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NAS KEY WEST
5090.3a

ADDENDUM TO THE RESOURCE CONSERVATION AND RECOVERY ACT FACILITY
ASSESSMENT FOR FORMER BOCA CHICA BLAST MEDIA DISPOSAL AREA WITH
TRANSMITTAL LETTER NAS KEY WEST FL
6/15/2004
TETRA TECH NUS



TETRA TECH NUS, INC.

AIK-04-0132

June 15, 2004

Project Number HK N2870

via U.S. mail

Commander
Department of the Navy
SOUTHDIV NAVFACENCOM
ATTN: Jim Reed (Code ES33)
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0188

Subject: Addendum to Resource Conservation and Recovery Act Facility Assessment for the Former Boca Chica Blast Media Disposal Area, Rev. 0, Naval Air Station, Key West on Boca Chica Key, Florida

Dear Mr. Reed:

I have enclosed the PDF file for the Addendum to Resource Conservation and Recovery Act Facility Assessment for the Former Boca Chica Blast Media Disposal Area, Rev. 0, Naval Air Station, Key West on Boca Chica Key, Florida. The file is being distributed to the members of the NAF Key West Partnering Team via U.S. mail for their convenience and to meet TtNUS's contractual obligation under CTO 0188. I am planning to receive approval on this report after promulgation of the new Florida Cleanup Target Levels, which is scheduled for October 2004.

Please call me at (803) 649-7963, extension 345, if you have any questions regarding the enclosed report.

Sincerely,

C. M. Bryan
Project Manager

CMB:spc

Enclosure

c: Ms. Debbie Wroblewski (Cover Letter Only)
Mr. S. Bivone, CCI
Ms. T. Vaught, FDEP
Mr. R. Courtright, NAS Key West

Mr. T. Ballard, USEPA Region IV
Mr. R. Demes, NAS Key West
Mr. M. Perry/File
File 2870-7.7.3

**Addendum to
Resource Conservation and
Recovery Act Facility Assessment**

for

**Former Boca Chica Blast Media
Disposal Area**

**Naval Air Station
Key West on Boca Chica Key, Florida**



**Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0188**

June 2004

**ADDENDUM TO
RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY ASSESSMENT
FOR
FORMER BOCA CHICA BLAST MEDIA DISPOSAL AREA**

**NAVAL AIR STATION
KEY WEST ON BOCA CHICA KEY, FLORIDA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
NORTH CHARLESTON, SOUTH CAROLINA 29406**

**Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220**

**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0188**

JUNE 2004

PREPARED UNDER THE SUPERVISION OF:

APPROVED FOR SUBMITTAL BY:

**CHUCK BRYAN
TASK ORDER MANAGER
TETRA TECH NUS
AIKEN, SOUTH CAROLINA**



**DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS
PITTSBURGH, PENNSYLVANIA**

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1.0 RFA REPORT ADDENDUM

Following delivery of the RFA Report for the Former Boca Chica Blast Media Disposal Area, Rev. 1 in October 2003, the Navy collected additional samples at the site to support proposed road construction at NAS Key West. This addendum presents analytical results for the additional samples collected, and updated 95% UCL calculations to support the previously recommended remedy of No Further Action.

Attachment A includes the analytical report for the additional surface soil samples collected from the Former Boca Chica Blast Media Disposal Area. Two samples, designated 48BCBMSS01 and 48BCBMSS02, and a field duplicate of 48BCBMSS01, labeled 48BCBMSS01FD were collected, along with a matrix spike (MS) and matrix spike duplicate (MSD). As seen in the analytical report, the samples required significant dilution (20 times), resulting in the following results:

SAMPLE ID	PARAMETER	RESULT (mg/kg)	ACTION LEVEL (mg/kg)
48BCBMSS01	ARSENIC	2.2	2.66
48BCBMSS01FD	ARSENIC	2.0	
48BCBMSS01-AVG	ARSENIC	2.1	
48BCBMSS02	ARSENIC	4.8	

For 95% UCL calculations using ProUCL Version 3.0, the average (2.1 mg/kg) of sample 48BCBMSS01 and the field duplicate, 48BCBMSS01FD, was used. Therefore, two results were added to the sample set previously used in Rev. 1 of the RFA Report. Attachment B presents the entire sample data set and results from ProUCL.

