mh 7-7-15

MAY 1 5 2015

P.O.BOX 5
ROCKWOOD, TN 37854

P.865-742-0329

HORSEHEAD
CORPORATION
Leading the World in Zinc Recycling

May 15, 2015

Tennessee Department of Environment and Conservation
Knoxville Environmental Field Office
3711 Middlebrook Pike
Knoxville, TN 37921

RE: Discharge Monitoring Report (DMR) for Permit Number SOP-01039 Roane Co.

Horsehead-Rockwood Tennessee Facility is pleased to provide the attached Discharge Monitoring Report (DMR) forms that include the results from the internal storm water sampling points and sampling of Moon Springs Pond.

The results include all permit-identified parameters for the three storm water monitoring points (SW-1, SW-2, andSW-3) and Sector "A" or Quadrant 2 of the Holding Pond.

All samples were acquired with strict adherence to the requirements of the permit. Storm water flow from each outfall was estimated using onsite measurements of precipitation, the duration of the storm event, and the discharge area of the drainage, as specified in the permit. The results include no exceedances of the permit-specified maximum values for the respective parameters.

Laboratory analytical reports are included as Attachment B.

If you have any questions, please feel free to contact me at (865) 354-0955 or by e-mail at tjohnston@horsehead.net

Sincerely,

Tom Johnston
Plant Manager

Check on outfall identification for DMR.

MAY 1 5 2015

Attachment A
Discharge Monitoring Report (DMR) Forms

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME Horsehead Corporation

ADDRESS 199 Truck Route
Rockwood, TN

FACILITY LOCATION Rockwood, Roane County, TN

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

MAY 15 2015
Form Approved.
OMB No. 2040-0004

rvh 7-7-15

SOP-01039	
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2014	5	1	TO	2015	4	30

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD5	SAMPLE MEASUREMENT				14.5	4.02	Non-Detect	mg/L	0	Ann.	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
TSS	SAMPLE MEASUREMENT				80.0	87.6	4.00	mg/L	0	Ann.	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Ammonia as N	SAMPLE MEASUREMENT				0.0637	0.0973	Non-Detect	mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
Oil and Grease	SAMPLE MEASUREMENT				Non-Detect	Non-Detect	Non-Detect	mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
COD	SAMPLE MEASUREMENT				61.3	40.0	19.1	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Aluminum, Total	SAMPLE MEASUREMENT				0.917	0.262	0.359	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Lead, Total	SAMPLE MEASUREMENT				0.794	0.173	0.0272	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
Tom Johnston	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	865	354-0955	5	15	15
TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

MAY 15 2015

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME Horsehead Corporation
ADDRESS 199 Truck Route
Rockwood, TN

FACILITY LOCATION Rockwood, Roane County, TN

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER: SOP-01039
DISCHARGE NUMBER:

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2014	5	1	TO	2015	4	30

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Cadmium, Total	SAMPLE MEASUREMENT				0.140	0.0267	0.00290	mg/L	0	Ann.	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Copper, Total	SAMPLE MEASUREMENT				0.154	0.0405	0.00670	mg/L	0	Ann.	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Arsenic, Total	SAMPLE MEASUREMENT				Non-Detect	Non-Detect	Non-Detect	mg/L	0	Ann.	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Chromium, Total	SAMPLE MEASUREMENT				0.133	0.0216	Non-Detect	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Manganese, Total	SAMPLE MEASUREMENT				1.75	0.343	0.0490	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Nickel, Total	SAMPLE MEASUREMENT				0.0111	Non-Detect	Non-Detect	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				
Zinc, Total	SAMPLE MEASUREMENT				27.5	5.52	0.698	mg/L	0	Ann	Comp
	PERMIT REQUIREMENT				Report	Report	Report				

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER: Tom Johnston
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

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AREA CODE	NUMBER	YEAR	MO	DAY

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PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME Horsehead Corporation

ADDRESS 199 Truck Route
Rockwood, TN

FACILITY LOCATION Rockwood, Roane County, TN

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DISCHARGE MONITORING REPORT (DMR)

Form Approved. OMB No. 2040-0004 15 2015

SOP-01039	
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FROM	2014	5	1	TO	2015	4	30

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER		QUANTITY OR LOADING VALUE	QUANTITY OR LOADING VALUE	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION VALUE	QUALITY OR CONCENTRATION VALUE	QUALITY OR CONCENTRATION VALUE	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
Flow	SAMPLE MEASUREMENT				0.316	0.168	0.167	MGD	0	Ann.	Est.
	PERMIT REQUIREMENT				Report	Report	Report				
Field pH	SAMPLE MEASUREMENT				8.82	8.84	8.06	s.u.	0	Ann.	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
Laboratory pH	SAMPLE MEASUREMENT				7.58	8.40	8.23	s.u.	0	Ann.	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

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PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME Horsehead Corporation

ADDRESS 199 Truck Route
Rockwood, TN

FACILITY LOCATION Rockwood, Roane County, TN
Holding Pond Sector A, Quad 2

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved. 5 2015
OMB No. 2040-0004

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		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
COD	SAMPLE MEASUREMENT				12.4			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report						
Aluminum, Total	SAMPLE MEASUREMENT				0.160			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report						
Arsenic, Total	SAMPLE MEASUREMENT				Non-Detect			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report						
Iron, Total	SAMPLE MEASUREMENT				0.786			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				Report						
Nickel, Dissolved	SAMPLE MEASUREMENT				Non-Detect			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				0.05						
Lead, Dissolved	SAMPLE MEASUREMENT				0.0026			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				0.015						
Mercury, Dissolved	SAMPLE MEASUREMENT				Non-Detect			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				0.002						

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NAME Horsehead Corporation

ADDRESS 199 Truck Route
Rockwood, TN

FACILITY LOCATION Rockwood, Roane County, TN
Holding Pond Sector A, Quad 2

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		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Silver, Total	SAMPLE MEASUREMENT				Non-Detect			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report						
Zinc, Total	SAMPLE MEASUREMENT				1.59			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				Report						
Cadmium, Dissolved	SAMPLE MEASUREMENT				0.0006			mg/L	0	Ann.	Grab
	PERMIT REQUIREMENT				0.005						
Chromium, Dissolved	SAMPLE MEASUREMENT				Non-Detect			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				0.1						
Copper, Total	SAMPLE MEASUREMENT				0.0106			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				Report						
Selenium, Total	SAMPLE MEASUREMENT				0.00570			mg/L	0	Ann	Grab
	PERMIT REQUIREMENT				Report						
Field pH	SAMPLE MEASUREMENT				8.6			s.u	0	Ann	Grab
	PERMIT REQUIREMENT				6.0-9.0						

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TELEPHONE		DATE		
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duplicate ? rec'd 7-7-15

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		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow	SAMPLE MEASUREMENT				0.316	0.168	0.167	MGD	0	Ann.	Est.
	PERMIT REQUIREMENT				Report	Report	Report				
Field pH	SAMPLE MEASUREMENT				8.82	8.84	8.06	s.u.	0	Ann.	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
Laboratory pH	SAMPLE MEASUREMENT				7.58	8.40	8.23	s.u.	0	Ann.	Grab
	PERMIT REQUIREMENT				Report	Report	Report				
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
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TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

MAY 1 5 2015

Attachment B
Laboratory Analytical Reports

MAY 1 5 2015

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-75692-1
Client Project/Site: Horsehead

For:
EnSafe, Inc.
308 North Peters Road, Suite 200
Knoxville, Tennessee 37922

Attn: Deborah Halcrow

Jennifer Huckaba

Authorized for release by:
4/15/2015 11:38:28 AM

Jennifer Huckaba, Project Manager II
(615)301-5042
jennifer.huckaba@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Case Narrative 4
Definitions 5
Client Sample Results 6
QC Sample Results 7
QC Association 11
Chronicle 13
Method Summary 14
Certification Summary 15
Chain of Custody 16
Receipt Checklists 18

Sample Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-75692-1	HP_04012015_G_SA	Surface Water	04/01/15 10:15	04/02/15 08:30

Job ID: 490-75692-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-75692-1

Comments
No additional comments.

