.3248	193	0.04	0.09	24.876	1023.65	23.54
3	217	25.907	25.541	24.889	35.214	5.3253	191	0.04	0.08	24.883	1023.65	23.54
3	216	25.812	25.590	24.889	35.213	5.3253	191	0.04	0.08	24.884	1023.65	23.54
3	214	25.678	25.614	24.887	35.214	5.3249	192	0.03	0.08	24.881	1023.65	23.54
3	218	26.038	25.779	24.889	35.214	5.3253	192	0.05	0.08	24.884	1023.65	23.54
3	219	26.193	26.041	24.895	35.219	5.3262	193	0.05	0.08	24.889	1023.65	23.54
3	221	26.493	26.235	24.914	35.226	5.3294	192	0.04	0.07	24.908	1023.65	23.54
3	220	26.346	26.278	24.905	35.225	5.3280	193	0.05	0.07	24.899	1023.65	23.54
3	222	26.643	26.516	24.918	35.224	5.3298	192	0.04	0.07	24.912	1023.65	23.54
3	223	26.798	26.564	24.920	35.222	5.3297	192	0.04	0.07	24.914	1023.65	23.54
3	224	26.957	26.802	24.921	35.221	5.3298	191	0.04	0.07	24.916	1023.65	23.53
3	225	27.122	26.911	24.921	35.221	5.3299	191	0.05	0.07	24.915	1023.65	23.54
3	226	27.284	27.222	24.919	35.223	5.3300	192	0.04	0.07	24.913	1023.65	23.54
3	227	27.437	27.240	24.918	35.224	5.3299	192	0.04	0.07	24.912	1023.65	23.54
3	228	27.588	27.393	24.917	35.221	5.3294	192	0.05	0.08	24.911	1023.65	23.54
3	229	27.748	27.490	24.915	35.214	5.3284	192	0.05	0.08	24.909	1023.65	23.53
3	230	27.926	27.672	24.913	35.211	5.3276	192	0.04	0.08	24.907	1023.65	23.53
3	231	28.122	27.898	24.912	35.211	5.3275	192	0.03	0.08	24.906	1023.65	23.53
3	232	28.323	28.226	24.914	35.214	5.3281	192	0.04	0.08	24.908	1023.65	23.53
3	233	28.513	28.415	24.918	35.219	5.3291	192	0.04	0.08	24.912	1023.65	23.53

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (μmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	234	28.685	28.543	24.922	35.224	5.3301	192	0.04	0.07	24.916	1023.66	23.54
3	235	28.845	28.683	24.924	35.225	5.3307	191	0.03	0.07	24.918	1023.66	23.54
3	236	29.005	28.756	24.921	35.224	5.3306	191	0.04	0.07	24.915	1023.66	23.54
3	237	29.173	28.994	24.915	35.225	5.3301	192	0.04	0.08	24.909	1023.66	23.54
3	238	29.346	29.121	24.909	35.227	5.3296	192	0.03	0.08	24.902	1023.67	23.54
3	239	29.523	29.365	24.904	35.229	5.3293	192	0.03	0.07	24.898	1023.67	23.55
3	240	29.700	29.517	24.901	35.230	5.3290	192	0.04	0.07	24.894	1023.67	23.55
3	241	29.871	29.724	24.898	35.231	5.3288	192	0.04	0.07	24.891	1023.68	23.55
3	242	30.035	29.901	24.894	35.231	5.3285	192	0.05	0.07	24.887	1023.68	23.55
3	243	30.190	29.980	24.891	35.232	5.3282	192	0.05	0.07	24.884	1023.68	23.55
3	244	30.352	30.029	24.890	35.233	5.3282	193	0.04	0.07	24.883	1023.68	23.55
3	245	30.535	30.315	24.889	35.233	5.3283	193	0.04	0.07	24.883	1023.68	23.55
3	246	30.731	30.516	24.884	35.232	5.3279	193	0.03	0.07	24.878	1023.69	23.56
3	247	30.925	30.845	24.875	35.232	5.3270	193	0.03	0.07	24.868	1023.69	23.56
3	248	31.106	30.906	24.865	35.235	5.3262	193	0.04	0.08	24.859	1023.70	23.56
3	249	31.284	31.034	24.860	35.238	5.3259	193	0.04	0.08	24.853	1023.70	23.57
3	250	31.469	31.277	24.859	35.239	5.3258	194	0.05	0.08	24.852	1023.70	23.57
3	251	31.665	31.350	24.858	35.240	5.3258	194	0.05	0.08	24.852	1023.70	23.57
3	252	31.882	31.563	24.858	35.239	5.3258	193	0.05	0.08	24.851	1023.70	23.57
3	253	32.115	32.014	24.856	35.239	5.3256	194	0.04	0.08	24.849	1023.70	23.57
3	255	32.541	32.203	24.848	35.240	5.3250	194	0.03	0.09	24.841	1023.71	23.57
3	254	32.335	32.263	24.852	35.239	5.3253	194	0.03	0.09	24.845	1023.71	23.57
3	256	32.754	32.580	24.846	35.241	5.3248	194	0.04	0.08	24.839	1023.71	23.57
3	257	32.978	32.659	24.844	35.242	5.3247	194	0.05	0.08	24.837	1023.71	23.57
3	258	33.220	32.903	24.842	35.242	5.3246	194	0.06	0.08	24.835	1023.72	23.57
3	259	33.486	33.238	24.841	35.242	5.3244	194	0.05	0.08	24.833	1023.72	23.58
3	260	33.763	33.566	24.839	35.243	5.3243	195	0.04	0.08	24.832	1023.72	23.58
3	261	34.041	33.822	24.839	35.243	5.3244	195	0.04	0.08	24.832	1023.72	23.58
3	262	34.306	34.303	24.840	35.244	5.3245	195	0.04	0.08	24.833	1023.72	23.58
3	263	34.538	34.419	24.842	35.244	5.3247	195	0.04	0.08	24.834	1023.72	23.58
3	264	34.732	34.705	24.843	35.243	5.3248	195	0.05	0.09	24.835	1023.72	23.57
3	265	34.885	34.851	24.843	35.243	5.3248	195	0.06	0.11	24.836	1023.72	23.57
3	266	34.994	34.906	24.843	35.243	5.3248	195	0.05	0.12	24.836	1023.72	23.57
3	267	35.070	34.936	24.843	35.243	5.3249	195	0.06	0.13	24.836	1023.72	23.57
3	275	35.200	34.961	24.843	35.243	5.3248	194	0.08	0.44	24.835	1023.72	23.57
3	268	35.123	34.967	24.843	35.243	5.3249	195	0.06	0.14	24.836	1023.72	23.57



**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
3	276	35.200	34.967	24.843	35.243	5.3248	194	0.07	0.30	24.835	1023.72	23.57
3	277	35.204	34.974	24.843	35.243	5.3248	194	0.07	0.23	24.835	1023.72	23.57
3	274	35.203	34.985	24.843	35.243	5.3248	195	0.08	0.44	24.836	1023.72	23.57
3	281	35.219	34.986	24.844	35.243	5.3249	195	0.17	0.90	24.836	1023.72	23.57
3	269	35.160	34.991	24.843	35.243	5.3248	195	0.06	0.13	24.836	1023.72	23.57
3	278	35.210	34.992	24.843	35.243	5.3249	195	0.10	0.32	24.836	1023.72	23.57
3	280	35.216	34.992	24.844	35.243	5.3249	195	0.15	0.74	24.836	1023.72	23.57
3	270	35.183	34.997	24.843	35.243	5.3248	195	0.06	0.13	24.836	1023.72	23.57
3	282	35.223	34.998	24.844	35.243	5.3249	195	0.22	0.97	24.836	1023.72	23.57
3	271	35.197	35.003	24.843	35.243	5.3249	195	0.06	0.15	24.836	1023.72	23.57
3	272	35.204	35.004	24.843	35.243	5.3248	195	0.07	0.18	24.836	1023.72	23.57
3	273	35.205	35.004	24.843	35.243	5.3248	195	0.08	0.30	24.836	1023.72	23.57
3	279	35.214	35.010	24.844	35.243	5.3249	195	0.13	0.52	24.836	1023.72	23.57
3	283	35.229	35.011	24.844	35.243	5.3249	195	0.26	0.97	24.836	1023.72	23.57
3	284	35.233	35.023	24.844	35.243	5.3249	195	0.23	0.93	24.837	1023.72	23.57
5	84	0.819	0.693	25.925	35.096	5.4187	183	0.44	0.04	25.924	1023.14	23.14
5	80	0.817	0.717	26.217	35.187	5.4653	161	0.34	0.53	26.217	1023.14	23.13
5	82	0.818	0.717	26.082	35.177	5.4481	174	0.86	0.43	26.082	1023.16	23.16
5	45	0.626	0.718	25.974	35.258	5.4409	204	0.46	0.42	25.974	1023.22	23.22
5	78	0.816	0.723	26.254	35.272	5.4730	161	0.21	0.31	26.254	1023.15	23.14
5	73	0.818	0.729	26.091	35.200	5.4495	175	3.59	0.44	26.091	1023.16	23.16
5	86	0.829	0.741	25.904	35.121	5.4177	199	13.56	0.19	25.904	1023.15	23.15
5	88	0.852	0.741	25.909	35.119	5.4183	194	27.21	0.01	25.909	1023.15	23.15
5	48	0.740	0.742	25.942	35.219	5.4355	179	20.80	0.07	25.942	1023.22	23.21
5	61	0.811	0.754	26.226	35.237	5.4656	156	-0.02	0.04	26.226	1023.13	23.13
5	90	0.922	0.754	25.903	35.118	5.4177	194	24.49	1.68	25.903	1023.16	23.15
5	46	0.681	0.760	25.991	35.237	5.4427	203	0.22	0.13	25.991	1023.21	23.21
5	50	0.769	0.760	25.953	35.284	5.4439	164	3.02	0.24	25.953	1023.25	23.25
5	55	0.798	0.760	25.994	35.205	5.4392	177	0.29	10.50	25.994	1023.19	23.19
5	59	0.807	0.760	26.104	35.208	5.4491	164	1.01	3.13	26.104	1023.15	23.15
5	47	0.717	0.766	25.967	35.203	5.4372	194	8.78	0.05	25.967	1023.20	23.20
5	53	0.792	0.766	26.014	35.188	5.4394	172	0.87	6.34	26.014	1023.18	23.17
5	76	0.815	0.766	26.118	35.238	5.4542	170	0.51	0.07	26.118	1023.16	23.16
5	92	1.116	0.772	25.902	35.119	5.4176	194	21.08	19.68	25.902	1023.16	23.15
5	63	0.815	0.773	26.281	35.243	5.4753	158	0.49	0.24	26.281	1023.13	23.13

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
5	65	0.815	0.778	26.324	35.273	5.4817	164	6.88	0.73	26.323	1023.13	23.13
5	71	0.819	0.778	26.111	35.221	5.4551	177	39.60	0.12	26.111	1023.18	23.17
5	67	0.815	0.784	26.353	35.240	5.4847	165	18.44	0.14	26.352	1023.12	23.12
5	51	0.779	0.785	25.983	35.253	5.4422	162	0.68	0.45	25.983	1023.22	23.22
5	75	0.815	0.790	26.084	35.217	5.4492	176	0.97	0.09	26.084	1023.17	23.16
5	49	0.757	0.791	25.939	35.273	5.4417	168	14.79	0.16	25.939	1023.26	23.25
5	52	0.786	0.791	26.011	35.222	5.4421	163	0.90	0.56	26.011	1023.19	23.19
5	56	0.800	0.791	26.001	35.210	5.4397	173	0.20	15.08	26.001	1023.19	23.19
5	57	0.804	0.809	26.028	35.220	5.4429	170	0.55	19.70	26.027	1023.18	23.18
5	58	0.805	0.815	26.063	35.208	5.4452	167	0.91	12.18	26.063	1023.16	23.16
5	70	0.818	0.815	26.154	35.228	5.4621	177	36.47	-0.13	26.153	1023.18	23.17
5	68	0.817	0.821	26.287	35.219	5.4770	169	6.33	-0.08	26.287	1023.14	23.13
5	69	0.819	0.827	26.212	35.239	5.4702	174	12.41	-0.15	26.212	1023.17	23.16
5	66	0.815	0.833	26.359	35.277	5.4869	164	18.78	0.55	26.359	1023.13	23.12
5	54	0.797	0.852	26.001	35.194	5.4389	179	0.76	12.11	26.001	1023.18	23.18
5	64	0.815	0.852	26.292	35.254	5.4769	162	0.78	0.52	26.291	1023.13	23.13
5	89	0.877	0.857	25.907	35.118	5.4181	194	27.30	0.23	25.907	1023.15	23.15
5	60	0.810	0.858	26.162	35.228	5.4568	160	0.58	0.10	26.162	1023.14	23.14
5	62	0.813	0.858	26.268	35.240	5.4724	156	-0.03	0.06	26.268	1023.13	23.13
5	91	0.996	0.869	25.902	35.119	5.4175	194	21.47	9.11	25.902	1023.16	23.15
5	87	0.837	0.875	25.908	35.121	5.4182	196	28.00	-0.06	25.908	1023.15	23.15
5	74	0.817	0.876	26.078	35.197	5.4472	176	0.86	0.27	26.078	1023.16	23.16
5	77	0.816	0.888	26.182	35.267	5.4636	163	0.23	0.17	26.182	1023.16	23.16
5	72	0.820	0.894	26.098	35.219	5.4517	176	18.66	0.40	26.098	1023.17	23.16
5	79	0.816	0.900	26.273	35.227	5.4735	159	0.22	0.47	26.273	1023.13	23.13
5	81	0.817	0.906	26.145	35.189	5.4559	169	0.58	0.53	26.145	1023.15	23.15
5	85	0.823	0.906	25.903	35.118	5.4172	196	0.73	0.20	25.902	1023.15	23.15
5	83	0.818	0.918	25.997	35.111	5.4315	174	0.88	0.16	25.997	1023.15	23.14
5	93	1.293	1.186	25.902	35.118	5.4176	194	8.83	18.17	25.901	1023.16	23.15
5	94	1.515	1.308	25.900	35.117	5.4174	194	-0.04	6.05	25.899	1023.16	23.15
5	95	1.771	1.722	25.896	35.117	5.4172	194	-0.12	0.04	25.896	1023.16	23.15
5	96	2.047	1.996	25.891	35.116	5.4165	194	-0.20	0.10	25.890	1023.16	23.16
5	97	2.325	2.391	25.884	35.115	5.4157	194	-0.04	0.14	25.884	1023.17	23.16
5	98	2.599	2.537	25.876	35.112	5.4146	194	0.07	0.16	25.875	1023.17	23.16
5	99	2.877	2.787	25.863	35.109	5.4130	194	0.07	0.14	25.862	1023.17	23.16
5	100	3.163	3.225	25.856	35.112	5.4121	194	0.02	0.13	25.856	1023.18	23.16