Nineteen arsenic values were used to calculate the 95% UCL, including 10 Phase I surface soil sample results, 6 Phase II surface soil sample results, the average arsenic concentration of 4 confirmation samples, and 2 results from recently collected samples. For "U" qualified values, one-half the method detection limit was used for 95% UCL calculations.

ProUCL determined that the arsenic data from the Blast Media Disposal Area surface soil were lognormal, using both the Lilliefors test and the Shapiro-Wilk test. Assuming lognormal distribution of the data, ProUCL recommended using the 95% H-UCL, which is based upon the H-Statistic (Land, 1971; Gilbert, 1987). The 95% H-UCL value calculated for arsenic was 2.04 mg/kg, as reported in Attachment B, meaning that there is a 95% confidence level that the mean concentration of arsenic at the Blast Media Disposal Area is less than 2.04 mg/kg. The 95% UCL can be compared directly to the residential SCTL to determine if the Blast Media Disposal Area qualifies for No Further Action. Currently the residential

SCTL for arsenic is 0.8 mg/kg. However, FDEP is in the process of developing new CTLs. The proposed residential SCTL for arsenic is 2.1 mg/kg, as last reported on February 26, 2004 (<http://fdep.ifas.ufl.edu>). The Partnering Team agreed to compare the calculated 95% UCL to the proposed residential SCTL for arsenic to expedite site closure (NAS Key West Partnering Team, 2003). Thus, the mean concentration for arsenic in surface soil at 95% confidence level is less than 2.04 mg/kg, which is less than the proposed FDEP SCTL of 2.1 mg/kg. In addition, the maximum detected arsenic exceedance of 4.8 mg/kg is less than three times the proposed SCTL of 2.1 mg/kg; therefore, this exceedance is not considered a "hot spot", as defined by FDEP (NAS Key West Partnering Team, 2003). No Further Action is recommended for the Former Boca Chica Blast Media Disposal Area.

ATTACHMENT A
ANALYTICAL REPORT



Client: CH2M Hill Constructors, Inc.
Project Name: Black Beauty Well Closure
Project Number: 160937.34.02.04.09

Report No.: J037205
Date Sampled: 12/18/2003
Date Received: 12/19/03 11:05
Date Reported: 12/22/2003

Attention: Steve Bivone
Phone Number: 7706049182

Address: 115 Perimeter Center Place, N.E. Suite 700

Atlanta, GA 30346

Project Description

The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody.

Project Name: Black Beauty Well Closure

Approved By: _____

Sean C. Hyde, Technical Director

If you have any questions, the above named should be contacted.

Advanced Environmental Laboratories certifies that the test results in this report meet all requirements of the NELAC standards, unless notated otherwise in the body of the report.

Total Number of Pages = 20 + 1 COC

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-01

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01

SampleType: N

Site: CTO48BCBM SURFACE SOIL 01

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	15	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	2	0.20	0.80	4.1	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-02

Date/Time Sampled: 12/18/2003 14:25

Client Sample ID: 48BCBMSS02

SampleType: N

Site: CT048BCBM SUFACE SOIL 02

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	6.7	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	2	0.18	0.73	3.0	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-03

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01FD

SampleType: FD

Site: FIELD DUPLICATE

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	14	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	2	0.20	0.79	4.4	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-04

Date/Time Sampled: 12/18/2003 14:25

Client Sample ID: 48BCBMSS02MS

SampleType: MS

Site: MATRIX SPIKE

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	6.7	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	2	0.18	0.73	29	mg/Kg	N	SW6010B		J

N Spiked sample recovery not within control limits

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-05

Date/Time Sampled: 12/18/2003 14:25

Client Sample ID: 48BCBMSS02SD

SampleType: SD

Site: MATRIX SPIKE DUPLICATE

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	6.7	%	*	SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	2	0.18	0.73	50	mg/Kg		SW6010B		J

* Duplicate analysis not within control limits.