Receipt
The sample was received on 4/2/2015 8:30 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.3° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method(s) 410.4: The matrix spike (MS) recovery for 240869 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Client Sample ID: HP_04012015_G_SA

Lab Sample ID: 490-75692-1

Date Collected: 04/01/15 10:15
Date Received: 04/02/15 08:30

Matrix: Surface Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.160		0.100	0.0500	mg/L		04/03/15 15:53	04/06/15 21:03	1
Arsenic	ND		0.0100	0.00720	mg/L		04/03/15 15:53	04/06/15 21:03	1
Copper	0.0106		0.0100	0.00500	mg/L		04/03/15 15:53	04/06/15 21:03	1
Iron	0.786		0.100	0.0500	mg/L		04/03/15 15:53	04/06/15 21:03	1
Selenium	0.00570	J	0.0100	0.00500	mg/L		04/03/15 15:53	04/06/15 21:03	1
Silver	ND		0.00500	0.00250	mg/L		04/03/15 15:53	04/06/15 21:03	1
Zinc	1.59		0.0500	0.0300	mg/L		04/03/15 15:53	04/06/15 21:03	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000600	J	0.00100	0.000500	mg/L		04/08/15 12:53	04/10/15 12:02	1
Chromium	ND		0.00500	0.00300	mg/L		04/08/15 12:53	04/10/15 12:02	1
Lead	0.00260	J	0.00500	0.00200	mg/L		04/08/15 12:53	04/10/15 12:02	1
Nickel	ND		0.0100	0.00300	mg/L		04/08/15 12:53	04/10/15 12:02	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L		04/07/15 11:14	04/08/15 14:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	12.4	J	20.0	5.00	mg/L			04/13/15 14:36	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.19		0.100	0.100	SU			04/03/15 08:53	1
Temperature	21.4		0.100	0.100	Degrees C			04/03/15 08:53	1

QC Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 490-238859/1-A
Matrix: Water
Analysis Batch: 239344

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 238859

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.100	0.0500	mg/L		04/03/15 15:53	04/06/15 19:06	1
Arsenic	ND		0.0100	0.00720	mg/L		04/03/15 15:53	04/06/15 19:06	1
Copper	ND		0.0100	0.00500	mg/L		04/03/15 15:53	04/06/15 19:06	1
Iron	ND		0.100	0.0500	mg/L		04/03/15 15:53	04/06/15 19:06	1
Selenium	ND		0.0100	0.00500	mg/L		04/03/15 15:53	04/06/15 19:06	1
Silver	ND		0.00500	0.00250	mg/L		04/03/15 15:53	04/06/15 19:06	1
Zinc	ND		0.0500	0.0300	mg/L		04/03/15 15:53	04/06/15 19:06	1

Lab Sample ID: LCS 490-238859/2-A
Matrix: Water
Analysis Batch: 239344

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 238859

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	2.00	1.802		mg/L		90	80 - 120
Arsenic	0.0500	0.04590		mg/L		92	80 - 120
Copper	0.250	0.2283		mg/L		91	80 - 120
Iron	1.00	0.9298		mg/L		93	80 - 120
Selenium	0.0500	0.04400		mg/L		88	80 - 120
Silver	0.0500	0.05110		mg/L		102	80 - 120
Zinc	0.500	0.4435		mg/L		89	80 - 120

Lab Sample ID: LCSD 490-238859/3-A
Matrix: Water
Analysis Batch: 239344

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 238859

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	2.00	1.961		mg/L		98	80 - 120	8	20
Arsenic	0.0500	0.04780		mg/L		96	80 - 120	4	20
Copper	0.250	0.2511		mg/L		100	80 - 120	10	20
Iron	1.00	0.9871		mg/L		99	80 - 120	6	20
Selenium	0.0500	0.05130		mg/L		103	80 - 120	15	20
Silver	0.0500	0.04920		mg/L		98	80 - 120	4	20
Zinc	0.500	0.4898		mg/L		98	80 - 120	10	20

Lab Sample ID: 490-75608-D-9-B MS
Matrix: Water
Analysis Batch: 239344

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 238859

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.0626	J	2.00	2.217		mg/L		108	75 - 125
Arsenic	ND		0.0500	0.05180		mg/L		104	75 - 125
Copper	ND		0.250	0.2721		mg/L		109	75 - 125
Iron	1.57		1.00	2.609		mg/L		104	75 - 125
Selenium	ND		0.0500	0.05200		mg/L		104	75 - 125
Silver	ND		0.0500	0.04630		mg/L		93	75 - 125
Zinc	0.0521		0.500	0.5709		mg/L		104	75 - 125

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 490-75608-D-9-C MSD
Matrix: Water
Analysis Batch: 239344

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 238859

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0626	J	2.00	2.045		mg/L		99	75 - 125	8	20
Arsenic	ND		0.0500	0.04790		mg/L		96	75 - 125	8	20
Copper	ND		0.250	0.2529		mg/L		101	75 - 125	7	20
Iron	1.57		1.00	2.521		mg/L		95	75 - 125	3	20
Selenium	ND		0.0500	0.04920		mg/L		98	75 - 125	6	20
Silver	ND		0.0500	0.04750		mg/L		95	75 - 125	3	20
Zinc	0.0521		0.500	0.5321		mg/L		96	75 - 125	7	20

Lab Sample ID: MB 490-239790/1-B
Matrix: Water
Analysis Batch: 240466

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 239791

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000500	mg/L		04/08/15 12:53	04/10/15 11:54	1
Chromium	ND		0.00500	0.00300	mg/L		04/08/15 12:53	04/10/15 11:54	1
Lead	ND		0.00500	0.00200	mg/L		04/08/15 12:53	04/10/15 11:54	1
Nickel	ND		0.0100	0.00300	mg/L		04/08/15 12:53	04/10/15 11:54	1

Lab Sample ID: LCS 490-239790/2-B
Matrix: Water
Analysis Batch: 240466

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 239791

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.0500	0.05210		mg/L		104	80 - 120
Chromium	0.200	0.2173		mg/L		109	80 - 120
Lead	0.0500	0.05400		mg/L		108	80 - 120
Nickel	0.500	0.5406		mg/L		108	80 - 120

Lab Sample ID: 490-75692-1 MS
Matrix: Surface Water
Analysis Batch: 240466

Client Sample ID: HP_04012015_G_SA
Prep Type: Dissolved
Prep Batch: 239791

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.000600	J	0.0500	0.05220		mg/L		103	75 - 125
Chromium	ND		0.200	0.2089		mg/L		104	75 - 125
Lead	0.00260	J	0.0500	0.05400		mg/L		103	75 - 125
Nickel	ND		0.500	0.5319		mg/L		106	75 - 125