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
5	101	3.443	3.414	25.861	35.117	5.4127	194	0.01	0.14	25.860	1023.18	23.16
5	102	3.725	3.615	25.862	35.113	5.4131	194	0.00	0.13	25.862	1023.18	23.16
5	103	4.020	3.974	25.851	35.106	5.4117	194	0.00	0.12	25.850	1023.18	23.16
5	104	4.317	4.388	25.833	35.105	5.4096	194	0.00	0.12	25.832	1023.19	23.17
5	105	4.606	4.540	25.815	35.105	5.4077	194	0.00	0.13	25.814	1023.19	23.17
5	106	4.893	4.851	25.798	35.105	5.4059	194	0.01	0.13	25.797	1023.20	23.18
5	107	5.189	5.088	25.781	35.106	5.4041	194	0.01	0.13	25.780	1023.21	23.18
5	108	5.493	5.484	25.768	35.107	5.4026	195	0.00	0.13	25.766	1023.21	23.19
5	109	5.793	5.825	25.760	35.110	5.4019	195	0.01	0.14	25.758	1023.22	23.19
5	110	6.090	5.959	25.753	35.109	5.4013	195	0.02	0.14	25.752	1023.22	23.19
5	111	6.396	6.318	25.743	35.106	5.4000	195	0.03	0.14	25.742	1023.22	23.20
5	112	6.714	6.641	25.735	35.109	5.3992	195	0.03	0.14	25.734	1023.23	23.20
5	113	7.037	7.031	25.730	35.111	5.3991	195	0.03	0.13	25.729	1023.23	23.20
5	114	7.358	7.298	25.718	35.107	5.3979	195	0.03	0.13	25.717	1023.24	23.21
5	115	7.681	7.597	25.697	35.102	5.3953	195	0.03	0.14	25.695	1023.24	23.21
5	116	8.005	8.017	25.675	35.101	5.3926	195	0.01	0.15	25.673	1023.25	23.22
5	117	8.321	8.315	25.657	35.104	5.3909	195	0.01	0.15	25.655	1023.26	23.22
5	118	8.623	8.626	25.642	35.106	5.3896	194	0.01	0.13	25.640	1023.26	23.23
5	119	8.918	8.839	25.623	35.103	5.3876	194	0.02	0.11	25.621	1023.27	23.23
5	120	9.210	9.186	25.602	35.101	5.3850	193	0.02	0.10	25.600	1023.28	23.24
5	121	9.501	9.405	25.589	35.105	5.3836	193	0.02	0.10	25.587	1023.28	23.24
5	122	9.791	9.789	25.583	35.109	5.3833	192	0.02	0.10	25.581	1023.29	23.24
5	123	10.068	10.136	25.582	35.110	5.3832	192	0.03	0.10	25.579	1023.29	23.25
5	124	10.329	10.190	25.579	35.110	5.3831	192	0.02	0.10	25.577	1023.29	23.25
5	125	10.593	10.507	25.574	35.110	5.3827	192	0.01	0.10	25.571	1023.29	23.25
5	126	10.866	10.781	25.565	35.108	5.3817	193	0.01	0.10	25.562	1023.30	23.25
5	127	11.137	11.146	25.555	35.109	5.3807	192	0.02	0.10	25.553	1023.30	23.26
5	128	11.402	11.280	25.548	35.111	5.3801	192	0.01	0.09	25.545	1023.31	23.26
5	130	11.895	11.706	25.534	35.113	5.3793	192	0.02	0.09	25.531	1023.32	23.27
5	129	11.656	11.792	25.543	35.113	5.3798	192	0.01	0.09	25.540	1023.31	23.26
5	131	12.135	12.041	25.510	35.109	5.3774	192	0.03	0.09	25.508	1023.33	23.28
5	132	12.386	12.309	25.470	35.110	5.3740	192	0.03	0.09	25.468	1023.35	23.29
5	133	12.636	12.577	25.425	35.119	5.3702	192	0.04	0.10	25.423	1023.37	23.31
5	134	12.885	12.784	25.390	35.133	5.3675	193	0.04	0.10	25.388	1023.38	23.33
5	135	13.131	13.113	25.370	35.143	5.3660	193	0.03	0.10	25.367	1023.39	23.34
5	136	13.372	13.259	25.359	35.149	5.3654	193	0.03	0.10	25.356	1023.40	23.34

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
5	137	13.612	13.539	25.351	35.152	5.3650	193	0.02	0.10	25.348	1023.41	23.35
5	138	13.857	13.691	25.342	35.154	5.3645	194	0.02	0.09	25.339	1023.41	23.35
5	139	14.110	14.050	25.332	35.156	5.3637	194	0.03	0.09	25.328	1023.42	23.36
5	140	14.362	14.306	25.322	35.160	5.3632	194	0.04	0.09	25.319	1023.43	23.37
5	141	14.601	14.611	25.317	35.165	5.3631	195	0.05	0.10	25.314	1023.43	23.37
5	142	14.818	14.860	25.317	35.167	5.3632	195	0.04	0.10	25.314	1023.43	23.37
5	143	15.012	14.909	25.319	35.168	5.3636	195	0.04	0.09	25.316	1023.43	23.37
5	144	15.185	15.311	25.323	35.169	5.3641	195	0.05	0.09	25.320	1023.43	23.37
5	145	15.309	15.554	25.326	35.168	5.3644	196	0.05	0.10	25.323	1023.43	23.37
6	19	0.740	0.694	25.498	35.128	5.3758	154	0.04	0.09	25.498	1023.28	23.28
6	14	0.656	0.700	25.483	34.977	5.3543	198	0.03	0.08	25.483	1023.18	23.17
6	29	0.752	0.700	25.565	35.129	5.3832	166	0.03	0.09	25.565	1023.27	23.26
6	35	0.753	0.706	25.629	35.086	5.3850	155	0.04	0.08	25.629	1023.22	23.22
6	27	0.750	0.718	25.538	35.142	5.3816	158	0.04	0.09	25.538	1023.28	23.28
6	33	0.752	0.718	25.647	35.090	5.3875	153	0.03	0.08	25.646	1023.22	23.21
6	37	0.755	0.718	25.674	35.055	5.3836	154	0.02	0.08	25.674	1023.17	23.17
6	45	0.760	0.718	25.633	34.921	5.3623	166	0.04	0.11	25.633	1023.09	23.09
6	52	0.770	0.718	25.604	34.887	5.3594	151	0.00	0.07	25.603	1023.10	23.10
6	16	0.712	0.719	25.453	35.130	5.3696	162	0.04	0.08	25.453	1023.29	23.29
6	21	0.744	0.719	25.506	35.135	5.3784	158	0.03	0.09	25.505	1023.29	23.29
6	43	0.763	0.724	25.650	34.897	5.3624	162	0.04	0.11	25.649	1023.08	23.07
6	57	0.827	0.724	25.377	35.142	5.3652	191	-0.07	0.14	25.376	1023.33	23.33
6	59	0.936	0.724	25.379	35.140	5.3653	188	0.00	0.12	25.379	1023.33	23.33
6	31	0.754	0.730	25.618	35.124	5.3867	157	0.04	0.08	25.617	1023.24	23.24
6	41	0.761	0.730	25.718	34.857	5.3643	148	0.03	0.08	25.718	1023.03	23.02
6	50	0.764	0.730	25.679	34.842	5.3575	152	0.02	0.07	25.679	1023.02	23.02
6	17	0.725	0.731	25.478	35.137	5.3726	153	0.05	0.09	25.478	1023.28	23.28
6	24	0.743	0.731	25.461	35.187	5.3800	149	0.04	0.09	25.461	1023.34	23.34
6	25	0.745	0.736	25.478	35.195	5.3816	146	0.04	0.08	25.478	1023.33	23.33
6	23	0.743	0.737	25.464	35.173	5.3791	154	0.03	0.09	25.464	1023.33	23.33
6	22	0.743	0.743	25.484	35.150	5.3790	157	0.03	0.08	25.484	1023.31	23.31
6	40	0.759	0.748	25.734	34.890	5.3694	145	0.04	0.08	25.734	1023.04	23.04
6	49	0.763	0.748	25.694	34.831	5.3575	152	0.03	0.08	25.694	1023.01	23.01
6	26	0.747	0.749	25.512	35.171	5.3817	150	0.05	0.08	25.511	1023.31	23.30
6	38	0.757	0.754	25.702	35.006	5.3803	151	0.02	0.08	25.702	1023.13	23.12

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (μmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
6	54	0.780	0.755	25.417	35.095	5.3658	180	0.05	0.08	25.417	1023.30	23.30
6	46	0.761	0.761	25.650	34.904	5.3605	162	0.04	0.11	25.650	1023.06	23.06
6	15	0.691	0.767	25.456	35.088	5.3661	181	0.03	0.08	25.456	1023.27	23.26
6	34	0.752	0.767	25.638	35.086	5.3864	154	0.04	0.08	25.638	1023.22	23.22
6	47	0.763	0.767	25.680	34.872	5.3593	155	0.05	0.10	25.679	1023.03	23.03
6	48	0.763	0.767	25.698	34.843	5.3585	150	0.05	0.08	25.697	1023.01	23.01
6	55	0.789	0.767	25.385	35.134	5.3656	192	0.08	0.10	25.385	1023.33	23.32
6	18	0.734	0.773	25.497	35.126	5.3749	152	0.05	0.09	25.497	1023.28	23.28
6	39	0.759	0.773	25.725	34.948	5.3750	146	0.04	0.08	25.724	1023.08	23.07
6	30	0.753	0.779	25.584	35.133	5.3850	162	0.04	0.08	25.584	1023.26	23.26
6	32	0.754	0.779	25.643	35.100	5.3876	154	0.04	0.08	25.643	1023.22	23.22
6	56	0.803	0.779	25.377	35.139	5.3650	194	-0.01	0.13	25.377	1023.33	23.33
6	53	0.774	0.785	25.501	34.987	5.3634	162	-0.01	0.07	25.501	1023.21	23.21
6	36	0.755	0.797	25.642	35.084	5.3841	155	0.03	0.08	25.642	1023.20	23.20
6	44	0.762	0.797	25.633	34.919	5.3625	165	0.03	0.11	25.633	1023.09	23.09
6	58	0.868	0.797	25.378	35.141	5.3653	189	-0.03	0.13	25.378	1023.33	23.33
6	60	1.050	0.797	25.382	35.141	5.3656	188	0.01	0.11	25.381	1023.33	23.33
6	20	0.744	0.798	25.506	35.137	5.3771	156	0.04	0.09	25.505	1023.28	23.28
6	28	0.752	0.803	25.553	35.132	5.3822	165	0.04	0.09	25.553	1023.27	23.27
6	42	0.763	0.803	25.684	34.866	5.3625	155	0.04	0.09	25.683	1023.05	23.04
6	51	0.767	0.809	25.659	34.856	5.3576	150	0.02	0.07	25.659	1023.04	23.04
6	61	1.228	0.913	25.385	35.140	5.3659	188	0.04	0.09	25.385	1023.33	23.33
6	62	1.467	1.345	25.392	35.140	5.3664	188	0.06	0.09	25.392	1023.33	23.32
6	63	1.745	1.656	25.402	35.138	5.3673	188	0.05	0.09	25.402	1023.33	23.32
6	64	2.039	2.039	25.408	35.135	5.3679	188	0.04	0.08	25.408	1023.33	23.32
6	65	2.339	2.277	25.410	35.134	5.3680	188	0.04	0.08	25.410	1023.33	23.32
6	66	2.633	2.782	25.412	35.130	5.3678	188	0.04	0.08	25.411	1023.32	23.31
6	67	2.908	2.922	25.413	35.127	5.3675	188	0.04	0.09	25.413	1023.32	23.31
6	68	3.167	3.178	25.414	35.129	5.3680	188	0.04	0.09	25.413	1023.33	23.31
6	69	3.429	3.257	25.414	35.132	5.3685	188	0.03	0.10	25.413	1023.33	23.31
6	70	3.711	3.646	25.412	35.132	5.3683	188	0.04	0.10	25.412	1023.33	23.32
6	71	4.005	4.030	25.410	35.130	5.3679	188	0.05	0.09	25.409	1023.33	23.32
6	72	4.297	4.231	25.407	35.130	5.3676	188	0.05	0.09	25.407	1023.33	23.32
6	73	4.597	4.493	25.406	35.131	5.3675	188	0.05	0.09	25.405	1023.34	23.32
6	74	4.907	4.888	25.406	35.132	5.3676	188	0.04	0.09	25.405	1023.34	23.32
6	75	5.213	5.314	25.406	35.131	5.3676	188	0.04	0.09	25.405	1023.34	23.32

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
6	76	5.505	5.412	25.405	35.131	5.3675	188	0.03	0.09	25.404	1023.34	23.32
6	77	5.796	5.747	25.403	35.130	5.3672	188	0.04	0.09	25.401	1023.34	23.32
6	78	6.097	5.984	25.401	35.131	5.3671	188	0.04	0.08	25.400	1023.34	23.32
6	79	6.402	6.465	25.401	35.131	5.3671	188	0.03	0.08	25.400	1023.35	23.32
6	80	6.699	6.654	25.401	35.131	5.3671	188	0.03	0.09	25.399	1023.35	23.32
6	81	6.990	6.934	25.401	35.131	5.3671	188	0.04	0.09	25.399	1023.35	23.32
6	82	7.290	7.141	25.401	35.131	5.3671	188	0.05	0.08	25.399	1023.35	23.32
6	83	7.602	7.579	25.401	35.131	5.3671	189	0.06	0.08	25.399	1023.35	23.32
6	84	7.917	7.859	25.397	35.131	5.3671	189	0.06	0.08	25.395	1023.36	23.32
6	85	8.233	8.170	25.361	35.123	5.3651	188	0.05	0.08	25.359	1023.38	23.34
6	86	8.554	8.462	25.268	35.125	5.3583	188	0.05	0.08	25.266	1023.42	23.39
6	87	8.883	8.797	25.172	35.163	5.3507	188	0.06	0.08	25.170	1023.47	23.43
6	88	9.213	9.236	25.134	35.201	5.3482	189	0.06	0.08	25.132	1023.49	23.45
6	89	9.534	9.485	25.128	35.208	5.3487	190	0.06	0.08	25.126	1023.50	23.46
6	90	9.850	9.753	25.111	35.204	5.3476	190	0.05	0.08	25.109	1023.51	23.47
6	91	10.170	10.112	25.080	35.206	5.3449	190	0.05	0.08	25.077	1023.52	23.48
6	92	10.491	10.441	25.051	35.217	5.3427	190	0.05	0.08	25.049	1023.54	23.49
6	93	10.812	10.715	25.035	35.227	5.3418	191	0.05	0.08	25.032	1023.55	23.50
6	94	11.137	11.037	25.026	35.230	5.3412	191	0.05	0.08	25.024	1023.55	23.51
6	95	11.464	11.457	25.020	35.232	5.3408	191	0.05	0.07	25.018	1023.56	23.51
6	96	11.782	11.750	25.016	35.234	5.3406	191	0.05	0.08	25.014	1023.56	23.51
6	97	12.084	12.121	25.014	35.236	5.3407	191	0.04	0.08	25.012	1023.57	23.51
6	98	12.379	12.145	25.014	35.237	5.3407	191	0.04	0.08	25.011	1023.57	23.52
6	99	12.683	12.681	25.013	35.237	5.3407	191	0.04	0.08	25.010	1023.57	23.52
6	100	12.991	12.827	25.012	35.237	5.3406	191	0.04	0.08	25.009	1023.57	23.52
6	101	13.298	13.333	25.011	35.238	5.3407	192	0.05	0.08	25.008	1023.57	23.52
6	102	13.598	13.473	25.011	35.238	5.3407	192	0.06	0.08	25.008	1023.58	23.52
6	103	13.889	13.917	25.011	35.238	5.3407	192	0.06	0.08	25.008	1023.58	23.52
6	104	14.178	13.935	25.011	35.238	5.3408	191	0.06	0.08	25.008	1023.58	23.52
6	105	14.477	14.410	25.011	35.238	5.3408	191	0.06	0.08	25.008	1023.58	23.52
6	106	14.780	14.721	25.012	35.238	5.3408	192	0.05	0.08	25.008	1023.58	23.52
6	107	15.082	14.928	25.012	35.238	5.3409	192	0.06	0.08	25.009	1023.58	23.52
6	108	15.390	15.293	25.012	35.238	5.3409	192	0.06	0.09	25.008	1023.58	23.52
6	109	15.698	15.658	25.011	35.238	5.3409	191	0.06	0.09	25.008	1023.58	23.52
6	110	15.992	15.999	25.012	35.238	5.3410	191	0.05	0.08	25.008	1023.59	23.52
6	111	16.278	16.030	25.012	35.238	5.3411	192	0.06	0.08	25.008	1023.59	23.52