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-06LRDL

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01LRDL

SampleType: LR

Site: CTO48BCBM SURFACE SOIL 01

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	15	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	5	0.50	2.0	4.4	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-07LRDL2

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01LRDL2

SampleType: LR

Site: CTO48BCBM SURFACE SOIL 01

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	15	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	20	2.0	8.0	2.2	mg/Kg	B	SW6010B		J

B The value is above the MDL but below the reporting limit.

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-08LRDL

Date/Time Sampled: 12/18/2003 14:25

Client Sample ID: 48BCBMSS02LRDL

SampleType: LR

Site: CT048BCBM SUFACE SOIL 02

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	6.7	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	5	0.46	1.8	3.5	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-09LRDL2

Date/Time Sampled: 12/18/2003 14:25

Client Sample ID: 48BCBMSS02LRDL2

SampleType: LR

Site: CT048BCBM SUFACE SOIL 02

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	6.7	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	20	1.8	7.3	4.8	mg/Kg	B	SW6010B		J

B The value is above the MDL but below the reporting limit.

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-10LRDL

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01FDLRDL

SampleType: LR

Site: FIELD DUPLICATE

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	14	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	5	0.49	2.0	3.5	mg/Kg		SW6010B		J

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-11LRDL2

Date/Time Sampled: 12/18/2003 14:10

Client Sample ID: 48BCBMSS01FDLRDL2

SampleType: LR

Site: FIELD DUPLICATE

Sampled By: Carlton Ivery/Amer Aw

Matrix: Soil

Shipping Method: Fed Ex

Miscellaneous Analytes

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
% Moisture	1		0.20	14	%		SM2540G		J

Total Metals

Analytes:	Dilution	Adjusted MDL	Adjusted Reporting Limit	Results	Units	Qualifier(s)	Method	Parameter Comment	Lab
Arsenic	20	2.0	7.9	2.0	mg/Kg	B	SW6010B		J

B The value is above the MDL but below the reporting limit.

J DOH certification #E82574 (AEL-JAX) (FL NELAC certification)

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Lab Code: J037205-09LRDL2		SampleType: LR			Site: CT048BCBM SUFACE SOI		
Client Sample Number: 48BCBMSS02LRDL2					Matrix: Soil		
Test Description	Analysis Method	Prep Method	Analytical Batch ID	Analysis Date/Time	Analyst	Prep Batch ID	Prep Date/Time
% Moisture	SM2540G	NONE	WCJ-121903-%M	12/19/2003 13:12	SCH		
Total Metals	SW6010B	SW3050B	M121903-3050 #1	12/20/2003 21:30	DS	M121903-3050 #1	12/19/2003 13:00

Lab Code: J037205-10LRDL		SampleType: LR			Site: FIELD DUPLICATE		
Client Sample Number: 48BCBMSS01FDLRDL					Matrix: Soil		
Test Description	Analysis Method	Prep Method	Analytical Batch ID	Analysis Date/Time	Analyst	Prep Batch ID	Prep Date/Time
% Moisture	SM2540G	NONE	WCJ-121903-%M	12/19/2003 13:12	SCH		
Total Metals	SW6010B	SW3050B	M121903-3050 #1	12/20/2003 21:30	DS	M121903-3050 #1	12/19/2003 13:00

Lab Code: J037205-11LRDL2		SampleType: LR			Site: FIELD DUPLICATE		
Client Sample Number: 48BCBMSS01FDLRDL2					Matrix: Soil		
Test Description	Analysis Method	Prep Method	Analytical Batch ID	Analysis Date/Time	Analyst	Prep Batch ID	Prep Date/Time
% Moisture	SM2540G	NONE	WCJ-121903-%M	12/19/2003 13:12	SCH		
Total Metals	SW6010B	SW3050B	M121903-3050 #1	12/20/2003 21:30	DS	M121903-3050 #1	12/19/2003 13:00

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Quality Assurance Report

Method Blanks

Total Metals								
QCBatchID	Analyte	QC Sample Type	Method	MDL	PQL	Result	Units	Qualifier
M121903-3050 #1	Arsenic	Method Blank	SW6010B	0.085	0.34	0.085	mg/Kg	U

Quality Assurance Qualifiers:

U The compound was analyzed for but not detected.