Lab Sample ID: 490-75692-1 MSD
Matrix: Surface Water
Analysis Batch: 240466

Client Sample ID: HP_04012015_G_SA
Prep Type: Dissolved
Prep Batch: 239791

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.000600	J	0.0500	0.04950		mg/L		98	75 - 125	5	20
Chromium	ND		0.200	0.2095		mg/L		105	75 - 125	0	20
Lead	0.00260	J	0.0500	0.05160		mg/L		98	75 - 125	5	20
Nickel	ND		0.500	0.5048		mg/L		101	75 - 125	5	20

QC Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 490-239444/1-B
Matrix: Water
Analysis Batch: 239878

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 239452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L		04/07/15 11:14	04/08/15 14:49	1

Lab Sample ID: LCS 490-239444/2-B
Matrix: Water
Analysis Batch: 239878

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 239452

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00100	0.0008656		mg/L		87	80 - 120

Lab Sample ID: 490-75692-1 MS
Matrix: Surface Water
Analysis Batch: 239878

Client Sample ID: HP_04012015_G_SA
Prep Type: Dissolved
Prep Batch: 239452

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.0009045		mg/L		90	75 - 125

Lab Sample ID: 490-75692-1 MSD
Matrix: Surface Water
Analysis Batch: 239878

Client Sample ID: HP_04012015_G_SA
Prep Type: Dissolved
Prep Batch: 239452

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0008931		mg/L		89	75 - 125	1	20

Method: 410.4 - COD

Lab Sample ID: MB 490-240869/3
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		20.0	5.00	mg/L			04/13/15 14:36	1

Lab Sample ID: LCS 490-240869/4
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	50.0	50.13		mg/L		100	90 - 110

Lab Sample ID: LCSD 490-240869/5
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	50.0	51.61		mg/L		103	90 - 110	3	20

Method: 410.4 - COD (Continued)

Lab Sample ID: 490-75801-A-1 MS
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	31.2	F1	50.0	71.39	F1	mg/L		80	90 - 110

Lab Sample ID: 490-75881-A-1 MS
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	11.4	J F1	50.0	54.83	F1	mg/L		87	90 - 110

Lab Sample ID: 490-75805-A-1 DU
Matrix: Water
Analysis Batch: 240869

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	14.9	J	15.19	J	mg/L		2	20

Method: 9040C - pH

Lab Sample ID: LCS 490-238670/1
Matrix: Water
Analysis Batch: 238670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.010		SU		100	95 - 105

Lab Sample ID: 490-75692-1 DU
Matrix: Surface Water
Analysis Batch: 238670

Client Sample ID: HP_04012015_G_SA
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	8.19		8.190		SU		0	20
Temperature	21.4		21.40		Degrees C		0	20

QC Association Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Metals

Prep Batch: 238859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75608-D-9-B MS	Matrix Spike	Total/NA	Water	3010A	
490-75608-D-9-C MSD	Matrix Spike Duplicate	Total/NA	Water	3010A	
490-75692-1	HP_04012015_G_SA	Total/NA	Surface Water	3010A	
LCS 490-238859/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 490-238859/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 490-238859/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 239344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75608-D-9-B MS	Matrix Spike	Total/NA	Water	6010C	238859
490-75608-D-9-C MSD	Matrix Spike Duplicate	Total/NA	Water	6010C	238859
490-75692-1	HP_04012015_G_SA	Total/NA	Surface Water	6010C	238859
LCS 490-238859/2-A	Lab Control Sample	Total/NA	Water	6010C	238859
LCSD 490-238859/3-A	Lab Control Sample Dup	Total/NA	Water	6010C	238859
MB 490-238859/1-A	Method Blank	Total/NA	Water	6010C	238859

Filtration Batch: 239444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
LCS 490-239444/2-B	Lab Control Sample	Dissolved	Water	Filtration	
MB 490-239444/1-B	Method Blank	Dissolved	Water	Filtration	

Prep Batch: 239452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239444
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239444
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239444
LCS 490-239444/2-B	Lab Control Sample	Dissolved	Water	7470A	239444
MB 490-239444/1-B	Method Blank	Dissolved	Water	7470A	239444

Filtration Batch: 239790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	Filtration	
LCS 490-239790/2-B	Lab Control Sample	Dissolved	Water	Filtration	
MB 490-239790/1-B	Method Blank	Dissolved	Water	Filtration	

Prep Batch: 239791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	3005A	239790
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	3005A	239790
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	3005A	239790
LCS 490-239790/2-B	Lab Control Sample	Dissolved	Water	3005A	239790
MB 490-239790/1-B	Method Blank	Dissolved	Water	3005A	239790

Analysis Batch: 239878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239452

Metals (Continued)

Analysis Batch: 239878 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239452
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	7470A	239452
LCS 490-239444/2-B	Lab Control Sample	Dissolved	Water	7470A	239452
MB 490-239444/1-B	Method Blank	Dissolved	Water	7470A	239452

Analysis Batch: 240466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Dissolved	Surface Water	6010C	239791
490-75692-1 MS	HP_04012015_G_SA	Dissolved	Surface Water	6010C	239791
490-75692-1 MSD	HP_04012015_G_SA	Dissolved	Surface Water	6010C	239791
LCS 490-239790/2-B	Lab Control Sample	Dissolved	Water	6010C	239791
MB 490-239790/1-B	Method Blank	Dissolved	Water	6010C	239791

General Chemistry

Analysis Batch: 238670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Total/NA	Surface Water	9040C	
490-75692-1 DU	HP_04012015_G_SA	Total/NA	Surface Water	9040C	
LCS 490-238670/1	Lab Control Sample	Total/NA	Water	9040C	

Analysis Batch: 240869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-75692-1	HP_04012015_G_SA	Total/NA	Surface Water	410.4	
490-75801-A-1 MS	Matrix Spike	Total/NA	Water	410.4	
490-75805-A-1 DU	Duplicate	Total/NA	Water	410.4	
490-75881-A-1 MS	Matrix Spike	Total/NA	Water	410.4	
LCS 490-240869/4	Lab Control Sample	Total/NA	Water	410.4	
LCSD 490-240869/5	Lab Control Sample Dup	Total/NA	Water	410.4	
MB 490-240869/3	Method Blank	Total/NA	Water	410.4	

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Client Sample ID: HP_04012015_G_SA

Lab Sample ID: 490-75692-1

Date Collected: 04/01/15 10:15

Matrix: Surface Water

Date Received: 04/02/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	239791	04/08/15 12:53	TSC	TAL NSH
Dissolved	Filtration	Filtration			1.0 mL	1.0 mL	239790	04/08/15 12:53	TSC	TAL NSH
Dissolved	Analysis	6010C		1	50 mL	50 mL	240466	04/10/15 12:02	ADN	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	238859	04/03/15 15:53	TSC	TAL NSH
Total/NA	Analysis	6010C		1	50 mL	50 mL	239344	04/06/15 21:03	LEG	TAL NSH
Dissolved	Prep	7470A			30 mL	30 mL	239452	04/07/15 11:14	NJB	TAL NSH
Dissolved	Filtration	Filtration			30 mL	30 mL	239444	04/07/15 11:14	NJB	TAL NSH
Dissolved	Analysis	7470A		1	30 mL	30 mL	239878	04/08/15 14:55	CME	TAL NSH
Total/NA	Analysis	410.4		1	2 mL	2 mL	240869	04/13/15 14:36	MSJ	TAL NSH
Total/NA	Analysis	9040C		1		20 mL	238670	04/03/15 08:53	AOJ	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL NSH
7470A	Mercury (CVAA)	SW846	TAL NSH
410.4	COD	MCAWW	TAL NSH
9040C	pH	SW846	TAL NSH