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
6	112	16.575	16.480	25.012	35.238	5.3411	192	0.06	0.08	25.008	1023.59	23.52
6	113	16.885	16.706	25.011	35.238	5.3410	192	0.05	0.08	25.008	1023.59	23.52
6	114	17.196	17.211	25.011	35.238	5.3410	192	0.05	0.08	25.008	1023.59	23.52
6	115	17.498	17.369	25.011	35.238	5.3410	192	0.05	0.08	25.007	1023.59	23.52
6	116	17.797	17.643	25.011	35.238	5.3410	192	0.05	0.08	25.007	1023.59	23.52
6	117	18.110	17.893	25.012	35.238	5.3411	192	0.06	0.08	25.008	1023.60	23.52
6	118	18.432	18.428	25.012	35.239	5.3414	192	0.05	0.09	25.008	1023.60	23.52
6	119	18.744	18.648	25.011	35.240	5.3414	191	0.05	0.10	25.007	1023.60	23.52
6	120	19.050	18.885	25.009	35.240	5.3413	191	0.05	0.09	25.005	1023.60	23.52
6	121	19.363	19.184	25.006	35.241	5.3412	192	0.05	0.08	25.002	1023.61	23.52
6	122	19.678	19.695	25.005	35.242	5.3410	192	0.05	0.08	25.000	1023.61	23.52
6	123	19.983	19.804	25.006	35.243	5.3412	192	0.05	0.08	25.001	1023.61	23.52
6	124	20.287	20.151	25.007	35.242	5.3413	192	0.05	0.08	25.003	1023.61	23.52
6	125	20.597	20.437	25.006	35.242	5.3413	192	0.04	0.08	25.002	1023.61	23.52
6	126	20.919	20.663	24.998	35.239	5.3407	192	0.04	0.08	24.994	1023.62	23.53
6	127	21.262	21.083	24.981	35.239	5.3392	192	0.05	0.08	24.976	1023.63	23.54
6	128	21.612	21.594	24.964	35.246	5.3379	192	0.06	0.08	24.959	1023.63	23.54
6	129	21.948	21.838	24.956	35.251	5.3373	192	0.08	0.08	24.951	1023.64	23.55
6	130	22.274	22.112	24.952	35.250	5.3367	192	0.08	0.08	24.948	1023.64	23.55
6	132	22.867	22.593	24.951	35.251	5.3366	192	0.08	0.07	24.946	1023.64	23.55
6	131	22.584	22.727	24.951	35.250	5.3365	192	0.08	0.08	24.946	1023.64	23.55
6	133	23.147	23.043	24.951	35.251	5.3366	192	0.07	0.07	24.946	1023.65	23.55
6	134	23.438	23.171	24.950	35.250	5.3365	192	0.07	0.07	24.945	1023.65	23.55
6	135	23.739	23.615	24.949	35.250	5.3364	192	0.06	0.08	24.944	1023.65	23.55
6	136	24.044	23.914	24.949	35.250	5.3363	192	0.07	0.09	24.944	1023.65	23.55
6	137	24.338	24.291	24.949	35.250	5.3364	192	0.08	0.10	24.944	1023.65	23.55
6	138	24.624	24.358	24.949	35.250	5.3364	192	0.08	0.10	24.944	1023.65	23.55
6	139	24.923	24.693	24.949	35.250	5.3364	192	0.08	0.09	24.944	1023.65	23.55
6	140	25.244	24.991	24.949	35.250	5.3365	192	0.08	0.10	24.944	1023.65	23.55
6	141	25.572	25.570	24.950	35.251	5.3367	192	0.09	0.11	24.945	1023.66	23.55
6	142	25.884	25.746	24.951	35.250	5.3368	192	0.09	0.09	24.946	1023.66	23.55
6	143	26.170	26.233	24.952	35.250	5.3368	192	0.07	0.08	24.946	1023.66	23.55
6	144	26.413	26.440	24.952	35.250	5.3369	192	0.07	0.08	24.947	1023.66	23.55
6	145	26.604	26.647	24.953	35.250	5.3369	192	0.07	0.10	24.947	1023.66	23.55
6	146	26.745	26.769	24.954	35.250	5.3370	192	0.09	0.11	24.948	1023.66	23.55
6	147	26.839	26.824	24.954	35.250	5.3370	192	0.09	0.12	24.948	1023.66	23.55

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
6	148	26.892	26.866	24.955	35.250	5.3371	192	0.09	0.12	24.949	1023.66	23.55
7	8	0.674	0.754	25.711	35.380	5.4314	198	-0.03	0.07	25.711	1023.40	23.40
7	12	0.817	0.803	25.693	35.328	5.4220	152	0.07	0.12	25.692	1023.37	23.36
7	11	0.799	0.821	25.687	35.335	5.4219	156	0.06	0.12	25.687	1023.37	23.37
7	33	0.862	0.821	26.319	35.161	5.4695	163	0.18	0.13	26.318	1023.07	23.07
7	9	0.735	0.827	25.688	35.317	5.4199	183	0.04	0.13	25.688	1023.36	23.36
7	14	0.843	0.827	25.693	35.369	5.4287	149	0.06	0.13	25.693	1023.40	23.40
7	23	0.860	0.827	26.711	35.247	5.5181	164	-0.03	0.17	26.711	1022.98	22.98
7	10	0.775	0.833	25.682	35.341	5.4219	165	0.05	0.13	25.682	1023.38	23.37
7	49	1.050	0.833	25.686	35.112	5.3977	175	0.13	0.16	25.686	1023.24	23.23
7	17	0.861	0.839	25.716	35.357	5.4273	156	0.07	0.13	25.716	1023.38	23.37
7	45	0.887	0.839	26.026	35.153	5.4364	162	0.35	0.12	26.026	1023.15	23.15
7	20	0.863	0.845	26.150	35.344	5.4652	154	0.07	0.13	26.150	1023.20	23.19
7	22	0.861	0.845	26.575	35.317	5.5079	165	-0.03	0.17	26.575	1023.05	23.05
7	36	0.862	0.845	26.216	35.171	5.4588	163	0.16	0.12	26.216	1023.10	23.10
7	40	0.863	0.845	26.122	35.162	5.4475	164	-0.03	0.15	26.121	1023.12	23.12
7	25	0.863	0.851	26.752	35.173	5.5183	161	0.08	0.14	26.752	1022.95	22.95
7	29	0.863	0.851	26.504	35.162	5.4904	162	0.04	0.21	26.504	1023.02	23.01
7	38	0.861	0.851	26.169	35.163	5.4531	163	0.00	0.15	26.169	1023.11	23.11
7	39	0.861	0.851	26.144	35.164	5.4503	164	-0.02	0.16	26.144	1023.12	23.12
7	19	0.863	0.857	25.966	35.376	5.4507	147	0.05	0.13	25.966	1023.28	23.28
7	27	0.864	0.857	26.630	35.154	5.5039	163	0.07	0.17	26.629	1022.98	22.98
7	28	0.863	0.857	26.563	35.161	5.4970	163	0.13	0.20	26.563	1023.00	23.00
7	30	0.863	0.857	26.453	35.165	5.4847	163	-0.05	0.18	26.453	1023.03	23.03
7	43	0.873	0.857	26.069	35.160	5.4414	160	0.19	0.14	26.069	1023.14	23.13
7	13	0.831	0.858	25.695	35.375	5.4293	149	0.06	0.13	25.695	1023.40	23.40
7	31	0.863	0.858	26.409	35.163	5.4794	163	0.05	0.17	26.409	1023.04	23.04
7	41	0.866	0.863	26.103	35.162	5.4453	162	0.00	0.20	26.103	1023.13	23.13
7	42	0.869	0.863	26.086	35.160	5.4433	160	0.10	0.20	26.086	1023.13	23.13
7	35	0.864	0.864	26.243	35.165	5.4613	162	0.33	0.13	26.243	1023.09	23.09
7	37	0.862	0.864	26.194	35.167	5.4561	162	0.03	0.11	26.194	1023.11	23.10
7	46	0.904	0.864	25.999	35.157	5.4343	161	0.19	0.12	25.998	1023.16	23.16
7	47	0.932	0.864	25.935	35.132	5.4277	161	0.03	0.13	25.935	1023.18	23.18
7	26	0.864	0.869	26.700	35.154	5.5116	162	0.05	0.15	26.700	1022.96	22.96
7	16	0.858	0.870	25.692	35.362	5.4276	156	0.07	0.12	25.692	1023.40	23.40



**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
7	44	0.878	0.870	26.050	35.155	5.4390	162	0.29	0.11	26.050	1023.14	23.14
7	15	0.853	0.876	25.691	35.357	5.4268	151	0.07	0.13	25.691	1023.39	23.39
7	24	0.861	0.876	26.762	35.202	5.5209	161	0.04	0.15	26.761	1022.95	22.95
7	32	0.863	0.876	26.364	35.157	5.4740	163	0.16	0.17	26.363	1023.05	23.05
7	48	0.977	0.876	25.809	35.098	5.4125	164	0.05	0.15	25.809	1023.21	23.21
7	18	0.863	0.882	25.810	35.389	5.4372	149	0.06	0.13	25.810	1023.35	23.34
7	21	0.863	0.882	26.365	35.353	5.4875	163	0.04	0.15	26.365	1023.13	23.12
7	34	0.863	0.882	26.278	35.163	5.4652	162	0.29	0.11	26.278	1023.08	23.08
7	50	1.172	0.900	25.634	35.141	5.3924	185	0.11	0.14	25.633	1023.26	23.25
7	51	1.357	1.101	25.623	35.148	5.3918	189	0.03	0.14	25.623	1023.26	23.26
7	52	1.597	1.466	25.618	35.147	5.3913	187	0.02	0.14	25.618	1023.27	23.26
7	53	1.873	1.783	25.614	35.147	5.3909	186	0.06	0.12	25.613	1023.27	23.26
7	54	2.169	2.099	25.607	35.145	5.3903	185	0.08	0.12	25.607	1023.27	23.26
7	55	2.478	2.471	25.599	35.144	5.3893	185	0.08	0.14	25.599	1023.28	23.27
7	56	2.789	2.763	25.591	35.144	5.3884	185	0.08	0.15	25.591	1023.28	23.27
7	57	3.098	3.128	25.583	35.143	5.3877	186	0.08	0.15	25.582	1023.28	23.27
7	58	3.402	3.378	25.568	35.139	5.3862	186	0.08	0.14	25.567	1023.29	23.28
7	59	3.704	3.664	25.545	35.136	5.3836	187	0.08	0.15	25.545	1023.30	23.28
7	60	4.003	4.054	25.527	35.140	5.3816	188	0.09	0.17	25.526	1023.30	23.29
7	61	4.291	4.304	25.519	35.145	5.3810	190	0.10	0.18	25.518	1023.31	23.29
7	62	4.568	4.572	25.517	35.147	5.3809	191	0.10	0.18	25.516	1023.31	23.29
7	63	4.839	4.803	25.518	35.147	5.3811	191	0.11	0.17	25.517	1023.31	23.29
7	64	5.107	5.107	25.518	35.147	5.3812	191	0.11	0.17	25.517	1023.31	23.29
7	65	5.371	5.345	25.517	35.146	5.3811	191	0.11	0.17	25.515	1023.32	23.29
7	66	5.630	5.613	25.515	35.146	5.3809	191	0.11	0.17	25.513	1023.32	23.29
7	67	5.885	5.887	25.514	35.147	5.3808	191	0.11	0.18	25.513	1023.32	23.29
7	68	6.126	6.215	25.516	35.148	5.3811	191	0.11	0.18	25.514	1023.32	23.29
7	69	6.339	6.447	25.517	35.148	5.3814	192	0.11	0.18	25.516	1023.32	23.29
7	70	6.514	6.660	25.518	35.147	5.3814	193	0.10	0.18	25.516	1023.32	23.29
7	71	6.640	6.861	25.517	35.147	5.3814	193	0.11	0.18	25.516	1023.32	23.29
8	71	0.649	0.714	25.954	35.363	5.4472	203	12.00	1.18	25.953	1023.27	23.27
8	77	0.843	0.793	25.925	35.428	5.4616	155	0.13	0.06	25.924	1023.38	23.37
8	83	0.921	0.805	26.071	35.323	5.4593	171	24.55	10.63	26.070	1023.24	23.23
8	74	0.803	0.824	25.910	35.340	5.4457	184	0.00	0.12	25.910	1023.30	23.30
8	72	0.723	0.836	25.984	35.394	5.4582	204	-0.21	0.02	25.984	1023.31	23.30

