R&M ENGINEERING-KETCHIKAN, INC.
ENGINEERS GEOLOGISTS SURVEYORS

355 CARLANNA LAKE ROAD, SUITE 200, KETCHIKAN, ALASKA 99901
PHONE (907) 225-7917 FAX (907) 225-3441 EMAIL: RNMMain@rmketchikan.com

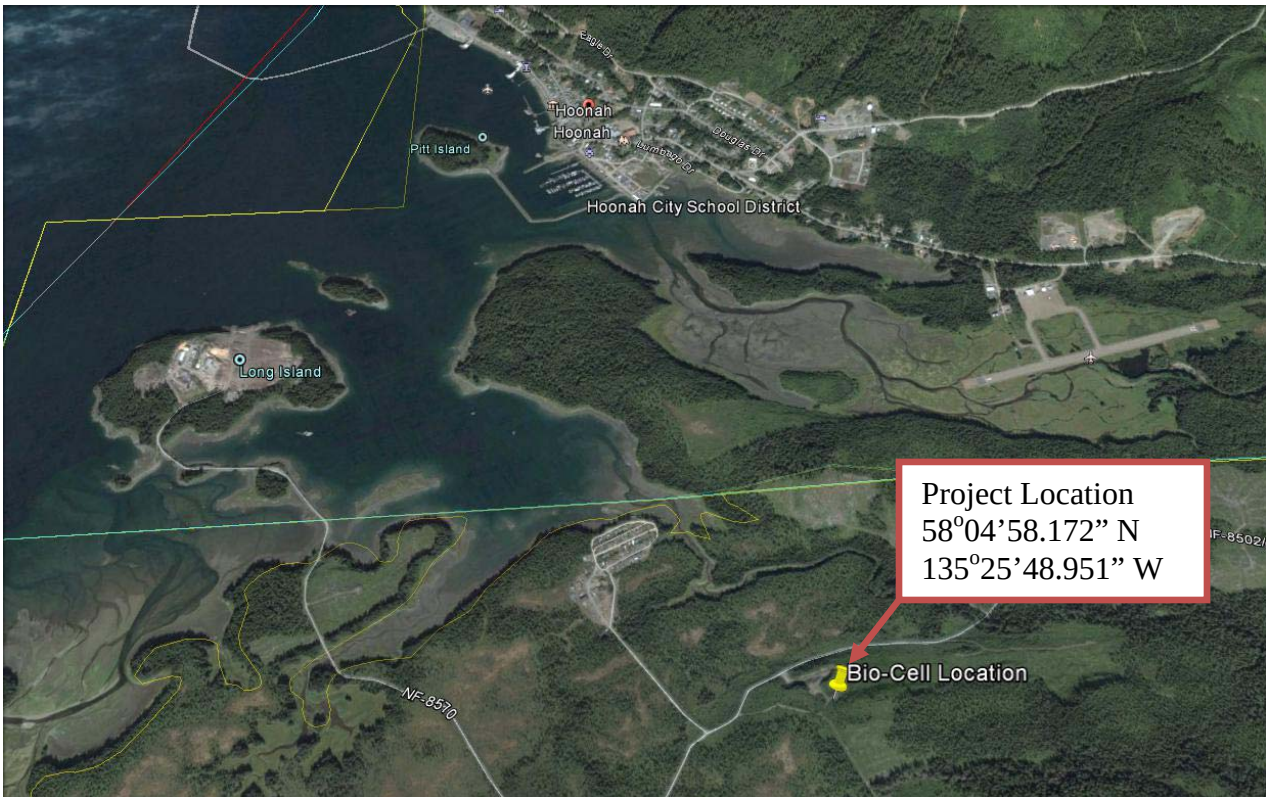
Whitestone Camp Bioremediation Cell Soil Sampling Report

Client: Sealaska **Date:** May 14th, 2016

Project: Whitestone Camp Bioremediation Cell Soil Sampling **Inspector(s):** Robert Badgett

Weather: Slightly Overcast

LOCATION MAP:



SITE OBSERVATIONS:

Prior to beginning soil sampling of site field technician performed a visual observation of the existing bioremediation cell. During the visual inspection it was noted that the existing cell was approximately 90'long by 20' wide and approximately 18" deep. The existing surface of the bioremediation cell did not have an impermeable line covering it, however the R&M inspector did notice that the impermeable liner below the cell did appear to be intact. In general the

material in the cell consisted primarily of woody waste products (chipped up bark and small fragments of wood) consist with what would be encountered on the ground surface of a log sorting yard. Finally based on our field observations it there appeared to be a low spot in the middle of the cell where all the surface water would collect

SAMPLING PROCEEDURES AND LOCATIONS:

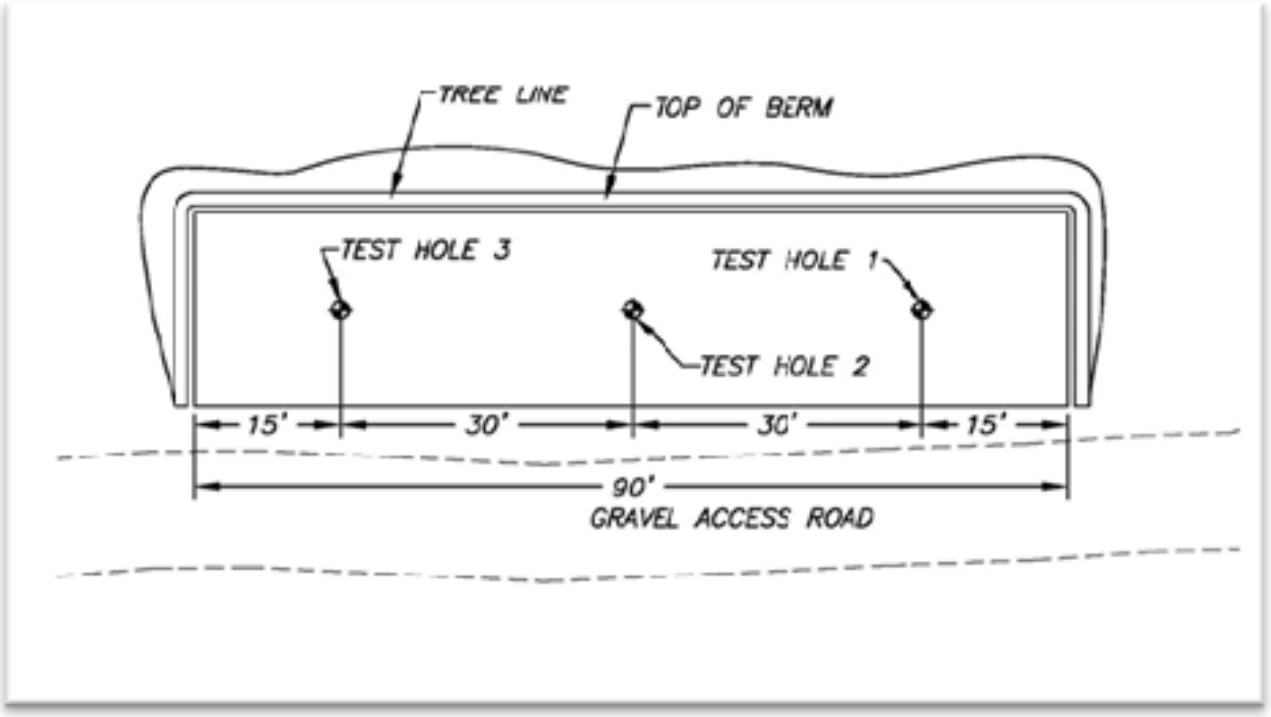
Upon completion of the field inspection R&M's technician performed the soil sampling. As per the approved soil sampling plan the cell was broken up into three approximalty equal parts or sub-cells and began sampling. The sampling consisted of taking three PID meter readings at various depth in each of the test holes, one soil sample for laboratory analysis from each test hole, and a duplicate sample for analysis form the test hole where the PID meter readings were the highest.

The PID meter readings were taken by collecting a small sample of soil in a ziplock bag, which was then sealed and placed in a bowl of warm water in order to heat the soil up to temperature conducive to sampling with a PID meter. Once the soil was sufficiently warmed the testing tube of the PID meter was then placed inside the plastic baggie and sealed and the measurement was then performed for approximately 45 seconds or until the meter reading no longer increased. The results from the PID tests are below.