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-75692-1

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	10-31-15
Arizona	State Program	9	AZ0473	05-05-15 *
Arkansas DEQ	State Program	6	88-0737	04-25-15
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-15
Illinois	NELAP	5	200010	12-09-15
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	04-30-15 *
Kentucky (UST)	State Program	4	19	06-30-15
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-15
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-15
Minnesota	NELAP	5	047-999-345	12-31-15
Mississippi	State Program	4	N/A	06-30-15
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-15
New Hampshire	NELAP	1	2963	10-09-15
New Jersey	NELAP	2	TN965	06-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15
Ohio VAP	State Program	5	CL0033	10-16-15
Oklahoma	State Program	6	9412	08-31-15
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-15
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-15 *
South Carolina (DW)	State Program	4	84009 (002)	02-23-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-15
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-15
Virginia	NELAP	3	460152	06-14-15
Washington	State Program	10	C789	07-19-15
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-15
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-75692 Chain of Custody

Cooler Received/Opened On 4/2/2015 @ 0830

1. Tracking # 0336 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID 18290455

2. Temperature of rep. sample or temp blank when opened: 6.3 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 (Front)

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry Ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) _____

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) _____

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) _____

I certify that I attached a label with the unique LIMS number to each container (intial) _____

21. Were there Non-Conformance issues at login? YES...NO Was a PIPE generated? YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 11/28/2012

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

ENSAFE

EnSafe Inc. 800-588-7962

Project Name: Horsehead

Site Location: Rockwood, TN

SamplerPhone# 865-693-3623

COC No. 1

PO No. ~~[illegible]~~ 18254

Page 1 of 1

Project No. 0888816616 Phase 03 Task

Lab Name Test America Nashville, TN

Samplers:

Send Results To: Debbie Halcrow Email: dhalcrow@ensafe.com

Data Shipping Address: 308 North Peters Road Suite 200, Knoxville, TN 37922

Sample Analysis Requested (Fill in the number of containers for each test)

Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers	Total Metals: Al, As, Fe, Cu, Zn, Ag, Se (NI)	Dissolved Metals: Pb, Cd, Cr, Ni, Hg (NP)	COD (SA)	pH (NP)	(SA)	(NI)	(NP)		<--Preservative Type (3) Remarks
													Loc: 490 75692			
HP_0401_2015_G_SA	HP	4/1/15	10:15	WS	N	N	4	1	1	1	1			91		Lab filter dissolved Metals

Turnaround Time: Standard

Email Results: Yes

Deliverable: Level 2

Field Comments:

Lab filter dissolved metals

Lab Comments:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	4/1/15	1425	1 [signature]	04-01-15	1425
2			2 [signature]	04/02/15	0830
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes X No

Method of Shipment: Hand Delivery

Airbill No:

Date Shipped:

(1) Matrix Code: AA=Air, AQ=Air Quality Control Matrix, DC=Drill Cuttings, GS=Soil Gas, LD=Drilling Fluid, LF=Free Product, LN=Liquid Waste, OB=Oil, SB=Bentonite, SC=Cement, SE=Sediment, SF=Filter Sandpack, SL=Sludge, SN=Miscellaneous Solid/Building Materials, SO=Soil, SQ=Soil/Solid Quality Control Matrix, ST=Solid Waste, SW=Swab/Wipe, TA=Animal Tissue, TP=Plant Tissue, TQ=Tissue Quality Control Matrix, U=Unknown, WA=Aqueous Drill Cuttings, WE=Estuary, WG=Ground Water, WL=Leachate, WO=Ocean Water, WP=Drinking Water, WQ=Water Quality Control Matrix, WS=Surface Water, WW=Waste Water

(2) Sample Type: AB=Ambient Blank, EB=Equipment Blank, FB=Field Blank, FD=Field Duplicate Sample, FR=Field Replicate, MB=Material Blank, N=Normal Environmental Sample, RB=Material Rinse Blank, TB=Trip Blank

(3) Preservative added: HA=Hydrochloric Acid, NI=Nitric Acid, SH=Sodium Hydroxide, SA=Sulfuric Acid, AA=Ascorbic Acid, HX=Hexane, ME=Methanol, SB=sodium bisulfate, ST=Sodium Thiosulfate, NP = No Preservative

Rev. 06/05

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 490-75692-1

Login Number: 75692
List Number: 1
Creator: Gambill, Shane

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.3
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Not requested on COC.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-76567-1
TestAmerica Sample Delivery Group: Rockwood, TN
Client Project/Site: Horsehead

For:
EnSafe, Inc.
308 North Peters Road, Suite 200
Knoxville, Tennessee 37922

Attn: Deborah Halcrow

Jennifer Huckaba

Authorized for release by:
4/23/2015 12:32:54 PM

Jennifer Huckaba, Project Manager II
(615)301-5042
jennifer.huckaba@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Case Narrative 4
Definitions 5
Client Sample Results 6
QC Sample Results 12
QC Association 17
Chronicle 19
Method Summary 21
Certification Summary 22
Chain of Custody 23
Receipt Checklists 26

Sample Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-76567-1	SW1_04142015_C	Surface Water	04/14/15 04:13	04/15/15 08:40
490-76567-2	SW1_04142015_G	Surface Water	04/14/15 02:45	04/15/15 08:40
490-76567-3	SW2_04142015_C	Surface Water	04/14/15 04:26	04/15/15 08:40
490-76567-4	SW2_04142015_G	Surface Water	04/14/15 03:30	04/15/15 08:40
490-76567-5	SW3_04142015_C	Surface Water	04/14/15 04:35	04/15/15 08:40
490-76567-6	SW3_04142015_G	Surface Water	04/14/15 03:15	04/15/15 08:40

Case Narrative

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Job ID: 490-76567-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-76567-1

Comments
No additional comments.

Receipt
The samples were received on 4/15/2015 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.1° C and 1.1° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method(s) 350.1: The matrix spike (MS) recovery for 242871 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 410.4: The matrix spike (MS) recovery for COD batch 243098 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) SM5210B: The glucose-glutamic acid standard recovered outside the recovery limits specified in the method in batch 242475.