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
8	78	0.856	0.842	25.892	35.444	5.4604	145	0.01	0.05	25.891	1023.40	23.40
8	81	0.898	0.842	25.931	35.349	5.4474	158	21.52	-0.02	25.930	1023.29	23.29
8	73	0.773	0.854	25.954	35.338	5.4519	199	-0.18	0.09	25.954	1023.30	23.29
8	75	0.823	0.854	25.919	35.400	5.4523	169	0.26	0.08	25.918	1023.33	23.33
8	76	0.834	0.854	25.940	35.413	5.4588	162	0.32	0.04	25.940	1023.35	23.35
8	85	0.941	0.854	26.211	35.347	5.4777	163	0.52	4.61	26.211	1023.21	23.21
8	79	0.872	0.878	25.873	35.444	5.4574	142	9.10	-0.04	25.873	1023.40	23.40
8	87	0.954	0.891	26.374	35.342	5.4948	152	-0.22	0.35	26.374	1023.16	23.15
8	91	0.977	0.897	26.966	35.274	5.5481	161	24.24	0.02	26.966	1022.92	22.92
8	102	1.044	0.903	26.359	35.209	5.4928	160	12.12	0.11	26.359	1023.16	23.16
8	80	0.885	0.909	25.884	35.418	5.4536	148	21.33	-0.06	25.884	1023.37	23.37
8	104	1.050	0.921	26.106	35.367	5.4718	170	27.16	0.20	26.106	1023.27	23.27
8	89	0.965	0.933	26.641	35.366	5.5201	157	6.07	0.00	26.641	1023.06	23.05
8	99	1.029	0.939	26.735	35.402	5.5425	160	6.24	0.42	26.735	1023.10	23.09
8	94	1.005	0.958	27.077	35.219	5.5576	158	0.45	0.13	27.077	1022.87	22.87
8	96	1.020	0.964	26.917	35.198	5.5465	156	30.60	0.16	26.917	1022.95	22.95
8	90	0.969	0.976	26.830	35.332	5.5377	161	21.27	-0.05	26.830	1022.98	22.98
8	112	1.076	0.976	25.893	35.152	5.4299	167	5.77	0.11	25.893	1023.23	23.23
8	114	1.140	0.976	25.723	35.157	5.4031	192	39.33	10.73	25.723	1023.24	23.23
8	116	1.318	0.982	25.721	35.153	5.4038	190	27.46	13.77	25.721	1023.24	23.24
8	82	0.910	0.988	26.000	35.319	5.4506	168	24.55	3.04	26.000	1023.25	23.25
8	93	0.998	0.994	27.074	35.223	5.5567	158	0.03	0.14	27.074	1022.87	22.87
8	110	1.056	0.994	26.152	35.304	5.4708	157	24.65	0.14	26.152	1023.23	23.22
8	86	0.948	1.006	26.292	35.353	5.4865	156	0.19	0.28	26.292	1023.19	23.18
8	107	1.050	1.006	26.098	35.334	5.4681	162	5.86	12.14	26.097	1023.26	23.26
8	88	0.961	1.012	26.474	35.347	5.5034	153	-0.21	0.18	26.474	1023.12	23.11
8	108	1.050	1.037	26.102	35.351	5.4684	160	0.51	4.53	26.101	1023.26	23.25
8	100	1.037	1.043	26.724	35.358	5.5415	154	0.24	0.34	26.724	1023.10	23.10
8	92	0.989	1.049	27.041	35.238	5.5537	159	9.01	0.11	27.041	1022.88	22.88
8	84	0.933	1.055	26.139	35.336	5.4685	168	9.57	12.11	26.139	1023.22	23.22
8	98	1.028	1.055	26.684	35.416	5.5384	162	24.42	0.27	26.684	1023.12	23.11
8	97	1.026	1.061	26.740	35.267	5.5354	159	39.49	0.12	26.740	1023.05	23.05
8	109	1.052	1.061	26.142	35.352	5.4718	158	13.08	0.03	26.141	1023.24	23.24
8	95	1.013	1.067	27.042	35.219	5.5564	157	9.69	0.17	27.041	1022.90	22.89
8	106	1.053	1.067	26.104	35.343	5.4684	163	20.94	10.74	26.104	1023.26	23.25
8	113	1.100	1.079	25.764	35.142	5.4093	181	23.99	3.15	25.763	1023.23	23.23

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
8	111	1.063	1.091	26.060	35.222	5.4560	158	11.99	0.16	26.060	1023.23	23.22
8	115	1.208	1.104	25.728	35.164	5.4041	193	33.46	13.76	25.728	1023.24	23.23
8	105	1.053	1.116	26.104	35.341	5.4689	165	27.12	3.24	26.104	1023.26	23.25
8	101	1.042	1.128	26.597	35.324	5.5288	153	0.29	0.18	26.597	1023.14	23.14
8	117	1.497	1.152	25.671	35.136	5.3989	189	27.74	13.99	25.671	1023.26	23.25
8	103	1.048	1.189	26.159	35.277	5.4709	168	27.12	0.14	26.159	1023.22	23.22
8	118	1.751	1.530	25.594	35.127	5.3897	189	12.88	6.75	25.594	1023.28	23.27
8	119	2.062	1.901	25.527	35.134	5.3823	189	0.22	0.55	25.527	1023.30	23.29
8	120	2.406	2.376	25.486	35.149	5.3787	189	-0.31	0.24	25.485	1023.32	23.31
8	121	2.770	2.608	25.463	35.158	5.3770	189	-0.26	0.11	25.463	1023.33	23.32
8	122	3.156	3.089	25.448	35.161	5.3758	189	-0.11	0.02	25.447	1023.34	23.33
8	123	3.570	3.357	25.421	35.159	5.3740	189	0.02	0.01	25.421	1023.35	23.34
8	124	4.018	3.868	25.365	35.153	5.3692	190	0.14	0.06	25.364	1023.38	23.36
8	125	4.500	4.386	25.294	35.160	5.3622	190	0.12	0.07	25.293	1023.41	23.39
8	126	5.004	4.910	25.251	35.183	5.3583	190	0.02	0.07	25.250	1023.42	23.40
8	127	5.523	5.482	25.244	35.199	5.3587	191	-0.01	0.08	25.243	1023.44	23.41
8	128	6.046	6.000	25.237	35.195	5.3587	191	0.00	0.09	25.236	1023.44	23.42
8	129	6.560	6.700	25.216	35.193	5.3566	191	0.01	0.08	25.215	1023.45	23.42
8	130	7.059	6.913	25.197	35.202	5.3552	191	0.01	0.08	25.196	1023.46	23.43
8	131	7.562	7.461	25.188	35.207	5.3548	191	0.00	0.07	25.187	1023.47	23.44
8	132	8.080	7.991	25.183	35.209	5.3545	192	-0.01	0.08	25.182	1023.48	23.44
8	133	8.602	8.630	25.181	35.211	5.3544	191	-0.01	0.08	25.179	1023.48	23.44
8	134	9.110	9.154	25.181	35.212	5.3545	191	-0.01	0.08	25.179	1023.48	23.44
8	135	9.603	9.495	25.181	35.211	5.3546	192	0.00	0.07	25.179	1023.49	23.44
8	136	10.098	10.019	25.179	35.211	5.3546	192	0.00	0.07	25.177	1023.49	23.45
8	137	10.592	10.603	25.176	35.211	5.3544	192	0.00	0.08	25.174	1023.49	23.45
8	138	11.082	10.950	25.171	35.212	5.3541	192	0.00	0.07	25.168	1023.50	23.45
8	139	11.581	11.425	25.161	35.212	5.3534	191	-0.01	0.07	25.158	1023.50	23.46
8	140	12.098	11.949	25.147	35.215	5.3525	192	-0.01	0.07	25.144	1023.51	23.46
8	141	12.636	12.472	25.135	35.220	5.3517	192	-0.01	0.07	25.133	1023.52	23.47
8	142	13.187	13.136	25.129	35.224	5.3514	193	0.00	0.07	25.126	1023.53	23.47
8	143	13.732	13.775	25.123	35.226	5.3511	193	0.00	0.07	25.120	1023.53	23.48
8	144	14.257	14.189	25.114	35.227	5.3506	193	0.01	0.07	25.111	1023.54	23.48
8	145	14.763	14.786	25.103	35.229	5.3498	193	0.01	0.07	25.100	1023.55	23.49
8	146	15.254	15.164	25.094	35.234	5.3493	193	0.01	0.07	25.091	1023.56	23.49
8	147	15.745	15.529	25.088	35.237	5.3489	193	0.00	0.07	25.085	1023.56	23.49

**Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)**

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
8	148	16.256	16.077	25.084	35.238	5.3487	193	0.00	0.07	25.080	1023.57	23.50
8	149	16.779	16.734	25.082	35.240	5.3486	193	-0.01	0.07	25.078	1023.57	23.50
8	150	17.300	17.197	25.080	35.240	5.3485	193	0.00	0.07	25.076	1023.57	23.50
8	151	17.816	17.709	25.077	35.240	5.3483	192	-0.01	0.07	25.073	1023.58	23.50
8	152	18.323	18.336	25.074	35.241	5.3482	192	0.00	0.08	25.070	1023.58	23.50
8	153	18.808	18.798	25.070	35.242	5.3479	193	0.00	0.07	25.066	1023.58	23.50
8	154	19.269	19.176	25.067	35.243	5.3478	193	0.00	0.07	25.063	1023.59	23.51
8	155	19.723	19.566	25.064	35.244	5.3476	193	0.00	0.07	25.060	1023.59	23.51
8	156	20.178	20.077	25.062	35.245	5.3475	193	0.00	0.06	25.057	1023.59	23.51
8	157	20.637	20.430	25.060	35.246	5.3474	193	0.00	0.06	25.055	1023.60	23.51
8	158	21.103	20.984	25.057	35.246	5.3472	193	0.00	0.06	25.052	1023.60	23.51
8	159	21.581	21.307	25.049	35.246	5.3467	193	0.01	0.07	25.044	1023.61	23.52
8	160	22.071	22.025	25.035	35.248	5.3458	193	0.00	0.07	25.031	1023.62	23.52
8	161	22.553	22.476	25.023	35.254	5.3450	193	0.00	0.07	25.018	1023.63	23.53
8	162	23.041	22.591	25.012	35.256	5.3443	193	0.00	0.07	25.007	1023.63	23.54
8	163	23.566	23.371	24.997	35.256	5.3430	193	0.01	0.07	24.992	1023.64	23.54
8	164	24.120	23.925	24.983	35.259	5.3417	193	0.02	0.07	24.978	1023.65	23.55
8	165	24.681	24.558	24.975	35.264	5.3412	193	0.01	0.07	24.970	1023.65	23.55
8	166	25.241	25.069	24.972	35.266	5.3411	194	0.00	0.07	24.967	1023.66	23.55
8	167	25.791	25.775	24.969	35.267	5.3409	193	0.01	0.07	24.963	1023.66	23.55
8	168	26.317	26.269	24.966	35.268	5.3407	193	0.01	0.07	24.961	1023.67	23.56
8	169	26.822	26.622	24.965	35.269	5.3406	193	0.00	0.07	24.959	1023.67	23.56
8	170	27.322	27.169	24.964	35.269	5.3406	194	0.01	0.07	24.958	1023.67	23.56
8	171	27.828	27.559	24.962	35.268	5.3404	194	0.02	0.07	24.956	1023.68	23.56
8	172	28.345	28.150	24.960	35.268	5.3402	194	0.01	0.07	24.954	1023.68	23.56
8	173	28.867	28.758	24.959	35.268	5.3401	194	0.01	0.07	24.952	1023.68	23.56
8	174	29.369	29.355	24.958	35.268	5.3400	193	0.00	0.07	24.951	1023.68	23.56
8	175	29.852	29.574	24.957	35.269	5.3400	193	0.01	0.07	24.950	1023.69	23.56
8	176	30.336	30.128	24.955	35.269	5.3398	193	0.01	0.07	24.948	1023.69	23.56
8	177	30.821	30.737	24.952	35.268	5.3396	193	0.02	0.07	24.946	1023.69	23.56
8	178	31.295	31.090	24.950	35.268	5.3394	193	0.01	0.07	24.944	1023.69	23.56
8	179	31.770	31.455	24.950	35.269	5.3393	193	0.01	0.07	24.943	1023.70	23.56
8	180	32.257	32.100	24.949	35.269	5.3393	194	0.02	0.06	24.942	1023.70	23.56
8	181	32.732	32.740	24.949	35.269	5.3393	193	0.02	0.06	24.942	1023.70	23.56
8	182	33.178	32.965	24.948	35.268	5.3392	193	0.01	0.07	24.941	1023.70	23.56
8	183	33.623	33.233	24.948	35.268	5.3391	194	0.01	0.07	24.941	1023.70	23.56

Table I-1. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI2 - July 2012)

Cast #	Elap Time (s)	Press (dbar)	Depth (m)	Temp (°C)	Salinity	Cond (S/m)	DO ( $\mu\text{mol/kg}$ )	Chlor ( $\text{mg/m}^3$ )	Turb (NTU)	Pot Temp (°C)	Density ( $\text{kg/m}^3$ )	Sigma- $\Theta$ ( $\text{kg/m}^3$ )
	<b>Median</b>	7.280	7.186	25.503	35.145	5.3713	188	0.03	0.08	25.500	1023.31	23.27
	<b>Mean</b>	10.893	10.826	25.505	35.145	5.3801	182	1.21	0.35	25.503	1023.34	23.30
	<b>Max</b>	45.280	45.327	27.077	35.444	5.5576	204	39.60	19.70	27.077	1023.78	23.58
	<b>Min</b>	0.495	0.520	24.839	33.810	5.2564	139	-0.37	-0.15	24.832	1022.13	22.12
	<b>SD</b>	10.965	10.912	0.425	0.141	0.0449	14	5.14	1.75	0.427	0.22	0.18
	<b>n</b>	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028
8	184	34.081	34.030	24.948	35.267	5.3391	194	0.01	0.07	24.941	1023.71	23.56
8	185	34.532	34.274	24.948	35.267	5.3390	194	0.02	0.07	24.941	1023.71	23.56
8	186	34.977	34.767	24.947	35.266	5.3389	193	0.02	0.07	24.940	1023.71	23.56
8	187	35.433	35.059	24.946	35.265	5.3387	193	0.03	0.07	24.938	1023.71	23.56
8	188	35.907	35.698	24.943	35.264	5.3384	194	0.04	0.07	24.935	1023.71	23.56
8	189	36.395	36.063	24.941	35.265	5.3382	194	0.04	0.06	24.933	1023.72	23.56
8	190	36.893	36.708	24.939	35.264	5.3378	193	0.03	0.07	24.931	1023.72	23.56
8	191	37.394	37.098	24.937	35.263	5.3376	193	0.03	0.07	24.928	1023.72	23.56
8	192	37.899	37.688	24.934	35.263	5.3373	193	0.03	0.07	24.926	1023.72	23.56
8	193	38.401	38.206	24.931	35.263	5.3370	193	0.04	0.07	24.923	1023.73	23.56
8	194	38.902	38.565	24.928	35.263	5.3368	194	0.04	0.07	24.920	1023.73	23.56
8	195	39.402	39.295	24.926	35.263	5.3365	194	0.04	0.07	24.918	1023.73	23.57
8	196	39.892	39.630	24.924	35.263	5.3363	193	0.05	0.08	24.915	1023.74	23.57
8	197	40.383	39.989	24.922	35.263	5.3361	193	0.06	0.07	24.913	1023.74	23.57
8	198	40.888	40.695	24.919	35.263	5.3359	194	0.06	0.07	24.910	1023.74	23.57
8	199	41.389	41.201	24.916	35.264	5.3357	194	0.05	0.07	24.907	1023.74	23.57
8	200	41.882	41.541	24.915	35.265	5.3357	194	0.05	0.07	24.906	1023.75	23.57
8	201	42.382	42.101	24.914	35.265	5.3357	194	0.04	0.07	24.905	1023.75	23.57
8	202	42.880	42.722	24.909	35.263	5.3351	194	0.04	0.07	24.900	1023.75	23.57
8	203	43.365	43.112	24.900	35.261	5.3341	193	0.05	0.07	24.891	1023.76	23.57
8	204	43.825	43.775	24.891	35.263	5.3334	193	0.05	0.07	24.882	1023.76	23.58
8	205	44.248	44.110	24.883	35.264	5.3326	194	0.04	0.07	24.874	1023.77	23.58
8	206	44.615	44.694	24.877	35.263	5.3317	194	0.05	0.07	24.867	1023.77	23.58
8	207	44.917	44.822	24.872	35.265	5.3313	194	0.05	0.07	24.862	1023.77	23.58
8	209	45.280	45.297	24.870	35.267	5.3311	194	0.06	0.07	24.860	1023.78	23.58
8	208	45.143	45.327	24.870	35.267	5.3312	194	0.06	0.07	24.860	1023.78	23.58