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Quality Assurance Report Laboratory Control Spikes

Project #: J037205

QC Batch ID: M121903-3050 #1

Matrix: Soil

Method: SW6010B

Units: mg/kg

Analyte	Spike Level	LCS Result	% Recovery	Acceptance Range	Qualifier(s)
Arsenic	20	20	100	80 - 120	

Advanced Environmental Laboratories, Inc.

Analytical Report

Client: CH2M Hill Constructors, Inc.

Report No.: J037205

Project Name: Black Beauty Well Closure

Date/Time Received: 12/19/03 11:05

Quality Assurance Report Matrix Spike Recoveries

Project #: J037205

QC Batch ID M121903-3050 #1 Method: SW6010B Matrix: Soil Ref. Sample: J037205-01 Client Sample ID: 48BCBMSS01

Analyte	Spike Level	Units	Sample Result	Spike Result							
				MS	MSD	MS %R	Qualifier	MSD %R	Qualifier	Range	%RPD
Arsenic	40	mg/kg	3.5	27	47	60	N	109	*	75 - 125	58

Quality Assurance Qualifiers:

- * Duplicate analysis not within control limits.
- N Spiked sample recovery not within control limits

Definitions:

Water matrix refers to all aqueous matrices, including but not limited to, drinking water, wastewater, ground water, surface water, aqueous wastes and leachates
Soil matrix refers to all non-aqueous matrices, including soils, solids, sludges, semi-solids, and non-aqueous waste samples
All results in mg/kg, ug/kg or % are reported in dry weight basis, unless notated otherwise. All results in mg/L or ug/L are reported in wet weight basis.

The estimated measurements of uncertainty can be provided upon request

This is the last page of the analytical report.



Laboratory Project No./SDG#: **J037205**

ProjectID: **Black Beauty Well Closure**

Client Name: CH2M Hill Constructors, Inc.

I. RECEIPT

No Exceptions were encountered with the samples. The COC was not labeled to include the project specific QC samples, but was changed after discussion with Bonnie Hogue to match project instructions.

II. HOLDING TIMES

Preparation. All holding times were met.

Analysis. All holding times were met.

III. METHOD

Analysis: SW6010B

Preparation: SW3050B

IV. PREPARATION

These samples contained crushed portions of sea shells, which are high in calcium. As a result, the acid was required to be added very slowly to minimize the reaction between the acid and the calcium carbonate.

V. ANALYSIS

A. Calibration: All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Spikes: The LCS and LCSD met all acceptance criteria. The MS was below the acceptance criteria while the MSD was acceptable. This is due to the non-homogenous nature of the sample. The sample was made as representative as possible, but due to the sand to sea shell ratio, a totally homogenous sample was unattainable.

D. Duplicates: All acceptance criteria were met.

E. Serial Dilution: All acceptance criteria were met.

F. Samples: Sample analyses proceeded normally. Due to the level of calcium in these samples, they required multiple dilutions to analyze. The accompanying sheet assists in tracking the relogged samples to report the dilutions. The samples were unable to be analyzed without a further dilution than the normal prep procedure due to the dissolved solids content. The samples were initially analyzed straight, but the plasma lost ignition when these samples reached the nebulizer, so that data was discarded and the analysis restarted after instrument cleanup was performed. The initial analysis of these samples was then done at a 1:2 dilution, but calcium was still well above the linear range, so further dilutions were required to get the calcium within its linear range. Since calcium is an interfering element, we are required to obtain it within its linear range to ensure it is applying any corrections correctly. All the dilutions are reported to see how the matrix affected the results. The final dilution at 1:20 is the most accurate number due to the minimized interferences at that level.