Method(s) SM5210B: The USB dilution water D.O. depletion was greater than 0.2 mg/L but less than the reporting limit of 2.0 mg/L. The associated sample results in batch 242475 are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
F3	Duplicate RPD exceeds the control limit
b	Result Detected in the Unseeded Control blank (USB).
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW1_04142015_C

Lab Sample ID: 490-76567-1

Date Collected: 04/14/15 04:13
Date Received: 04/15/15 08:40

Matrix: Surface Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.917		0.100	0.0500	mg/L		04/16/15 12:09	04/17/15 14:08	1
Arsenic	ND		0.0100	0.00720	mg/L		04/16/15 12:09	04/17/15 14:08	1
Cadmium	0.140	F1	0.00100	0.000500	mg/L		04/16/15 12:09	04/17/15 14:08	1
Chromium	0.133		0.00500	0.00300	mg/L		04/16/15 12:09	04/17/15 14:08	1
Copper	0.154	F1	0.0100	0.00500	mg/L		04/16/15 12:09	04/17/15 14:08	1
Lead	0.794		0.00500	0.00200	mg/L		04/16/15 12:09	04/17/15 14:08	1
Manganese	1.75	F1	0.0150	0.00500	mg/L		04/16/15 12:09	04/17/15 14:08	1
Nickel	0.0111		0.0100	0.00300	mg/L		04/16/15 12:09	04/17/15 14:08	1
Zinc	27.5		0.500	0.300	mg/L		04/16/15 12:09	04/18/15 14:11	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	61.3	F1	20.0	5.00	mg/L			04/22/15 14:51	1
Total Suspended Solids	80.0		4.00	2.80	mg/L			04/15/15 21:45	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	14.5	b *	4.00	4.00	mg/L			04/15/15 15:00	2

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW1_04142015_G
Date Collected: 04/14/15 02:45
Date Received: 04/15/15 08:40

Lab Sample ID: 490-76567-2
Matrix: Surface Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		4.52	1.58	mg/L		04/17/15 13:00	04/17/15 13:00	1
Ammonia (as N)	0.0637	J F1	0.100	0.0600	mg/L		04/21/15 17:45	04/22/15 09:06	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.58		0.100	0.100	SU			04/16/15 11:02	1
Temperature	21.1		0.100	0.100	Degrees C			04/16/15 11:02	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW2_04142015_C
Date Collected: 04/14/15 04:26
Date Received: 04/15/15 08:40

Lab Sample ID: 490-76567-3
Matrix: Surface Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.262		0.100	0.0500	mg/L		04/16/15 12:09	04/17/15 14:29	1
Arsenic	ND		0.0100	0.00720	mg/L		04/16/15 12:09	04/17/15 14:29	1
Cadmium	0.0267		0.00100	0.000500	mg/L		04/16/15 12:09	04/17/15 14:29	1
Chromium	0.0216		0.00500	0.00300	mg/L		04/16/15 12:09	04/17/15 14:29	1
Copper	0.0405		0.0100	0.00500	mg/L		04/16/15 12:09	04/17/15 14:29	1
Lead	0.173		0.00500	0.00200	mg/L		04/16/15 12:09	04/17/15 14:29	1
Manganese	0.343		0.0150	0.00500	mg/L		04/16/15 12:09	04/17/15 14:29	1
Nickel	ND		0.0100	0.00300	mg/L		04/16/15 12:09	04/17/15 14:29	1
Zinc	5.52		0.0500	0.0300	mg/L		04/16/15 12:09	04/17/15 14:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	40.0		20.0	5.00	mg/L			04/22/15 14:51	1
Total Suspended Solids	87.6		4.00	2.80	mg/L			04/15/15 21:45	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	4.02	b *	2.00	2.00	mg/L			04/15/15 15:00	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW2_04142015_G
Date Collected: 04/14/15 03:30
Date Received: 04/15/15 08:40

Lab Sample ID: 490-76567-4
Matrix: Surface Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		5.41	1.89	mg/L		04/17/15 13:00	04/17/15 13:00	1
Ammonia (as N)	0.0973	J	0.100	0.0600	mg/L		04/21/15 17:45	04/22/15 09:10	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.40		0.100	0.100	SU			04/16/15 11:02	1
Temperature	21.1		0.100	0.100	Degrees C			04/16/15 11:02	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW3_04142015_C
Date Collected: 04/14/15 04:35
Date Received: 04/15/15 08:40

Lab Sample ID: 490-76567-5
Matrix: Surface Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.359		0.100	0.0500	mg/L		04/16/15 12:09	04/17/15 14:33	1
Arsenic	ND		0.0100	0.00720	mg/L		04/16/15 12:09	04/17/15 14:33	1
Cadmium	0.00290		0.00100	0.000500	mg/L		04/16/15 12:09	04/17/15 14:33	1
Chromium	ND		0.00500	0.00300	mg/L		04/16/15 12:09	04/17/15 14:33	1
Copper	0.00670	J	0.0100	0.00500	mg/L		04/16/15 12:09	04/17/15 14:33	1
Lead	0.0272		0.00500	0.00200	mg/L		04/16/15 12:09	04/17/15 14:33	1
Manganese	0.0490		0.0150	0.00500	mg/L		04/16/15 12:09	04/17/15 14:33	1
Nickel	ND		0.0100	0.00300	mg/L		04/16/15 12:09	04/17/15 14:33	1
Zinc	0.698		0.0500	0.0300	mg/L		04/16/15 12:09	04/17/15 14:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	19.1	J	20.0	5.00	mg/L			04/22/15 14:51	1
Total Suspended Solids	4.00		1.00	0.700	mg/L			04/15/15 21:45	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	ND	*	2.00	2.00	mg/L			04/15/15 15:00	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW3_04142015_G
Date Collected: 04/14/15 03:15
Date Received: 04/15/15 08:40

Lab Sample ID: 490-76567-6
Matrix: Surface Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		5.41	1.89	mg/L		04/17/15 13:00	04/17/15 13:00	1
Ammonia (as N)	ND		0.100	0.0600	mg/L		04/21/15 17:51	04/22/15 09:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.23		0.100	0.100	SU			04/16/15 11:02	1
Temperature	21.1		0.100	0.100	Degrees C			04/16/15 11:02	1

QC Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 490-241740/1-A
Matrix: Water
Analysis Batch: 242202

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 241740

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.100	0.0500	mg/L		04/16/15 12:09	04/17/15 13:45	1
Arsenic	ND		0.0100	0.00720	mg/L		04/16/15 12:09	04/17/15 13:45	1
Cadmium	ND		0.00100	0.000500	mg/L		04/16/15 12:09	04/17/15 13:45	1
Chromium	ND		0.00500	0.00300	mg/L		04/16/15 12:09	04/17/15 13:45	1
Copper	ND		0.0100	0.00500	mg/L		04/16/15 12:09	04/17/15 13:45	1
Lead	ND		0.00500	0.00200	mg/L		04/16/15 12:09	04/17/15 13:45	1
Manganese	ND		0.0150	0.00500	mg/L		04/16/15 12:09	04/17/15 13:45	1
Nickel	ND		0.0100	0.00300	mg/L		04/16/15 12:09	04/17/15 13:45	1
Zinc	ND		0.0500	0.0300	mg/L		04/16/15 12:09	04/17/15 13:45	1

Lab Sample ID: MB 490-241740/1-A
Matrix: Water
Analysis Batch: 242353

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 241740

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.0500	0.0300	mg/L		04/16/15 12:09	04/18/15 14:02	1

Lab Sample ID: LCS 490-241740/2-A
Matrix: Water
Analysis Batch: 242202

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 241740

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	2.00	1.827		mg/L		91	80 - 120
Arsenic	0.0500	0.04390		mg/L		88	80 - 120
Cadmium	0.0500	0.04530		mg/L		91	80 - 120
Chromium	0.200	0.1854		mg/L		93	80 - 120
Copper	0.250	0.2300		mg/L		92	80 - 120
Lead	0.0500	0.04910		mg/L		98	80 - 120
Manganese	0.500	0.4596		mg/L		92	80 - 120
Nickel	0.500	0.4638		mg/L		93	80 - 120
Zinc	0.500	0.4514		mg/L		90	80 - 120