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
1	56	1.019	26.276	35.093	54.536	104	0.066	0.078	26.275	1023.02	23.02
1	57	1.037	26.273	35.096	54.534	104	0.076	0.080	26.273	1023.02	23.02
1	58	1.055	26.276	35.097	54.538	104	0.083	0.080	26.275	1023.02	23.02
1	59	1.066	26.279	35.097	54.541	104	0.083	0.081	26.279	1023.02	23.02
1	71	1.071	26.260	35.098	54.524	106	0.075	0.075	26.260	1023.03	23.02
1	60	1.075	26.280	35.096	54.543	105	0.076	0.082	26.280	1023.02	23.02
1	61	1.082	26.280	35.095	54.543	105	0.067	0.082	26.279	1023.02	23.02
1	70	1.084	26.255	35.098	54.518	106	0.064	0.072	26.255	1023.03	23.03
1	72	1.087	26.264	35.098	54.529	106	0.079	0.083	26.264	1023.03	23.02
1	62	1.088	26.276	35.094	54.540	105	0.067	0.080	26.276	1023.02	23.02
1	63	1.098	26.270	35.094	54.534	105	0.072	0.077	26.270	1023.03	23.02
1	69	1.107	26.252	35.097	54.516	106	0.058	0.070	26.252	1023.03	23.03
1	64	1.110	26.263	35.094	54.527	105	0.071	0.084	26.263	1023.03	23.02
1	65	1.122	26.260	35.097	54.524	106	0.068	0.094	26.259	1023.03	23.02
1	68	1.122	26.255	35.095	54.520	106	0.067	0.069	26.255	1023.03	23.03
1	73	1.122	26.267	35.097	54.531	106	0.079	0.095	26.266	1023.03	23.02
1	66	1.128	26.261	35.099	54.526	106	0.069	0.090	26.261	1023.03	23.02
1	67	1.128	26.260	35.096	54.525	106	0.071	0.077	26.260	1023.03	23.03
1	75	1.142	26.273	35.097	54.539	106	0.067	0.085	26.273	1023.03	23.02
1	74	1.143	26.270	35.098	54.535	106	0.074	0.094	26.270	1023.03	23.02
1	76	1.143	26.274	35.096	54.539	106	0.068	0.087	26.274	1023.03	23.02
1	77	1.168	26.270	35.094	54.535	106	0.071	0.092	26.270	1023.03	23.02
1	78	1.205	26.263	35.093	54.528	106	0.075	0.090	26.263	1023.03	23.02
1	79	1.235	26.257	35.095	54.522	107	0.080	0.085	26.257	1023.03	23.03
1	80	1.273	26.255	35.097	54.520	107	0.075	0.082	26.254	1023.03	23.03
1	81	1.332	26.255	35.097	54.519	107	0.075	0.077	26.255	1023.03	23.03
1	82	1.403	26.258	35.098	54.522	107	0.080	0.075	26.257	1023.03	23.03
1	83	1.466	26.263	35.099	54.529	107	0.078	0.077	26.263	1023.03	23.02
1	84	1.511	26.268	35.098	54.533	107	0.075	0.077	26.268	1023.03	23.02

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
1	85	1.549	26.272	35.097	54.537	107	0.077	0.078	26.272	1023.03	23.02
1	86	1.591	26.275	35.097	54.541	107	0.074	0.079	26.275	1023.03	23.02
1	87	1.648	26.276	35.096	54.542	107	0.067	0.073	26.276	1023.03	23.02
1	88	1.733	26.275	35.095	54.541	107	0.068	0.069	26.275	1023.03	23.02
1	89	1.866	26.272	35.094	54.537	107	0.070	0.072	26.271	1023.03	23.02
1	90	2.080	26.268	35.095	54.533	107	0.073	0.075	26.268	1023.03	23.02
1	91	2.382	26.268	35.096	54.532	107	0.081	0.076	26.267	1023.03	23.02
1	92	2.723	26.270	35.097	54.536	107	0.081	0.075	26.269	1023.03	23.02
1	93	3.052	26.272	35.097	54.538	107	0.071	0.073	26.272	1023.03	23.02
1	94	3.372	26.275	35.097	54.540	107	0.066	0.077	26.274	1023.03	23.02
1	95	3.695	26.278	35.097	54.544	107	0.065	0.083	26.277	1023.04	23.02
1	96	4.026	26.278	35.096	54.545	107	0.065	0.085	26.277	1023.04	23.02
1	97	4.371	26.278	35.095	54.544	107	0.067	0.082	26.277	1023.04	23.02
1	98	4.741	26.280	35.096	54.545	107	0.071	0.081	26.279	1023.04	23.02
1	99	5.141	26.283	35.096	54.549	107	0.071	0.083	26.281	1023.04	23.02
1	100	5.554	26.284	35.095	54.550	107	0.068	0.082	26.283	1023.04	23.02
1	101	5.959	26.284	35.095	54.550	107	0.069	0.077	26.283	1023.04	23.02
1	102	6.342	26.283	35.095	54.550	107	0.074	0.073	26.282	1023.04	23.02
1	103	6.690	26.283	35.095	54.550	108	0.078	0.074	26.282	1023.05	23.02
1	104	7.001	26.283	35.095	54.550	108	0.080	0.076	26.282	1023.05	23.02
1	105	7.299	26.283	35.095	54.550	108	0.080	0.075	26.282	1023.05	23.02
1	106	7.611	26.284	35.095	54.550	108	0.080	0.072	26.282	1023.05	23.02
1	107	7.938	26.284	35.095	54.550	108	0.080	0.072	26.282	1023.05	23.02
1	108	8.254	26.284	35.095	54.551	108	0.084	0.073	26.282	1023.05	23.02
1	109	8.542	26.284	35.095	54.551	108	0.093	0.077	26.282	1023.05	23.02
1	110	8.819	26.284	35.095	54.551	108	0.098	0.080	26.282	1023.05	23.02
1	111	9.120	26.284	35.095	54.551	108	0.094	0.076	26.282	1023.06	23.02
1	112	9.445	26.283	35.095	54.550	108	0.089	0.073	26.281	1023.06	23.02
1	113	9.764	26.282	35.094	54.549	108	0.085	0.075	26.280	1023.06	23.02

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
1	114	10.054	26.281	35.095	54.549	108	0.084	0.076	26.279	1023.06	23.02
1	115	10.312	26.280	35.095	54.548	108	0.083	0.076	26.278	1023.06	23.02
1	116	10.534	26.279	35.094	54.546	108	0.081	0.076	26.276	1023.06	23.02
1	117	10.716	26.276	35.094	54.543	108	0.080	0.082	26.274	1023.06	23.02
1	118	10.872	26.274	35.094	54.540	108	0.083	0.090	26.271	1023.07	23.02
1	119	11.018	26.272	35.094	54.538	108	0.090	0.081	26.269	1023.07	23.02
1	120	11.163	26.271	35.094	54.538	108	0.093	0.080	26.269	1023.07	23.02
1	121	11.313	26.271	35.094	54.538	108	0.086	0.095	26.269	1023.07	23.02
1	122	11.466	26.271	35.094	54.538	108	0.079	0.101	26.269	1023.07	23.02
1	123	11.613	26.271	35.094	54.539	108	0.075	0.092	26.269	1023.07	23.02
1	124	11.752	26.271	35.094	54.538	108	0.078	0.080	26.269	1023.07	23.02
1	125	11.892	26.271	35.094	54.538	108	0.089	0.078	26.268	1023.07	23.02
1	126	12.054	26.271	35.094	54.538	108	0.097	0.078	26.268	1023.07	23.02
1	127	12.261	26.270	35.094	54.537	108	0.094	0.081	26.267	1023.07	23.02
1	128	12.514	26.269	35.094	54.536	108	0.092	0.085	26.267	1023.07	23.02
1	129	12.797	26.270	35.095	54.537	108	0.091	0.085	26.267	1023.07	23.02
1	130	13.087	26.271	35.094	54.538	108	0.091	0.083	26.268	1023.08	23.02
1	131	13.377	26.272	35.094	54.539	108	0.092	0.092	26.269	1023.08	23.02
1	132	13.672	26.272	35.094	54.539	108	0.093	0.131	26.269	1023.08	23.02
1	133	13.965	26.271	35.093	54.538	108	0.095	0.148	26.268	1023.08	23.02
1	134	14.262	26.267	35.093	54.536	108	0.101	0.105	26.264	1023.08	23.02
1	135	14.581	26.257	35.089	54.524	108	0.102	0.078	26.253	1023.09	23.03
1	136	14.903	26.243	35.088	54.508	108	0.096	0.081	26.240	1023.09	23.03
1	137	15.189	26.234	35.093	54.500	108	0.093	0.081	26.231	1023.10	23.03
1	138	15.438	26.232	35.096	54.499	108	0.098	0.080	26.229	1023.10	23.03
1	139	15.672	26.233	35.096	54.501	108	0.106	0.080	26.230	1023.10	23.03
1	140	15.889	26.234	35.095	54.501	109	0.112	0.082	26.230	1023.10	23.03
1	141	16.079	26.234	35.096	54.502	109	0.111	0.084	26.230	1023.10	23.03
1	142	16.238	26.236	35.097	54.505	109	0.107	0.085	26.232	1023.10	23.03



**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
1	143	16.362	26.238	35.095	54.505	109	0.105	0.081	26.234	1023.10	23.03
1	144	16.470	26.237	35.095	54.505	109	0.105	0.081	26.234	1023.10	23.03
1	145	16.589	26.239	35.097	54.508	109	0.107	0.085	26.236	1023.10	23.03
1	146	16.706	26.242	35.096	54.511	109	0.108	0.086	26.238	1023.10	23.03
1	147	16.793	26.244	35.095	54.512	109	0.107	0.083	26.240	1023.10	23.03
1	148	16.860	26.244	35.095	54.512	109	0.103	0.079	26.240	1023.10	23.03
1	149	16.932	26.244	35.095	54.513	109	0.100	0.081	26.240	1023.10	23.03
1	150	17.027	26.244	35.094	54.512	109	0.105	0.083	26.240	1023.10	23.03
1	151	17.144	26.242	35.094	54.510	109	0.107	0.082	26.238	1023.10	23.03
1	152	17.273	26.240	35.094	54.508	109	0.103	0.080	26.236	1023.10	23.03
1	153	17.416	26.236	35.093	54.504	109	0.099	0.081	26.232	1023.11	23.03
1	154	17.552	26.231	35.093	54.498	109	0.098	0.084	26.227	1023.11	23.03
1	155	17.655	26.228	35.095	54.495	109	0.095	0.090	26.224	1023.11	23.03
1	156	17.723	26.227	35.095	54.496	109	0.087	0.092	26.223	1023.11	23.04
1	157	17.774	26.227	35.095	54.495	109	0.084	0.090	26.223	1023.11	23.04
1	158	17.823	26.225	35.095	54.494	109	0.092	0.089	26.221	1023.11	23.04
1	159	17.879	26.224	35.095	54.492	109	0.100	0.086	26.220	1023.11	23.04
1	160	17.947	26.222	35.094	54.490	109	0.102	0.087	26.218	1023.11	23.04
1	161	18.013	26.220	35.096	54.489	109	0.099	0.094	26.216	1023.11	23.04
1	162	18.083	26.220	35.096	54.489	109	0.097	0.096	26.216	1023.11	23.04
1	163	18.180	26.219	35.095	54.488	109	0.098	0.090	26.215	1023.12	23.04
1	164	18.326	26.217	35.095	54.485	109	0.098	0.087	26.213	1023.12	23.04
1	165	18.556	26.215	35.095	54.484	109	0.098	0.085	26.211	1023.12	23.04
1	166	18.887	26.212	35.095	54.481	109	0.100	0.082	26.208	1023.12	23.04
1	167	19.298	26.208	35.094	54.476	109	0.109	0.084	26.204	1023.12	23.04
1	168	19.755	26.207	35.096	54.475	109	0.114	0.090	26.203	1023.13	23.04
1	169	20.232	26.207	35.096	54.477	109	0.107	0.087	26.203	1023.13	23.04
1	170	20.711	26.205	35.095	54.475	109	0.094	0.085	26.201	1023.13	23.04
1	171	21.166	26.203	35.095	54.473	109	0.093	0.092	26.198	1023.13	23.04

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-Θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
1	172	21.554	26.202	35.096	54.472	109	0.108	0.104	26.197	1023.14	23.04
1	173	21.834	26.202	35.097	54.473	109	0.121	0.126	26.198	1023.14	23.04
1	174	22.003	26.203	35.097	54.473	109	0.126	0.147	26.198	1023.14	23.04
1	180	22.030	26.205	35.096	54.476	109	0.128	0.155	26.200	1023.14	23.04
1	179	22.037	26.206	35.096	54.477	109	0.133	0.158	26.201	1023.14	23.04
1	181	22.052	26.204	35.096	54.474	109	0.124	0.155	26.199	1023.14	23.04
1	178	22.066	26.206	35.097	54.477	109	0.137	0.163	26.201	1023.14	23.04
1	175	22.088	26.203	35.097	54.474	109	0.133	0.154	26.198	1023.14	23.04
1	182	22.097	26.204	35.096	54.474	109	0.119	0.150	26.199	1023.14	23.04
1	177	22.098	26.205	35.097	54.475	109	0.134	0.164	26.200	1023.14	23.04
1	176	22.113	26.204	35.097	54.474	109	0.134	0.158	26.199	1023.14	23.04
1	183	22.151	26.204	35.097	54.474	109	0.111	0.136	26.199	1023.14	23.04
1	184	22.210	26.205	35.096	54.475	110	0.108	0.125	26.200	1023.14	23.04
1	185	22.266	26.204	35.096	54.475	110	0.123	0.127	26.199	1023.14	23.04
1	186	22.301	26.204	35.096	54.475	109	0.134	0.129	26.199	1023.14	23.04
1	187	22.315	26.204	35.096	54.475	109	0.124	0.133	26.199	1023.14	23.04
1	188	22.316	26.204	35.096	54.475	109	0.117	0.139	26.199	1023.14	23.04
2	36	1.301	27.358	35.123	55.7245	102	0.023	0.071	27.358	1022.70	22.70
2	37	1.381	27.379	35.140	55.7618	102	0.017	0.081	27.378	1022.70	22.70
2	38	1.499	27.333	35.126	55.7699	102	-0.002	0.085	27.332	1022.75	22.74
2	39	1.675	27.112	35.071	55.5584	102	-0.001	0.073	27.111	1022.83	22.83
2	40	1.907	26.849	35.133	55.2971	103	0.014	0.062	26.848	1022.93	22.92
2	41	2.171	26.716	35.219	55.1967	103	0.016	0.065	26.716	1022.99	22.98
2	42	2.449	26.641	35.167	55.0615	103	0.015	0.070	26.641	1022.99	22.98
2	43	2.720	26.581	35.189	54.9948	103	0.018	0.069	26.581	1023.01	22.99
2	44	2.969	26.560	35.206	54.9896	103	0.011	0.066	26.559	1023.02	23.01
2	45	3.206	26.505	35.108	54.8391	103	-0.004	0.066	26.505	1022.99	22.98