G. Other:

I certify that this data package is in compliance with the terms and conditions agreed to by Advanced Environmental Laboratories, Inc. and by the client, both technically and for completeness, except for the conditions detailed above. The Technical Director or his designee, as verified by the following signature, has authorized release of the data contained in this hard copy data package and in the computer-readable data submitted on diskette:

Sean C. Hyde, Technical Director

AEL Project (SDG) # J036452
Accompanying table to case narratives

AEL Sample #	CH2M Hill Sample ID	AEL Relog ID	CH2M Hill Relog ID	Method	Reason For Relog
J037205-06	48BCBMSS01	J037205-06LRDL	48BCBMSS01LRDL	SW6010B	Dilution for calcium above LDR
J037205-07	48BCBMSS01	J037205-07LRDL2	48BCBMSS01LRDL2	SW6010B	Dilution for calcium above LDR
J037205-08	48BCBMSS02	J037205-08LRDL	48BCBMSS02LRDL	SW6010B	Dilution for calcium above LDR
J037205-09	48BCBMSS02	J037205-09LRDL2	48BCBMSS02LRDL2	SW6010B	Dilution for calcium above LDR
J037205-10	48BCBMSS01	J037205-10LRDL	48BCBMSS01FDLRDL	SW6010B	Dilution for calcium above LDR
J037205-11	48BCBMSS01	J037205-11LRDL2	48BCBMSS01FDLRDL2	SW6010B	Dilution for calcium above LDR



Client: CH2M Hill

Project name: Black Beauty Well Closure

Date/Time Rcvd: 12-19-03 11:05

Log-In request number: 5037205

Received by: [Signature]

Completed by: [Signature]

Cooler/Shipping Information:

Courier: AEL Client UPS Pony Express FedEx Other (describe): _____

Type: Cooler Box Other (describe) _____

Cooler temperature: Identify the cooler and document the temperature blank or ice water measurement

Cooler ID	<u>1</u>				
Temp (°C)	<u>1-2°C</u>				
Temp taken from	<input type="checkbox"/> Temp blank <input checked="" type="checkbox"/> Sample bottle	<input type="checkbox"/> Temp blank <input type="checkbox"/> Sample bottle			
Temp measured with	<input checked="" type="checkbox"/> IR gun <input type="checkbox"/> Thermometer (enter ID):	<input type="checkbox"/> IR gun <input type="checkbox"/> Thermometer (enter ID):	<input type="checkbox"/> IR gun <input type="checkbox"/> Thermometer (enter ID):	<input type="checkbox"/> IR gun <input type="checkbox"/> Thermometer (enter ID):	<input type="checkbox"/> IR gun <input type="checkbox"/> Thermometer (enter ID):

Other Information:

Any "NO" responses or discrepancies should be explained in the "Comments" section below.

CHECKLIST

	YES	NO	NA
1. Were custody seals on shipping container(s) intact?	<input checked="" type="checkbox"/>		
2. Were custody papers properly included with samples?	<input checked="" type="checkbox"/>		
3. Were custody papers properly filled out (ink, signed, match labels)?	<input checked="" type="checkbox"/>		
4. Did all bottles arrive in good condition (unbroken)?	<input checked="" type="checkbox"/>		
5. Were all bottle labels complete (sample #, date, signed, analysis, preservatives)?	<input checked="" type="checkbox"/>		
6. Did the sample labels agree with the chain of custody?	<input checked="" type="checkbox"/>		
7. Were correct bottles used for the tests indicated?	<input checked="" type="checkbox"/>		
8. Were proper sample preservation techniques indicated on the label?	<input checked="" type="checkbox"/>		
9. Were samples received within holding times?	<input checked="" type="checkbox"/>		
10. Were all VOA vials checked for the presence of air bubbles?			<input checked="" type="checkbox"/>
11. Were there air bubbles present in the VOA vials?			<input checked="" type="checkbox"/>
12. Were samples in direct contact with wet ice? If "No," check one: <input type="checkbox"/> NO ICE <input type="checkbox"/> BLUE ICE	<input checked="" type="checkbox"/>		
13. Was the cooler temperature less than 6°C?	<input checked="" type="checkbox"/>		
14. Were sample pHs checked and recorded by Sample control? <i>NOTE: VOA samples are checked by laboratory analysts.</i>			<input checked="" type="checkbox"/>
15. Were the sample containers provided by AEL?	<input checked="" type="checkbox"/>		
16. Were samples accepted into the laboratory?	<input checked="" type="checkbox"/>		

Comments:

ATTACHMENT B
ProUCL SAMPLE DATA SET AND RESULTS

BLAST MEDIA DISPOSAL AREA
ARSENIC RESULTS FOR SURFACE SOIL

SAMPLE	PARAMETER	RESULT (mg/kg)	QUALIFIER	RESULT FOR UCL CALCS
BCBM-SO-08-02	ARSENIC	0.46	U	0.23
BCBM-SO-10-02	ARSENIC	0.66	U	0.33
BCBM-SO-07-02	ARSENIC	0.84	U	0.42
BCBM-SO-03-02	ARSENIC	0.54		0.54
BCBM-SO-05-02	ARSENIC	2.6		2.6
BCBM-SO-09-02	ARSENIC	0.66	U	0.33
BCBM-SO-04-02	ARSENIC	1.3		1.3
BCBM-SO-12-02	ARSENIC	2.9		2.9
BCBM-SO-02-02	ARSENIC	0.76		0.76
BCBM-SO-01-02	ARSENIC	0.37		0.37
BCBM-SB06-02	ARSENIC	0.64		0.64
BCBM-SB-04-02	ARSENIC	0.78		0.78
BCBM-SB-02-02	ARSENIC	0.41	U	0.205
BCBM-SB05-02	ARSENIC	2		2
BCBM-SB-01-02	ARSENIC	0.4	U	0.2
BCBM-SB-03-02	ARSENIC	0.52		0.52
BCBM-CONF-01	ARSENIC	0.543	U	0.2715
BCBM-CONF-02	ARSENIC	0.543	U	0.2715
BCBM-CONF-03	ARSENIC	0.543	U	0.2715
BCBM-CONF-04	ARSENIC	0.538	U	0.269
48BCBMSS01-AVG	ARSENIC	2.100	J	2.1
48BCBMSS02	ARSENIC	4.800	J	4.8

ProUCL INPUT
ARSENIC RESULTS

Arsenic (mg/kg)
0.2300
0.3300
0.4200
0.5400
2.6000
0.3300
1.3000
2.9000
0.7600
0.3700
0.6400
0.7800
0.2050
2.0000
0.2000
0.5200
0.2709
2.1000
4.8000

average of confirmation sample results

ProUCL Results

Data File		Variable: Arsenic (mg/kg)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.749404
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.901
Minimum	0.2	Data not normal at 5% significance level	
Maximum	4.8	95% UCL (Assuming Normal Distribution)	
Mean	1.120837	Student's-t UCL	1.611105
Median	0.54	Gamma Distribution Test	
Standard Deviation	1.232382	A-D Test Statistic	0.879063
Variance	1.518766	A-D 5% Critical Value	0.764936
Coefficient of Variation	1.09952	K-S Test Statistic	0.204889
Skewness	1.826451	K-S 5% Critical Value	0.20353
Gamma Statistics		Data do not follow gamma distribution at 5% significance level	
k hat	1.1747	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	1.024308	Approximate Gamma UCL	1.702117
Theta hat	0.954148	Adjusted Gamma UCL	1.767069
Theta star	1.094238	Lognormal Distribution Test	
nu hat	44.63859	Shapiro-Wilk Test Statistic	0.927102
nu star	38.92372	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	25.6311	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	24.68899	95% H-UCL	2.041919
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	2.260005
Minimum of log data	-1.609438	97.5% Chebyshev (MVUE) UCL	2.770185
Maximum of log data	1.568616	99% Chebyshev (MVUE) UCL	3.772336
Mean of log data	-0.368524	95% Non-parametric UCLs	
Standard Deviation of log data	0.981403	CLT UCL	1.585883
Variance of log data	0.963152	Adj-CLT UCL (Adjusted for skewness)	1.712467
		Mod-t UCL (Adjusted for skewness)	1.630849
		Jackknife UCL	1.611105
		Standard Bootstrap UCL	1.561772
		Bootstrap-t UCL	1.903741
		Hall's Bootstrap UCL	1.787863
		Percentile Bootstrap UCL	1.618205
		BCA Bootstrap UCL	1.544832
		95% Chebyshev (Mean, Sd) UCL	2.353219
		97.5% Chebyshev (Mean, Sd) UCL	2.886472
		99% Chebyshev (Mean, Sd) UCL	3.933943
RECOMMENDATION			
Data are lognormal (0.05)			
Use H-UCL			