Lab Sample ID: LCS 490-241740/2-A
Matrix: Water
Analysis Batch: 242353

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 241740

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Zinc	0.500	0.4376		mg/L		88	80 - 120

Lab Sample ID: 490-76567-1 MS
Matrix: Surface Water
Analysis Batch: 242202

Client Sample ID: SW1_04142015_C
Prep Type: Total/NA
Prep Batch: 241740

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.917		2.00	2.419		mg/L		75	75 - 125
Arsenic	ND		0.0500	0.04120		mg/L		82	75 - 125
Cadmium	0.140	F1	0.0500	0.1650	F1	mg/L		50	75 - 125
Chromium	0.133		0.200	0.2851		mg/L		76	75 - 125
Copper	0.154	F1	0.250	0.3349	F1	mg/L		73	75 - 125

QC Sample Results

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 490-76567-1 MS — **Client Sample ID: SW1_04142015_C**
Matrix: Surface Water — **Prep Type: Total/NA**
Analysis Batch: 242202 — **Prep Batch: 241740**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.794		0.0500	0.7450	4	mg/L		-99	75 - 125
Manganese	1.75	F1	0.500	2.060	F1	mg/L		61	75 - 125
Nickel	0.0111		0.500	0.4126		mg/L		80	75 - 125

Lab Sample ID: 490-76567-1 MS — **Client Sample ID: SW1_04142015_C**
Matrix: Surface Water — **Prep Type: Total/NA**
Analysis Batch: 242353 — **Prep Batch: 241740**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Zinc	27.5		0.500	30.16	4	mg/L		536	75 - 125

Lab Sample ID: 490-76567-1 MSD — **Client Sample ID: SW1_04142015_C**
Matrix: Surface Water — **Prep Type: Total/NA**
Analysis Batch: 242202 — **Prep Batch: 241740**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.917		2.00	2.764		mg/L		92	75 - 125	13	20
Arsenic	ND		0.0500	0.04620		mg/L		92	75 - 125	11	20
Cadmium	0.140	F1	0.0500	0.1832		mg/L		86	75 - 125	10	20
Chromium	0.133		0.200	0.3206		mg/L		94	75 - 125	12	20
Copper	0.154	F1	0.250	0.3857		mg/L		93	75 - 125	14	20
Lead	0.794		0.0500	0.8277	4	mg/L		67	75 - 125	11	20
Manganese	1.75	F1	0.500	2.260		mg/L		101	75 - 125	9	20
Nickel	0.0111		0.500	0.4673		mg/L		91	75 - 125	12	20

Lab Sample ID: 490-76567-1 MSD — **Client Sample ID: SW1_04142015_C**
Matrix: Surface Water — **Prep Type: Total/NA**
Analysis Batch: 242353 — **Prep Batch: 241740**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Zinc	27.5		0.500	32.34	4	mg/L		972	75 - 125	7	20

Method: 1664A - HEM and SGT-HEM

Lab Sample ID: MB 490-242057/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 242060 — **Prep Batch: 242057**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		4.00	1.40	mg/L		04/17/15 13:00	04/17/15 13:00	1

Lab Sample ID: LCS 490-242057/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 242060 — **Prep Batch: 242057**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
HEM	41.7	36.88		mg/L		88	78 - 114

Method: 1664A - HEM and SGT-HEM (Continued)

Lab Sample ID: 490-76550-B-2-A MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 242060 — **Prep Batch: 242057**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
HEM	ND		48.2	40.96		mg/L		85	78 - 114

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 490-242871/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 242944 — **Prep Batch: 242871**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (as N)	ND		0.100	0.0600	mg/L		04/21/15 17:45	04/22/15 08:48	1

Lab Sample ID: LCS 490-242871/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 242944 — **Prep Batch: 242871**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	5.00	4.560		mg/L		91	90 - 110

Lab Sample ID: 490-76567-2 MS — **Client Sample ID: SW1_04142015_G**
Matrix: Surface Water — **Prep Type: Total/NA**
Analysis Batch: 242944 — **Prep Batch: 242871**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	0.0637	J F1	5.00	6.760	F1	mg/L		134	90 - 110

Method: 410.4 - COD

Lab Sample ID: MB 490-243098/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243098

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		20.0	5.00	mg/L			04/22/15 14:51	1

Lab Sample ID: LCS 490-243098/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243098

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	50.0	51.05		mg/L		102	90 - 110

Lab Sample ID: LCSD 490-243098/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243098

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	50.0	50.26		mg/L		101	90 - 110	2	20

Method: 410.4 - COD (Continued)

Lab Sample ID: 490-76567-1 MS
Matrix: Surface Water
Analysis Batch: 243098

Client Sample ID: SW1_04142015_C
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	61.3	F1	50.0	127.4	F1	mg/L		132	90 - 110

Lab Sample ID: 490-76463-B-1 DU
Matrix: Water
Analysis Batch: 243098

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	24.2		24.75		mg/L		2	20

Method: 9040C - pH

Lab Sample ID: LCS 490-241701/1
Matrix: Water
Analysis Batch: 241701

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.040		SU		101	95 - 105

Lab Sample ID: 490-76567-2 DU
Matrix: Surface Water
Analysis Batch: 241701

Client Sample ID: SW1_04142015_G
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.58		7.590		SU		0.1	20
Temperature	21.1		21.10		Degrees C		0	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 490-241591/1
Matrix: Water
Analysis Batch: 241591

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L			04/15/15 21:45	1

Lab Sample ID: LCS 490-241591/2
Matrix: Water
Analysis Batch: 241591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	100	100.9		mg/L		101	90 - 110

Lab Sample ID: 490-76575-A-2 DU
Matrix: Water
Analysis Batch: 241591

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	580		658.0		mg/L		13	20

Method: SM 2540D - Solids, Total Suspended (TSS) (Continued)

Lab Sample ID: 490-76575-A-3 DU
Matrix: Water
Analysis Batch: 241591

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	1300		1468		mg/L		12	20

Method: SM5210B - BOD, 5 Day

Lab Sample ID: MB 490-242475/2
Matrix: Water
Analysis Batch: 242475

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	ND		2.00	2.00	mg/L			04/15/15 09:00	1

Lab Sample ID: 490-76554-E-1 DU
Matrix: Water
Analysis Batch: 242475

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Biochemical Oxygen Demand	17.2	b *	31.55	* F3	mg/L		59	20

QC Association Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Metals

Prep Batch: 241740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	3010A	
490-76567-1 MS	SW1_04142015_C	Total/NA	Surface Water	3010A	
490-76567-1 MSD	SW1_04142015_C	Total/NA	Surface Water	3010A	
490-76567-3	SW2_04142015_C	Total/NA	Surface Water	3010A	
490-76567-5	SW3_04142015_C	Total/NA	Surface Water	3010A	
LCS 490-241740/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-241740/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 242202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-1 MS	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-1 MSD	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-3	SW2_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-5	SW3_04142015_C	Total/NA	Surface Water	6010C	241740
LCS 490-241740/2-A	Lab Control Sample	Total/NA	Water	6010C	241740
MB 490-241740/1-A	Method Blank	Total/NA	Water	6010C	241740

Analysis Batch: 242353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-1 MS	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
490-76567-1 MSD	SW1_04142015_C	Total/NA	Surface Water	6010C	241740
LCS 490-241740/2-A	Lab Control Sample	Total/NA	Water	6010C	241740
MB 490-241740/1-A	Method Blank	Total/NA	Water	6010C	241740