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
2	46	3.442	26.427	35.077	54.6969	103	-0.012	0.070	26.426	1022.98	22.97
2	47	3.664	26.391	35.098	54.6606	103	-0.004	0.075	26.390	1023.00	22.98
2	48	3.861	26.380	35.100	54.6529	103	0.011	0.075	26.379	1023.00	22.99
2	49	4.039	26.369	35.098	54.6393	103	0.021	0.069	26.368	1023.01	22.99
2	50	4.223	26.362	35.099	54.6317	103	0.029	0.066	26.361	1023.01	22.99
2	51	4.429	26.359	35.101	54.6301	103	0.037	0.065	26.358	1023.01	22.99
2	52	4.642	26.357	35.100	54.6277	103	0.035	0.069	26.356	1023.01	22.99
2	53	4.836	26.357	35.100	54.6277	103	0.019	0.069	26.356	1023.01	22.99
2	54	5.001	26.358	35.101	54.6313	104	0.009	0.067	26.357	1023.02	22.99
2	55	5.156	26.359	35.101	54.6327	104	0.020	0.069	26.357	1023.02	23.00
2	56	5.336	26.355	35.098	54.6284	104	0.032	0.072	26.354	1023.02	23.00
2	57	5.544	26.348	35.096	54.6207	104	0.028	0.071	26.347	1023.02	23.00
2	58	5.762	26.342	35.097	54.6139	104	0.017	0.072	26.341	1023.02	23.00
2	59	5.984	26.338	35.099	54.6117	105	0.016	0.071	26.337	1023.03	23.00
2	60	6.207	26.329	35.096	54.6031	105	0.024	0.066	26.328	1023.03	23.01
2	61	6.429	26.316	35.092	54.5847	105	0.032	0.064	26.315	1023.03	23.01
2	62	6.654	26.306	35.094	54.5735	105	0.032	0.066	26.304	1023.04	23.01
2	63	6.893	26.301	35.097	54.5704	105	0.027	0.068	26.299	1023.04	23.01
2	64	7.144	26.299	35.098	54.5691	105	0.028	0.069	26.298	1023.04	23.01
2	65	7.403	26.299	35.098	54.5692	105	0.033	0.070	26.297	1023.04	23.01
2	66	7.668	26.299	35.098	54.5688	105	0.040	0.070	26.297	1023.05	23.01
2	67	7.919	26.298	35.098	54.5688	105	0.049	0.068	26.297	1023.05	23.01
2	68	8.151	26.298	35.098	54.5691	105	0.052	0.069	26.297	1023.05	23.01
2	69	8.363	26.298	35.098	54.5693	105	0.045	0.073	26.296	1023.05	23.01
2	70	8.549	26.298	35.098	54.5695	106	0.039	0.076	26.296	1023.05	23.01
2	71	8.718	26.298	35.098	54.5692	106	0.040	0.077	26.296	1023.05	23.01
2	72	8.878	26.298	35.098	54.5692	106	0.038	0.077	26.296	1023.05	23.01
2	73	9.028	26.298	35.098	54.5698	106	0.033	0.071	26.296	1023.05	23.01
2	74	9.177	26.298	35.098	54.5701	106	0.026	0.068	26.296	1023.05	23.01

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
2	75	9.341	26.298	35.098	54.5697	106	0.020	0.069	26.296	1023.05	23.01
2	76	9.518	26.298	35.098	54.5695	106	0.028	0.070	26.296	1023.05	23.01
2	77	9.714	26.298	35.098	54.5694	106	0.045	0.071	26.295	1023.06	23.01
2	78	9.940	26.297	35.097	54.5684	106	0.045	0.070	26.295	1023.06	23.01
2	79	10.180	26.296	35.097	54.5679	106	0.038	0.070	26.294	1023.06	23.01
2	80	10.413	26.296	35.097	54.5679	106	0.039	0.068	26.294	1023.06	23.01
2	81	10.636	26.295	35.097	54.5672	106	0.043	0.068	26.292	1023.06	23.02
2	82	10.842	26.293	35.096	54.5643	106	0.044	0.073	26.290	1023.06	23.02
2	83	11.031	26.290	35.095	54.5601	106	0.042	0.074	26.287	1023.06	23.02
2	84	11.221	26.287	35.096	54.5572	106	0.040	0.070	26.285	1023.06	23.02
2	85	11.422	26.285	35.096	54.5552	106	0.043	0.067	26.283	1023.07	23.02
2	86	11.632	26.283	35.096	54.5536	106	0.048	0.070	26.281	1023.07	23.02
2	87	11.848	26.280	35.095	54.5504	106	0.052	0.075	26.277	1023.07	23.02
2	88	12.063	26.276	35.094	54.5445	106	0.049	0.073	26.273	1023.07	23.02
2	89	12.261	26.273	35.094	54.5404	106	0.047	0.067	26.270	1023.07	23.02
2	90	12.438	26.271	35.095	54.5391	106	0.046	0.065	26.268	1023.07	23.02
2	91	12.610	26.268	35.094	54.5367	106	0.045	0.067	26.265	1023.08	23.02
2	92	12.787	26.264	35.093	54.5313	106	0.049	0.067	26.261	1023.08	23.02
2	93	12.963	26.259	35.093	54.5254	106	0.055	0.066	26.256	1023.08	23.02
2	94	13.131	26.255	35.093	54.5214	106	0.058	0.065	26.252	1023.08	23.03
2	95	13.294	26.253	35.094	54.5196	106	0.058	0.065	26.250	1023.08	23.03
2	96	13.472	26.251	35.095	54.5179	106	0.057	0.065	26.248	1023.08	23.03
2	97	13.674	26.248	35.094	54.5155	106	0.058	0.066	26.245	1023.09	23.03
2	98	13.889	26.244	35.094	54.5111	106	0.061	0.070	26.241	1023.09	23.03
2	99	14.095	26.240	35.094	54.5064	106	0.066	0.070	26.237	1023.09	23.03
2	100	14.280	26.238	35.095	54.5050	106	0.068	0.069	26.235	1023.09	23.03
2	101	14.450	26.237	35.095	54.5046	106	0.072	0.082	26.234	1023.09	23.03
2	102	14.617	26.236	35.095	54.5035	106	0.078	0.095	26.232	1023.09	23.03
2	103	14.788	26.232	35.094	54.4996	106	0.078	0.083	26.228	1023.10	23.03

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
2	104	14.970	26.226	35.093	54.4924	106	0.074	0.070	26.222	1023.10	23.04
2	105	15.161	26.221	35.094	54.4872	106	0.069	0.071	26.217	1023.10	23.04
2	106	15.358	26.218	35.095	54.4852	106	0.065	0.073	26.215	1023.10	23.04
2	107	15.562	26.217	35.095	54.4838	106	0.064	0.073	26.213	1023.10	23.04
2	108	15.773	26.214	35.095	54.4812	106	0.063	0.071	26.210	1023.11	23.04
2	109	15.997	26.208	35.094	54.4756	106	0.061	0.072	26.205	1023.11	23.04
2	110	16.233	26.203	35.094	54.4699	106	0.059	0.071	26.200	1023.11	23.04
2	111	16.478	26.201	35.096	54.4683	107	0.060	0.068	26.198	1023.11	23.04
2	112	16.738	26.201	35.096	54.4689	107	0.061	0.074	26.197	1023.12	23.04
2	113	17.012	26.199	35.095	54.4671	107	0.062	0.080	26.195	1023.12	23.04
2	114	17.293	26.194	35.094	54.4614	107	0.067	0.078	26.190	1023.12	23.05
2	115	17.571	26.185	35.093	54.4526	107	0.068	0.070	26.181	1023.12	23.05
2	116	17.851	26.172	35.093	54.4419	107	0.064	0.066	26.168	1023.13	23.06
2	117	18.145	26.150	35.089	54.4199	107	0.062	0.065	26.146	1023.14	23.06
2	118	18.446	26.125	35.088	54.3889	107	0.056	0.069	26.120	1023.15	23.07
2	119	18.733	26.106	35.094	54.3712	107	0.052	0.075	26.101	1023.15	23.08
2	120	19.003	26.093	35.097	54.3610	107	0.058	0.074	26.089	1023.16	23.08
2	121	19.278	26.085	35.098	54.3512	107	0.063	0.074	26.081	1023.16	23.08
2	122	19.561	26.083	35.102	54.3512	107	0.065	0.077	26.078	1023.17	23.08
2	123	19.849	26.083	35.102	54.3531	107	0.071	0.075	26.079	1023.17	23.08
2	124	20.150	26.081	35.100	54.3497	107	0.075	0.074	26.077	1023.17	23.08
2	125	20.465	26.077	35.099	54.3449	107	0.072	0.072	26.072	1023.17	23.09
2	126	20.777	26.073	35.101	54.3420	107	0.073	0.072	26.069	1023.18	23.09
2	127	21.069	26.072	35.101	54.3407	107	0.076	0.081	26.067	1023.18	23.09
2	128	21.345	26.071	35.102	54.3405	107	0.076	0.086	26.066	1023.18	23.09
2	129	21.624	26.071	35.102	54.3410	107	0.074	0.081	26.066	1023.18	23.09
2	130	21.919	26.070	35.101	54.3401	108	0.070	0.077	26.065	1023.18	23.09
2	131	22.215	26.070	35.102	54.3394	108	0.072	0.075	26.065	1023.18	23.09
2	132	22.491	26.070	35.102	54.3402	108	0.076	0.070	26.065	1023.18	23.09

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-Θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
2	133	22.756	26.069	35.101	54.3395	108	0.078	0.071	26.064	1023.19	23.09
2	134	23.018	26.068	35.101	54.3382	108	0.079	0.075	26.063	1023.19	23.09
2	135	23.284	26.067	35.101	54.3374	108	0.079	0.076	26.061	1023.19	23.09
2	136	23.560	26.066	35.102	54.3367	108	0.069	0.077	26.061	1023.19	23.09
2	137	23.838	26.068	35.103	54.3389	108	0.063	0.078	26.063	1023.19	23.09
2	138	24.096	26.072	35.103	54.3435	108	0.070	0.081	26.066	1023.19	23.09
2	139	24.324	26.076	35.103	54.3480	108	0.077	0.087	26.071	1023.19	23.09
2	140	24.526	26.081	35.104	54.3535	108	0.079	0.091	26.076	1023.19	23.09
2	141	24.695	26.084	35.102	54.3574	108	0.079	0.099	26.079	1023.19	23.09
2	142	24.826	26.086	35.102	54.3589	108	0.080	0.107	26.081	1023.19	23.08
2	143	24.923	26.088	35.102	54.3606	108	0.087	0.105	26.082	1023.19	23.08
2	144	24.986	26.088	35.102	54.3613	108	0.096	0.100	26.083	1023.19	23.08
2	145	25.017	26.089	35.102	54.3616	108	0.097	0.100	26.083	1023.19	23.08
3	63	1.333	26.511	35.093	54.7813	94	-0.118	0.055	26.511	1022.95	22.94
3	64	1.529	26.512	35.092	54.7828	93	-0.122	0.057	26.512	1022.95	22.94
3	65	1.800	26.512	35.091	54.7824	93	-0.061	0.064	26.511	1022.95	22.94
3	66	2.118	26.509	35.091	54.7801	93	-0.008	0.070	26.509	1022.95	22.94
3	67	2.463	26.507	35.091	54.7773	92	0.041	0.090	26.506	1022.95	22.94
3	68	2.837	26.506	35.092	54.7769	92	0.038	0.104	26.505	1022.96	22.94
3	69	3.244	26.506	35.092	54.7778	92	-0.106	0.077	26.506	1022.96	22.94
3	70	3.677	26.505	35.091	54.7775	92	-0.152	0.057	26.505	1022.96	22.94
3	71	4.130	26.503	35.091	54.7755	92	-0.009	0.072	26.502	1022.96	22.95
3	72	4.590	26.500	35.092	54.7736	91	0.052	0.079	26.499	1022.97	22.95
3	73	5.042	26.499	35.093	54.7734	91	0.021	0.075	26.498	1022.97	22.95
3	74	5.500	26.499	35.094	54.7739	91	0.015	0.075	26.498	1022.97	22.95
3	75	5.984	26.499	35.094	54.7749	91	0.017	0.071	26.497	1022.97	22.95
3	76	6.492	26.495	35.092	54.7721	91	0.026	0.066	26.493	1022.98	22.95

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
3	77	7.001	26.484	35.092	54.7631	91	0.025	0.066	26.483	1022.98	22.95
3	78	7.508	26.473	35.095	54.7540	91	0.016	0.065	26.471	1022.99	22.96
3	79	8.026	26.467	35.098	54.7490	91	0.021	0.065	26.465	1023.00	22.96
3	80	8.544	26.462	35.099	54.7453	91	0.030	0.071	26.460	1023.00	22.96
3	81	9.050	26.457	35.098	54.7403	90	0.034	0.075	26.455	1023.00	22.97
3	82	9.549	26.452	35.099	54.7354	90	0.036	0.069	26.450	1023.01	22.97
3	83	10.040	26.449	35.100	54.7329	90	0.037	0.062	26.447	1023.01	22.97
3	84	10.525	26.445	35.100	54.7301	90	0.038	0.060	26.443	1023.02	22.97
3	85	11.007	26.440	35.099	54.7247	90	0.035	0.069	26.437	1023.02	22.97
3	86	11.471	26.435	35.100	54.7194	90	0.032	0.081	26.432	1023.02	22.97
3	87	11.913	26.432	35.100	54.7162	90	0.036	0.078	26.429	1023.03	22.97
3	88	12.359	26.430	35.100	54.7138	90	0.047	0.071	26.427	1023.03	22.98
3	89	12.830	26.427	35.100	54.7111	90	0.055	0.073	26.424	1023.03	22.98
3	90	13.292	26.425	35.100	54.7087	90	0.057	0.073	26.422	1023.03	22.98
3	91	13.702	26.424	35.101	54.7084	90	0.057	0.070	26.421	1023.03	22.98
3	92	14.082	26.425	35.101	54.7088	90	0.056	0.065	26.421	1023.04	22.98
3	93	14.490	26.424	35.100	54.7088	90	0.053	0.063	26.421	1023.04	22.98
3	94	14.952	26.424	35.101	54.7088	90	0.051	0.065	26.421	1023.04	22.98
3	95	15.463	26.423	35.100	54.7081	90	0.050	0.068	26.420	1023.04	22.98
3	96	15.992	26.421	35.099	54.7058	90	0.045	0.074	26.417	1023.05	22.98
3	97	16.503	26.417	35.099	54.7017	90	0.047	0.082	26.414	1023.05	22.98
3	98	16.993	26.413	35.098	54.6965	90	0.053	0.081	26.409	1023.05	22.98
3	99	17.479	26.409	35.098	54.6927	90	0.055	0.073	26.406	1023.05	22.98
3	100	17.963	26.407	35.098	54.6901	90	0.058	0.068	26.403	1023.06	22.98
3	101	18.439	26.405	35.098	54.6875	90	0.063	0.069	26.400	1023.06	22.98
3	102	18.893	26.404	35.099	54.6870	90	0.071	0.073	26.400	1023.06	22.98
3	103	19.318	26.403	35.098	54.6871	90	0.078	0.073	26.399	1023.06	22.98
3	104	19.738	26.395	35.094	54.6780	90	0.073	0.073	26.390	1023.07	22.99
3	105	20.184	26.382	35.092	54.6612	90	0.068	0.075	26.377	1023.07	22.99

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
3	106	20.645	26.372	35.094	54.6502	90	0.078	0.074	26.367	1023.08	22.99
3	107	21.087	26.368	35.097	54.6476	90	0.090	0.073	26.364	1023.08	22.99
3	108	21.511	26.366	35.097	54.6469	90	0.102	0.075	26.361	1023.09	22.99
3	109	21.948	26.356	35.093	54.6363	90	0.111	0.075	26.351	1023.09	23.00
3	110	22.408	26.338	35.088	54.6132	90	0.107	0.075	26.333	1023.10	23.00
3	111	22.874	26.322	35.090	54.5953	90	0.102	0.081	26.317	1023.10	23.00
3	112	23.339	26.314	35.094	54.5886	90	0.104	0.086	26.309	1023.11	23.01
3	113	23.814	26.310	35.094	54.5846	90	0.108	0.083	26.305	1023.11	23.01
3	114	24.306	26.306	35.094	54.5806	90	0.112	0.079	26.301	1023.11	23.01
3	115	24.802	26.304	35.095	54.5783	90	0.121	0.077	26.298	1023.12	23.01
3	116	25.291	26.303	35.096	54.5779	90	0.135	0.074	26.297	1023.12	23.01
3	117	25.779	26.302	35.096	54.5777	90	0.145	0.075	26.296	1023.12	23.01
3	118	26.284	26.302	35.096	54.5775	90	0.148	0.079	26.296	1023.12	23.01
3	119	26.827	26.301	35.096	54.5778	90	0.155	0.080	26.295	1023.13	23.01
3	120	27.390	26.302	35.096	54.5790	90	0.169	0.077	26.296	1023.13	23.01
3	121	27.932	26.303	35.097	54.5805	90	0.172	0.073	26.297	1023.13	23.01
3	122	28.444	26.303	35.097	54.5817	90	0.161	0.076	26.297	1023.13	23.01
3	123	28.942	26.303	35.097	54.5823	90	0.156	0.080	26.297	1023.14	23.01
3	124	29.418	26.303	35.096	54.5824	90	0.163	0.079	26.297	1023.14	23.01
3	125	29.875	26.303	35.096	54.5821	90	0.178	0.076	26.296	1023.14	23.01
3	126	30.340	26.302	35.096	54.5811	90	0.189	0.079	26.295	1023.14	23.01
3	127	30.821	26.301	35.096	54.5798	90	0.190	0.091	26.294	1023.14	23.01
3	128	31.294	26.300	35.096	54.5790	90	0.192	0.096	26.293	1023.15	23.01
3	129	31.738	26.299	35.096	54.5783	90	0.195	0.088	26.292	1023.15	23.01
3	130	32.169	26.296	35.096	54.5766	90	0.197	0.081	26.289	1023.15	23.02
3	131	32.625	26.287	35.092	54.5680	90	0.197	0.081	26.280	1023.16	23.02
3	132	33.130	26.270	35.088	54.5468	90	0.201	0.085	26.262	1023.16	23.02
3	133	33.676	26.252	35.090	54.5275	90	0.208	0.088	26.245	1023.17	23.03
3	134	34.238	26.242	35.094	54.5188	90	0.216	0.084	26.234	1023.18	23.03



**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
3	135	34.796	26.235	35.095	54.5125	90	0.220	0.080	26.227	1023.18	23.03
3	136	35.335	26.230	35.095	54.5072	90	0.218	0.079	26.222	1023.19	23.04
3	137	35.861	26.226	35.096	54.5035	90	0.215	0.079	26.218	1023.19	23.04
3	138	36.406	26.221	35.096	54.4996	90	0.216	0.079	26.213	1023.19	23.04
3	139	36.998	26.214	35.096	54.4949	90	0.219	0.078	26.206	1023.20	23.04
3	140	37.620	26.201	35.093	54.4809	90	0.217	0.076	26.192	1023.21	23.05
3	141	38.220	26.183	35.091	54.4598	91	0.217	0.080	26.175	1023.21	23.05
3	142	38.784	26.169	35.094	54.4462	91	0.225	0.090	26.160	1023.22	23.06
3	143	39.336	26.159	35.097	54.4372	91	0.222	0.089	26.150	1023.23	23.06
3	144	39.892	26.152	35.098	54.4307	91	0.213	0.082	26.143	1023.23	23.06
3	145	40.445	26.149	35.100	54.4286	91	0.209	0.086	26.140	1023.24	23.06
3	146	40.993	26.145	35.099	54.4253	91	0.209	0.092	26.136	1023.24	23.07
3	147	41.530	26.137	35.097	54.4176	91	0.209	0.090	26.128	1023.24	23.07
3	148	42.043	26.126	35.097	54.4065	91	0.212	0.086	26.117	1023.25	23.07
3	149	42.532	26.115	35.097	54.3948	91	0.218	0.088	26.106	1023.26	23.08
3	150	43.018	26.104	35.098	54.3844	91	0.217	0.090	26.094	1023.26	23.08
3	151	43.536	26.091	35.098	54.3722	91	0.214	0.083	26.082	1023.27	23.08
3	152	44.082	26.080	35.099	54.3598	91	0.213	0.077	26.070	1023.27	23.09
3	153	44.636	26.071	35.101	54.3523	91	0.212	0.077	26.061	1023.28	23.09
3	154	45.198	26.063	35.101	54.3451	91	0.216	0.085	26.053	1023.29	23.09
3	155	45.781	26.053	35.100	54.3360	91	0.223	0.090	26.042	1023.29	23.10
3	156	46.399	26.032	35.097	54.3167	91	0.226	0.086	26.021	1023.30	23.11
3	157	47.048	25.998	35.091	54.2790	91	0.226	0.078	25.987	1023.32	23.12
3	158	47.717	25.959	35.091	54.2370	91	0.227	0.075	25.948	1023.33	23.13
3	159	48.380	25.928	35.099	54.2073	91	0.241	0.081	25.917	1023.34	23.14
3	160	49.015	25.910	35.105	54.1920	91	0.256	0.090	25.900	1023.35	23.15
3	161	49.619	25.898	35.107	54.1816	91	0.252	0.089	25.887	1023.36	23.15
3	162	50.204	25.881	35.105	54.1658	91	0.244	0.083	25.870	1023.37	23.16
3	163	50.784	25.858	35.103	54.1420	92	0.244	0.083	25.847	1023.38	23.16

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
3	164	51.352	25.837	35.107	54.1204	92	0.246	0.087	25.826	1023.39	23.17
3	165	51.885	25.824	35.110	54.1076	92	0.242	0.087	25.812	1023.40	23.18
3	166	52.374	25.815	35.112	54.1000	92	0.242	0.083	25.804	1023.40	23.18
3	167	52.819	25.810	35.114	54.0963	92	0.248	0.080	25.798	1023.41	23.18
3	168	53.221	25.806	35.114	54.0932	92	0.248	0.074	25.794	1023.41	23.18
3	169	53.572	25.802	35.114	54.0885	92	0.245	0.070	25.790	1023.41	23.18
3	170	53.838	25.800	35.115	54.0871	92	0.246	0.071	25.788	1023.41	23.19
3	171	53.998	25.800	35.116	54.0883	92	0.249	0.074	25.788	1023.41	23.19
3	172	54.075	25.800	35.115	54.0880	92	0.254	0.078	25.788	1023.41	23.19
4	85	1.008	26.237	35.026	54.4054	99	-0.051	0.095	26.236	1022.98	22.98
4	86	1.079	26.226	35.018	54.3890	99	-0.040	0.094	26.225	1022.99	22.98
4	87	1.160	26.214	35.021	54.3745	99	-0.037	0.082	26.214	1022.99	22.98
4	88	1.256	26.210	35.024	54.3725	99	-0.022	0.080	26.210	1022.99	22.99
4	89	1.361	26.208	35.022	54.3690	99	-0.013	0.086	26.207	1022.99	22.99
4	90	1.470	26.205	35.021	54.3629	99	-0.012	0.087	26.204	1022.99	22.99
4	91	1.583	26.208	35.026	54.3687	100	0.005	0.091	26.207	1022.99	22.99
4	92	1.702	26.210	35.026	54.3749	100	0.043	0.090	26.209	1022.99	22.99
4	93	1.824	26.205	35.021	54.3670	100	0.057	0.077	26.205	1022.99	22.99
4	94	1.940	26.201	35.023	54.3615	100	-0.011	0.087	26.200	1023.00	22.99
4	95	2.060	26.197	35.023	54.3592	100	-0.037	0.107	26.197	1023.00	22.99
4	96	2.188	26.193	35.021	54.3532	100	0.030	0.091	26.193	1023.00	22.99
4	97	2.319	26.186	35.020	54.3464	100	0.046	0.070	26.185	1023.00	22.99
4	98	2.451	26.171	35.016	54.3303	100	0.007	0.076	26.171	1023.01	23.00
4	99	2.590	26.158	35.018	54.3122	100	-0.001	0.081	26.157	1023.01	23.00
4	100	2.729	26.158	35.024	54.3134	100	0.027	0.073	26.157	1023.01	23.00
4	101	2.863	26.165	35.026	54.3233	100	0.066	0.081	26.164	1023.01	23.00
4	102	2.996	26.169	35.024	54.3289	100	0.046	0.107	26.168	1023.01	23.00

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
4	103	3.135	26.167	35.022	54.3270	100	-0.035	0.117	26.166	1023.01	23.00
4	104	3.277	26.158	35.017	54.3151	100	-0.052	0.114	26.157	1023.01	23.00
4	105	3.417	26.142	35.016	54.2992	100	-0.019	0.115	26.142	1023.02	23.01
4	106	3.561	26.129	35.019	54.2845	100	-0.005	0.114	26.128	1023.02	23.01
4	107	3.710	26.122	35.022	54.2776	100	-0.002	0.108	26.121	1023.03	23.01
4	108	3.864	26.120	35.023	54.2770	100	0.012	0.106	26.119	1023.03	23.01
4	109	4.019	26.120	35.024	54.2775	100	0.035	0.109	26.119	1023.03	23.01
4	110	4.177	26.120	35.024	54.2783	100	0.036	0.121	26.119	1023.03	23.01
4	111	4.341	26.119	35.024	54.2781	100	0.021	0.140	26.118	1023.03	23.01
4	112	4.514	26.119	35.025	54.2785	100	0.019	0.139	26.118	1023.03	23.01
4	113	4.689	26.120	35.025	54.2795	100	0.017	0.124	26.119	1023.03	23.01
4	114	4.859	26.120	35.026	54.2810	100	0.009	0.116	26.119	1023.04	23.02
4	115	5.016	26.120	35.026	54.2813	100	0.007	0.119	26.119	1023.04	23.02
4	116	5.165	26.120	35.025	54.2799	100	0.017	0.131	26.119	1023.04	23.01
4	117	5.306	26.119	35.024	54.2792	100	0.024	0.131	26.118	1023.04	23.01
4	118	5.426	26.120	35.025	54.2795	100	0.008	0.123	26.118	1023.04	23.01
4	119	5.532	26.120	35.025	54.2797	100	-0.004	0.121	26.119	1023.04	23.01
4	120	5.643	26.120	35.025	54.2803	100	-0.005	0.119	26.119	1023.04	23.01
4	121	5.766	26.121	35.025	54.2813	100	-0.006	0.113	26.119	1023.04	23.01
4	122	5.898	26.121	35.025	54.2821	100	-0.004	0.109	26.120	1023.04	23.01
4	123	6.042	26.120	35.025	54.2818	100	0.002	0.119	26.119	1023.04	23.02
4	124	6.193	26.119	35.025	54.2801	100	0.010	0.131	26.118	1023.04	23.02
4	125	6.346	26.119	35.025	54.2798	100	0.024	0.129	26.117	1023.04	23.02
4	126	6.492	26.119	35.026	54.2818	100	0.027	0.125	26.118	1023.04	23.02
4	127	6.614	26.120	35.026	54.2831	100	0.010	0.124	26.119	1023.04	23.02
4	128	6.730	26.120	35.026	54.2832	100	-0.001	0.151	26.118	1023.04	23.02
4	129	6.861	26.120	35.027	54.2835	101	-0.001	0.204	26.118	1023.05	23.02
4	130	7.007	26.120	35.027	54.2839	101	-0.001	0.207	26.118	1023.05	23.02
4	131	7.170	26.120	35.027	54.2838	101	0.009	0.160	26.118	1023.05	23.02

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
4	132	7.350	26.120	35.027	54.2836	101	0.023	0.129	26.118	1023.05	23.02
4	133	7.530	26.120	35.027	54.2833	101	0.020	0.131	26.118	1023.05	23.02
4	134	7.696	26.120	35.027	54.2833	101	0.005	0.144	26.118	1023.05	23.02
4	135	7.863	26.120	35.028	54.2850	101	-0.001	0.139	26.118	1023.05	23.02
4	136	8.040	26.120	35.028	54.2869	101	0.005	0.129	26.118	1023.05	23.02
4	137	8.218	26.121	35.029	54.2880	101	0.014	0.130	26.119	1023.05	23.02
4	138	8.400	26.121	35.030	54.2896	101	0.019	0.131	26.119	1023.05	23.02
4	139	8.589	26.121	35.030	54.2905	101	0.017	0.129	26.119	1023.06	23.02
4	140	8.777	26.121	35.030	54.2904	101	0.011	0.126	26.119	1023.06	23.02
4	141	8.956	26.121	35.030	54.2904	101	0.008	0.126	26.119	1023.06	23.02
4	142	9.130	26.121	35.030	54.2905	101	0.005	0.133	26.119	1023.06	23.02
4	143	9.305	26.121	35.030	54.2909	101	-0.003	0.137	26.119	1023.06	23.02
4	144	9.483	26.122	35.031	54.2925	101	-0.002	0.134	26.120	1023.06	23.02
4	145	9.664	26.122	35.032	54.2943	101	0.011	0.133	26.120	1023.06	23.02
4	146	9.850	26.123	35.032	54.2948	101	0.013	0.140	26.121	1023.06	23.02
4	147	10.040	26.123	35.031	54.2945	101	-0.002	0.148	26.121	1023.06	23.02
4	148	10.232	26.123	35.031	54.2948	101	-0.010	0.149	26.121	1023.06	23.02
4	149	10.424	26.123	35.031	54.2954	101	0.000	0.172	26.121	1023.06	23.02
4	150	10.611	26.123	35.032	54.2959	101	0.015	0.198	26.121	1023.06	23.02
4	151	10.797	26.123	35.032	54.2967	101	0.018	0.168	26.121	1023.07	23.02
4	152	10.980	26.123	35.034	54.2982	101	0.016	0.140	26.120	1023.07	23.02
4	153	11.150	26.123	35.035	54.2994	101	0.018	0.143	26.120	1023.07	23.02
4	154	11.315	26.123	35.034	54.2992	101	0.017	0.146	26.120	1023.07	23.02
4	155	11.480	26.122	35.034	54.2986	101	0.010	0.144	26.119	1023.07	23.02
4	156	11.640	26.122	35.034	54.2980	101	0.004	0.142	26.119	1023.07	23.02
4	157	11.801	26.122	35.034	54.2969	101	0.009	0.146	26.119	1023.07	23.02
4	158	11.963	26.122	35.034	54.2969	101	0.022	0.153	26.119	1023.07	23.02
4	159	12.119	26.122	35.036	54.3006	101	0.024	0.155	26.119	1023.07	23.02
4	160	12.274	26.123	35.039	54.3060	101	0.017	0.161	26.120	1023.08	23.03