General Chemistry

Analysis Batch: 241591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	SM 2540D	
490-76567-3	SW2_04142015_C	Total/NA	Surface Water	SM 2540D	
490-76567-5	SW3_04142015_C	Total/NA	Surface Water	SM 2540D	
490-76575-A-2 DU	Duplicate	Total/NA	Water	SM 2540D	
490-76575-A-3 DU	Duplicate	Total/NA	Water	SM 2540D	
LCS 490-241591/2	Lab Control Sample	Total/NA	Water	SM 2540D	
MB 490-241591/1	Method Blank	Total/NA	Water	SM 2540D	

Analysis Batch: 241701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-2	SW1_04142015_G	Total/NA	Surface Water	9040C	
490-76567-2 DU	SW1_04142015_G	Total/NA	Surface Water	9040C	
490-76567-4	SW2_04142015_G	Total/NA	Surface Water	9040C	
490-76567-6	SW3_04142015_G	Total/NA	Surface Water	9040C	
LCS 490-241701/1	Lab Control Sample	Total/NA	Water	9040C	

Prep Batch: 242057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76550-B-2-A MS	Matrix Spike	Total/NA	Water	1664A	
490-76567-2	SW1_04142015_G	Total/NA	Surface Water	1664A	

General Chemistry (Continued)

Prep Batch: 242057 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-4	SW2_04142015_G	Total/NA	Surface Water	1664A	
490-76567-6	SW3_04142015_G	Total/NA	Surface Water	1664A	
LCS 490-242057/2-A	Lab Control Sample	Total/NA	Water	1664A	
MB 490-242057/1-A	Method Blank	Total/NA	Water	1664A	

Analysis Batch: 242060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76550-B-2-A MS	Matrix Spike	Total/NA	Water	1664A	242057
490-76567-2	SW1_04142015_G	Total/NA	Surface Water	1664A	242057
490-76567-4	SW2_04142015_G	Total/NA	Surface Water	1664A	242057
490-76567-6	SW3_04142015_G	Total/NA	Surface Water	1664A	242057
LCS 490-242057/2-A	Lab Control Sample	Total/NA	Water	1664A	242057
MB 490-242057/1-A	Method Blank	Total/NA	Water	1664A	242057

Analysis Batch: 242475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76554-E-1 DU	Duplicate	Total/NA	Water	SM5210B	
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	SM5210B	
490-76567-3	SW2_04142015_C	Total/NA	Surface Water	SM5210B	
490-76567-5	SW3_04142015_C	Total/NA	Surface Water	SM5210B	
MB 490-242475/2	Method Blank	Total/NA	Water	SM5210B	

Prep Batch: 242871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-2	SW1_04142015_G	Total/NA	Surface Water	Distill/Ammonia	
490-76567-2 MS	SW1_04142015_G	Total/NA	Surface Water	Distill/Ammonia	
490-76567-4	SW2_04142015_G	Total/NA	Surface Water	Distill/Ammonia	
490-76567-6	SW3_04142015_G	Total/NA	Surface Water	Distill/Ammonia	
LCS 490-242871/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 490-242871/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 242944

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76567-2	SW1_04142015_G	Total/NA	Surface Water	350.1	242871
490-76567-2 MS	SW1_04142015_G	Total/NA	Surface Water	350.1	242871
490-76567-4	SW2_04142015_G	Total/NA	Surface Water	350.1	242871
490-76567-6	SW3_04142015_G	Total/NA	Surface Water	350.1	242871
LCS 490-242871/2-A	Lab Control Sample	Total/NA	Water	350.1	242871
MB 490-242871/1-A	Method Blank	Total/NA	Water	350.1	242871

Analysis Batch: 243098

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76463-B-1 DU	Duplicate	Total/NA	Water	410.4	
490-76567-1	SW1_04142015_C	Total/NA	Surface Water	410.4	
490-76567-1 MS	SW1_04142015_C	Total/NA	Surface Water	410.4	
490-76567-3	SW2_04142015_C	Total/NA	Surface Water	410.4	
490-76567-5	SW3_04142015_C	Total/NA	Surface Water	410.4	
LCS 490-243098/4	Lab Control Sample	Total/NA	Water	410.4	
LCSD 490-243098/5	Lab Control Sample Dup	Total/NA	Water	410.4	
MB 490-243098/3	Method Blank	Total/NA	Water	410.4	

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW1_04142015_C

Lab Sample ID: 490-76567-1
Matrix: Surface Water

Date Collected: 04/14/15 04:13
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	241740	04/16/15 12:09	TSC	TAL NSH
Total/NA	Analysis	6010C		1	50 mL	50 mL	242202	04/17/15 14:08	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	241740	04/16/15 12:09	TSC	TAL NSH
Total/NA	Analysis	6010C		10	50 mL	50 mL	242353	04/18/15 14:11	ADN	TAL NSH
Total/NA	Analysis	410.4		1	2 mL	2 mL	243098	04/22/15 14:51	MSJ	TAL NSH
Total/NA	Analysis	SM 2540D		1	250 mL	1000 mL	241591	04/15/15 21:45	CMO	TAL NSH
Total/NA	Analysis	SM5210B		2		300 mL	242475		FZA	TAL NSH
							(Start)	04/15/15 15:00		
							(End)	04/20/15 08:50		

Client Sample ID: SW1_04142015_G

Lab Sample ID: 490-76567-2
Matrix: Surface Water

Date Collected: 04/14/15 02:45
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1664A		1	850 mL	960 mL	242060	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	1664A			850 mL	960 mL	242057	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	242871	04/21/15 17:45	ADJ	TAL NSH
Total/NA	Analysis	350.1		1	50 mL	50 mL	242944	04/22/15 09:06	KRB	TAL NSH
Total/NA	Analysis	9040C		1		20 mL	241701	04/16/15 11:02	AOJ	TAL NSH

Client Sample ID: SW2_04142015_C

Lab Sample ID: 490-76567-3
Matrix: Surface Water

Date Collected: 04/14/15 04:26
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	241740	04/16/15 12:09	TSC	TAL NSH
Total/NA	Analysis	6010C		1	50 mL	50 mL	242202	04/17/15 14:29	LEG	TAL NSH
Total/NA	Analysis	410.4		1	2 mL	2 mL	243098	04/22/15 14:51	MSJ	TAL NSH
Total/NA	Analysis	SM 2540D		1	250 mL	1000 mL	241591	04/15/15 21:45	CMO	TAL NSH
Total/NA	Analysis	SM5210B		1		300 mL	242475		FZA	TAL NSH
							(Start)	04/15/15 15:00		
							(End)	04/20/15 08:50		

Client Sample ID: SW2_04142015_G

Lab Sample ID: 490-76567-4
Matrix: Surface Water

Date Collected: 04/14/15 03:30
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1664A		1	710 mL	960 mL	242060	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	1664A			710 mL	960 mL	242057	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	242871	04/21/15 17:45	ADJ	TAL NSH
Total/NA	Analysis	350.1		1	50 mL	50 mL	242944	04/22/15 09:10	KRB	TAL NSH

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Client Sample ID: SW2_04142015_G

Lab Sample ID: 490-76567-4

Date Collected: 04/14/15 03:30
Matrix: Surface Water
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9040C		1		20 mL	241701	04/16/15 11:02	AOJ	TAL NSH