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
4	161	12.433	26.123	35.041	54.3086	101	0.013	0.166	26.120	1023.08	23.03
4	162	12.603	26.124	35.043	54.3118	101	0.018	0.168	26.121	1023.08	23.03
4	163	12.781	26.127	35.047	54.3206	101	0.029	0.184	26.124	1023.08	23.03
4	164	12.961	26.131	35.051	54.3300	101	0.033	0.204	26.128	1023.09	23.03
4	165	13.141	26.133	35.052	54.3349	101	0.033	0.212	26.130	1023.09	23.03
4	166	13.319	26.135	35.053	54.3378	101	0.036	0.212	26.132	1023.09	23.03
4	167	13.492	26.136	35.053	54.3396	101	0.042	0.204	26.133	1023.09	23.03
4	168	13.666	26.136	35.053	54.3398	101	0.042	0.203	26.133	1023.09	23.03
4	169	13.848	26.136	35.053	54.3395	101	0.038	0.221	26.133	1023.09	23.03
4	170	14.032	26.137	35.053	54.3400	101	0.041	0.245	26.133	1023.09	23.03
4	171	14.209	26.137	35.054	54.3422	101	0.045	0.251	26.134	1023.09	23.03
4	172	14.366	26.138	35.054	54.3442	101	0.045	0.236	26.135	1023.09	23.03
4	173	14.493	26.138	35.053	54.3436	101	0.045	0.223	26.135	1023.09	23.03
4	174	14.612	26.137	35.052	54.3413	101	0.042	0.241	26.134	1023.09	23.03
4	175	14.760	26.137	35.053	54.3406	101	0.044	0.267	26.134	1023.09	23.03
4	176	14.934	26.138	35.054	54.3427	101	0.046	0.260	26.134	1023.09	23.03
4	177	15.106	26.138	35.055	54.3449	101	0.046	0.255	26.135	1023.10	23.03
4	178	15.269	26.139	35.054	54.3448	101	0.046	0.260	26.135	1023.10	23.03
4	179	15.426	26.139	35.055	54.3457	101	0.046	0.258	26.135	1023.10	23.03
4	180	15.566	26.140	35.056	54.3482	102	0.045	0.266	26.137	1023.10	23.03
4	181	15.707	26.142	35.056	54.3507	102	0.045	0.273	26.139	1023.10	23.03
4	182	15.883	26.144	35.057	54.3541	102	0.051	0.255	26.141	1023.10	23.03
4	183	16.083	26.146	35.057	54.3569	102	0.066	0.268	26.143	1023.10	23.03
4	184	16.279	26.147	35.057	54.3580	102	0.072	0.324	26.144	1023.10	23.03
4	185	16.469	26.148	35.057	54.3586	102	0.065	0.361	26.144	1023.10	23.03
4	186	16.653	26.150	35.057	54.3603	102	0.055	0.376	26.146	1023.10	23.03
4	187	16.822	26.152	35.057	54.3626	102	0.049	0.403	26.148	1023.10	23.03
4	188	16.954	26.153	35.056	54.3640	102	0.052	0.421	26.150	1023.10	23.03
4	189	17.042	26.153	35.056	54.3640	102	0.059	0.422	26.150	1023.10	23.03

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
4	190	17.085	26.153	35.056	54.3641	102	0.061	0.421	26.150	1023.10	23.03
5	72	1.048	26.501	35.041	54.7002	98	0.453	0.061	26.501	1022.91	22.91
5	73	1.145	26.502	35.040	54.7011	98	0.715	0.059	26.501	1022.91	22.91
5	74	1.295	26.501	35.040	54.7003	98	0.528	0.068	26.501	1022.91	22.91
5	75	1.497	26.500	35.040	54.6993	98	0.222	0.110	26.499	1022.91	22.91
5	76	1.738	26.494	35.040	54.6980	98	0.143	0.116	26.494	1022.92	22.91
5	77	2.008	26.473	35.028	54.6714	98	0.113	0.127	26.472	1022.92	22.92
5	78	2.300	26.422	35.013	54.6140	98	0.015	0.125	26.422	1022.94	22.93
5	79	2.606	26.340	35.002	54.5257	98	-0.007	0.091	26.340	1022.96	22.95
5	80	2.932	26.249	34.993	54.4102	98	-0.010	0.070	26.248	1022.98	22.97
5	81	3.281	26.186	35.007	54.3385	99	-0.040	0.076	26.185	1023.00	22.99
5	82	3.644	26.159	35.025	54.3197	99	-0.039	0.084	26.158	1023.02	23.00
5	83	4.016	26.151	35.028	54.3123	99	-0.021	0.083	26.150	1023.02	23.01
5	84	4.394	26.147	35.029	54.3104	99	0.003	0.077	26.146	1023.03	23.01
5	85	4.767	26.146	35.030	54.3095	99	0.018	0.075	26.145	1023.03	23.01
5	86	5.124	26.144	35.030	54.3091	99	0.011	0.083	26.143	1023.03	23.01
5	87	5.466	26.142	35.030	54.3078	99	-0.003	0.088	26.141	1023.03	23.01
5	88	5.796	26.140	35.029	54.3055	99	-0.009	0.084	26.139	1023.04	23.01
5	89	6.115	26.137	35.028	54.3029	99	-0.006	0.083	26.136	1023.04	23.01
5	90	6.439	26.133	35.028	54.2990	99	-0.004	0.090	26.132	1023.04	23.01
5	91	6.779	26.128	35.028	54.2944	99	-0.004	0.093	26.127	1023.04	23.02
5	92	7.125	26.125	35.030	54.2922	99	-0.004	0.085	26.124	1023.05	23.02
5	93	7.462	26.124	35.031	54.2930	99	0.003	0.079	26.123	1023.05	23.02
5	94	7.796	26.123	35.032	54.2942	99	0.016	0.084	26.121	1023.05	23.02
5	95	8.140	26.120	35.034	54.2938	99	0.022	0.091	26.118	1023.06	23.02
5	96	8.493	26.117	35.035	54.2930	99	0.022	0.097	26.115	1023.06	23.02
5	97	8.845	26.113	35.036	54.2910	99	0.018	0.101	26.111	1023.06	23.03

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
5	98	9.198	26.105	35.036	54.2851	99	0.011	0.106	26.103	1023.07	23.03
5	99	9.547	26.094	35.037	54.2761	99	0.013	0.111	26.092	1023.08	23.04
5	100	9.887	26.081	35.038	54.2643	99	0.021	0.117	26.079	1023.08	23.04
5	101	10.215	26.069	35.038	54.2510	99	0.028	0.127	26.066	1023.09	23.04
5	102	10.541	26.058	35.040	54.2414	99	0.034	0.137	26.056	1023.09	23.05
5	103	10.874	26.047	35.040	54.2321	99	0.034	0.136	26.044	1023.10	23.05
5	104	11.210	26.022	35.037	54.2130	99	0.033	0.134	26.019	1023.11	23.06
5	105	11.542	25.977	35.033	54.1684	100	0.040	0.135	25.975	1023.13	23.08
5	106	11.862	25.927	35.035	54.1153	100	0.053	0.129	25.924	1023.15	23.10
5	107	12.168	25.882	35.044	54.0756	100	0.064	0.115	25.879	1023.16	23.11
5	108	12.474	25.837	35.044	54.0327	100	0.070	0.108	25.834	1023.18	23.13
5	109	12.783	25.785	35.045	53.9820	100	0.084	0.111	25.783	1023.20	23.15
5	110	13.098	25.740	35.055	53.9384	100	0.103	0.112	25.737	1023.22	23.16
5	111	13.411	25.714	35.064	53.9140	100	0.110	0.111	25.711	1023.23	23.17
5	112	13.709	25.695	35.065	53.8955	100	0.106	0.108	25.692	1023.24	23.18
5	113	13.985	25.675	35.064	53.8753	100	0.103	0.109	25.672	1023.25	23.19
5	114	14.250	25.652	35.066	53.8552	100	0.104	0.112	25.649	1023.26	23.20
5	115	14.519	25.619	35.065	53.8301	100	0.113	0.116	25.616	1023.27	23.21
5	116	14.799	25.550	35.051	53.7641	100	0.129	0.118	25.546	1023.30	23.24
5	117	15.086	25.458	35.047	53.6587	101	0.138	0.110	25.455	1023.32	23.26
5	118	15.364	25.394	35.069	53.5938	101	0.141	0.108	25.391	1023.34	23.28
5	119	15.627	25.373	35.089	53.5823	101	0.145	0.116	25.370	1023.36	23.29
5	120	15.891	25.373	35.094	53.5854	101	0.144	0.115	25.370	1023.36	23.29
5	121	16.157	25.377	35.093	53.5903	101	0.143	0.107	25.374	1023.36	23.29
5	122	16.419	25.378	35.092	53.5925	101	0.143	0.102	25.374	1023.36	23.29
5	123	16.677	25.372	35.089	53.5885	101	0.144	0.102	25.368	1023.37	23.30
5	124	16.947	25.357	35.086	53.5732	101	0.155	0.107	25.353	1023.37	23.30
5	125	17.237	25.339	35.086	53.5526	101	0.160	0.112	25.335	1023.38	23.31
5	126	17.529	25.328	35.091	53.5430	101	0.149	0.111	25.324	1023.38	23.31

**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (µmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
5	127	17.808	25.324	35.095	53.5433	101	0.146	0.106	25.321	1023.39	23.31
5	128	18.082	25.322	35.094	53.5410	101	0.150	0.104	25.318	1023.39	23.31
5	129	18.358	25.317	35.092	53.5345	101	0.153	0.103	25.313	1023.39	23.31
5	130	18.627	25.315	35.094	53.5327	101	0.152	0.103	25.311	1023.39	23.32
5	131	18.896	25.313	35.094	53.5326	101	0.142	0.103	25.309	1023.40	23.32
5	132	19.176	25.307	35.092	53.5267	101	0.137	0.102	25.303	1023.40	23.32
5	133	19.461	25.301	35.093	53.5203	101	0.140	0.102	25.297	1023.40	23.32
5	134	19.743	25.299	35.095	53.5190	101	0.143	0.103	25.295	1023.41	23.32
5	135	20.024	25.299	35.095	53.5197	101	0.144	0.101	25.294	1023.41	23.32
5	136	20.321	25.296	35.094	53.5168	101	0.142	0.101	25.291	1023.41	23.32
5	137	20.638	25.295	35.096	53.5149	101	0.139	0.103	25.291	1023.41	23.32
5	138	20.970	25.309	35.103	53.5291	101	0.143	0.107	25.304	1023.41	23.32
5	139	21.305	25.326	35.100	53.5505	101	0.148	0.112	25.321	1023.41	23.32
5	140	21.640	25.321	35.089	53.5474	101	0.153	0.115	25.316	1023.41	23.32
5	141	21.985	25.295	35.084	53.5176	101	0.161	0.115	25.290	1023.42	23.32
5	142	22.332	25.271	35.089	53.4910	101	0.169	0.118	25.266	1023.43	23.33
5	143	22.667	25.268	35.099	53.4889	101	0.173	0.117	25.263	1023.43	23.33
5	144	22.995	25.279	35.104	53.5049	101	0.173	0.113	25.274	1023.43	23.33
5	145	23.332	25.284	35.098	53.5117	101	0.168	0.115	25.279	1023.43	23.33
5	146	23.685	25.269	35.089	53.4951	102	0.163	0.122	25.264	1023.43	23.33
5	147	24.052	25.246	35.090	53.4709	102	0.162	0.123	25.241	1023.44	23.34
5	148	24.426	25.230	35.095	53.4538	102	0.167	0.116	25.224	1023.45	23.35
5	149	24.797	25.226	35.100	53.4501	102	0.171	0.110	25.221	1023.45	23.35
5	150	25.149	25.232	35.104	53.4587	102	0.175	0.107	25.226	1023.45	23.35
5	151	25.484	25.237	35.102	53.4651	102	0.174	0.105	25.232	1023.45	23.35
5	152	25.817	25.239	35.101	53.4672	102	0.167	0.108	25.234	1023.45	23.35
5	153	26.155	25.244	35.102	53.4700	102	0.168	0.110	25.238	1023.45	23.34
5	154	26.483	25.256	35.104	53.4814	102	0.175	0.113	25.250	1023.45	23.34
5	155	26.764	25.270	35.105	53.5018	102	0.180	0.122	25.265	1023.45	23.34



**Table I-2. Ordnance Reef Follow-Up Investigation Hydrocasts (FUI3 - June 2013)**

Cast #	Elap Time (s)	Pressure (dbar)	Temp (°C)	Salinity	Cond (mS/cm)	DO (μmol/kg)	Chlor (mg/m <sup>3</sup> )	Turb (NTU)	Pot Temp (°C)	Density (kg/m <sup>3</sup> )	Sigma-θ (kg/m <sup>3</sup> )
	<b>Median</b>	12.792	26.211	35.095	54.4765	101	0.07	0.08	26.208	1023.07	23.02
	<b>Mean</b>	14.601	26.153	35.080	54.3980	101	0.08	0.10	26.150	1023.11	23.05
	<b>Max</b>	54.075	27.379	35.219	55.7699	110	0.72	0.42	27.378	1023.46	23.35
	<b>Min</b>	1.008	25.226	34.993	53.4501	90	-0.15	0.05	25.221	1022.70	22.70
	<b>SD</b>	11.402	0.301	0.031	0.3243	6	0.08	0.05	0.302	0.12	0.09
	<b>n</b>	546	546	546	546	546	546	546	546	546	546
5	156	26.965	25.270	35.097	53.5023	102	0.191	0.127	25.264	1023.45	23.34
5	157	27.076	25.257	35.092	53.4833	102	0.197	0.128	25.251	1023.45	23.34
5	158	27.114	25.242	35.094	53.4691	102	0.187	0.140	25.236	1023.46	23.34