Client Sample ID: SW3_04142015_C

Lab Sample ID: 490-76567-5

Date Collected: 04/14/15 04:35
Matrix: Surface Water
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	241740	04/16/15 12:09	TSC	TAL NSH
Total/NA	Analysis	6010C		1	50 mL	50 mL	242202	04/17/15 14:33	LEG	TAL NSH
Total/NA	Analysis	410.4		1	2 mL	2 mL	243098	04/22/15 14:51	MSJ	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	241591	04/15/15 21:45	CMO	TAL NSH
Total/NA	Analysis	SM5210B		1		300 mL	242475		FZA	TAL NSH
							(Start)	04/15/15 15:00		
							(End)	04/20/15 08:50		

Client Sample ID: SW3_04142015_G

Lab Sample ID: 490-76567-6

Date Collected: 04/14/15 03:15
Matrix: Surface Water
Date Received: 04/15/15 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1664A		1	710 mL	960 mL	242060	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	1664A			710 mL	960 mL	242057	04/17/15 13:00	BAD	TAL NSH
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	242871	04/21/15 17:51	ADJ	TAL NSH
Total/NA	Analysis	350.1		1	50 mL	50 mL	242944	04/22/15 09:11	KRB	TAL NSH
Total/NA	Analysis	9040C		1		20 mL	241701	04/16/15 11:02	AOJ	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL NSH
1664A	HEM and SGT-HEM	1664A	TAL NSH
350.1	Nitrogen, Ammonia	MCAWW	TAL NSH
410.4	COD	MCAWW	TAL NSH
9040C	pH	SW846	TAL NSH
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL NSH
SM5210B	BOD, 5 Day	SM	TAL NSH

Protocol References:

1664A = EPA-821-98-002

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: EnSafe, Inc.
Project/Site: Horsehead

TestAmerica Job ID: 490-76567-1
SDG: Rockwood, TN

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	10-31-15
Arizona	State Program	9	AZ0473	05-05-15 *
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-15
Illinois	NELAP	5	200010	12-09-15
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	04-30-15 *
Kentucky (UST)	State Program	4	19	06-30-15
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-15
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-15
Minnesota	NELAP	5	047-999-345	12-31-15
Mississippi	State Program	4	N/A	06-30-15
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-15
New Hampshire	NELAP	1	2963	10-09-15
New Jersey	NELAP	2	TN965	06-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15
Ohio VAP	State Program	5	CL0033	10-16-15
Oklahoma	State Program	6	9412	08-31-15
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-15
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-15 *
South Carolina (DW)	State Program	4	84009 (002)	02-23-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-15
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-15
Virginia	NELAP	3	460152	06-14-15
Washington	State Program	10	C789	07-19-15
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-15
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-76567 Chain of Custody

Cooler Received/Opened On 4/15/2015 @ 0840

1. Tracking # 2813 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID 12080142

2. Temperature of rep. sample or temp blank when opened: 1.1 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: one front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) DA

7. Were custody seals on containers: YES NO and intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry Ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # 2

I certify that I unloaded the cooler and answered questions 7-14 (intial) DA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) DA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) DA

I certify that I attached a label with the unique LIMS number to each container (intial) DA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

Comms

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 11/28/12

4/23/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

Loc: 490
76567

Cooler Received/Opened On: 4/15/2015 @0840

1. Tracking # 2393 (last 4 digits, FedEx)

Courier: Fed-Ex IR Gun ID: 96210146

2. Temperature of rep. sample or temp blank when opened: 1.1 *Degrees Celsius*

3. If item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 1 Front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) HF

7. Were custody seals on containers: YES NO and intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry Ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # 1

I certify that I unloaded the cooler and answered questions 7-14 (intial) P

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) 17

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) M

I certify that I attached a label with the unique LIMS number to each container (intial) D

21. Were there Non-Conformance Issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 11/28/12

4/23/2015

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. 1 | Page 1 of 1

ENSAFE

EnSafe Inc. 800-588-7962

Project Name: Horsehead | PO No. #### | Project No. 0888816616 Phase 03 Task

Site Location: Rockwood, TN | Lab Name: Test America Nashville, TN

SamplerPhone# 865-693-3623

Samplers:

Send Results To: Debbie Halcrow Email: dhalcrow@ensafe.com

Data Shipping Address: 308 North Peters Road Suite 200, Knoxville, TN 37922

Sample Analysis Requested (Fill in the number of containers for each test)

	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers	BOD (NP)	TSS (NP)	Oil and Grease (HA)	Ammonia (SA)	COD (SA)	Total Metals: As, Al, Pb,Cd,Cu,Cr,Mn,Ni,Zn (NI)	pH (NP)		<--Preservative Type (3) Remarks
1	SW1_04142015_C	SW1	4/14/15	4:13	WS	N	N	5	1	2			1	1			
2	SW1_04142015_G	SW1	4/14/15	2:45	WS	N	N	4			2	1			1		Loc: 490 76567
3	SW2_04142015_C	SW2	4/14/15	4:26	WS	N	N	5	1	2			1	1			
4	SW2_04142015_G	SW2	4/14/15	3:30	WS	N	N	4			2	1			1		
5	SW3_04142015_C	SW3	4/14/15	4:35	WS	N	N	5	1	2			1	1			
6	SW3_04142015_G	SW3	4/14/15	3:15	WS	N	N	4			2	1			1		

Turnaround Time: Standard | Email Results: Yes | Deliverable: Level 2

***Field* Comments:**

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 2

Samples Iced?(check) Yes X No

Method of Shipment: Hand Delivery

Airbill No:

Date Shipped:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	4/14/15		1 [signature]	04-14-15	10:25
2			2 [signature]	4/15/15	0840
3			3		

(1) **Matrix Code:** AA=Air, AQ=Air Quality Control Matrix, DC=Drill Cuttings, GS=Soil Gas, LD=Drilling Fluid, LF=Free Product, LH=Liquid Waste, Oil=Oil, SB=Bentonite, SC=Cement, SE=Sediment, SF=Filter Sandpack, SL=Sludge, SN=Miscellaneous Solid/Building Materials, SO=Soil, SQ=Soil/Solid Quality Control Matrix, ST=Solid Waste, SW=Swab/Wipe, TA=Animal Tissue, TP=Plant Tissue, TQ=Tissue Quality Control Matrix, U=Unknown, WA=Aqueous Drill Cuttings, WE=Estuary, WG=Ground Water, WL=Leachate, WO=Ocean Water, WP=Drinking Water, WQ=Water Quality Control Matrix, WS=Surface Water, WW=Waste Water

(2) **Sample Type:** AB=Ambient Blank, EB=Equipment Blank, FB=Field Blank, FD=Field Duplicate Sample, FR=Field Replicate, MB=Material Blank, N=Normal Environmental Sample, RB=Material Rinse Blank, TB=Trip Blank

(3) **Preservative added:** HA=Hydrochloric Acid, NI=Nitric Acid, SH=Sodium Hydroxide, SA=Sulfuric Acid, AA=Ascorbic Acid, HX=Hexane, ME=Methanol, SB=sodium bisulfate, ST=Sodium Thiosulfate, NP = No Preservative

Rev. 06/05

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 490-76567-1
SDG Number: Rockwood, TN

Login Number: 76567
List Number: 1
Creator: Buckingham, Paul

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	