Field Screening Results

Sub-cell #	Depth (in)	Soil Temperature (oF)	PID Reading (mg/l)
1	3	68	5
1	9	71	27
1	14	67	48
1	18	71	86
2	3	69	12
2	6	67	34
2	9	72	67
2	12	68	102
3	3	66	47
3	6	70	161
3	9	65	247
3	12	67	333

Test Hole Location Map



Test Sample Analysis Results

Sample ID#	Test Hole #	Sample Depth	Lab Results (DRO mg/kg)	Lab Results (DRO mg/kg) Silica Gel
1	1	18”	227	115
2	2	12”	196	93.3
2-Duplicate	2	12”	183	81.2
3	1	12”	835	526

CONCLUSIONS AND RECOMENDATIONS

Based on our review of the attached soil analysis report it appears that a large amount of the contaminated soil has been successfully remediated to contamination levels below the ACEC accepted limit of 200 mg/kg. However in the area where test hole 3 was located the contamination levels were still higher than the accepted limits. Therefore it is our recommendation some additional bioremediation be performed on the material. This can be accomplished by tilling, turning, and mixing nitrogen and phosphorus rich fertilize into the existing material in the bioremediation cell. Base off an assumed average hydrocarbon concentration of 130 mg/kg, an approximate unit weight of the existing soil of approximately 120 lb/cy, the addition of (3) 90 lb bags of nitrogen rich fertilizer thoroughly mixed into the existing soils will be sufficient to achieve the recommended 100carbon:100nitrogen:1 phosphorus ration in the existing soil. Once the fertilizer it mixed into the contaminated soil and the material is evenly spread along the bottom liner, this pipe should then be covered with a minimum 4mil impervious membrane to ensure no runoff water is allowed to mix in the with the contaminated soil.

Sincerely,
R&M Engineering-Ketchikan, Inc.

Robert Badgett

Robert K. Badgett, P.E.

STATE OF ALASKA
49TH
ROBERT BADGETT
No. CE12347
REGISTERED PROFESSIONAL ENGINEER

7/25/16

PHOTOS

	**Photograph No. 1** **Description:** Over all photo
	**Photograph No. 2** **Description:** Test Hole #1

	**Photograph No. 3** **Description:** Test Hole #2
	**Photograph No. 4** **Description:** Test Hole #3

Laboratory Analysis Report

Robert Badgett
R&M Engineering-Ketchikan, Inc.
355 Carlanna Lake Road
Ketchikan, AK 99901

Work Order:	1162539
	Whitestone Camp Bio-Cell
Client:	R&M Engineering-Ketchikan, Inc.
Report Date:	June 03, 2016

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO 17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.
The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.
All DRO/RRO analyses are integrated per SOP.

SGS Ref.#	1162539001		
Client Name	R&M Engineering-Ketchikan, Inc.	**Printed Date/Time**	06/03/2016 15:22
Project Name/#	Whitestone Camp Bio-Cell	**Collected Date/Time**	05/14/2016 10:15
Client Sample ID	TH1-1 2	**Received Date/Time**	05/20/2016 13:14
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Semivolatile Organic Fuels Department									
Diesel Range Organics	227	65.0	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
Residual Range Organics	1430	65.0	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	137		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	104		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Semivolatile Organic Fuels Department, Silica Gel									
DRO Silica Gel	115	65.0	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
RRO Silica Gel	648	65.0	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	109		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	97.3		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Solids									
Total Solids	60.3		%	SM21 2540G	A			05/21/16	RJA

SGS Ref.#	1162539002		
Client Name	R&M Engineering-Ketchikan, Inc.	**Printed Date/Time**	06/03/2016 15:22
Project Name/#	Whitestone Camp Bio-Cell	**Collected Date/Time**	05/14/2016 10:30
Client Sample ID	TH2-1 2	**Received Date/Time**	05/20/2016 13:14
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Semivolatile Organic Fuels Department									
Diesel Range Organics	196	62.3	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
Residual Range Organics	1360	62.3	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	119		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	106		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Semivolatile Organic Fuels Department, Silica Gel									
DRO Silica Gel	93.3	62.3	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
RRO Silica Gel	595	62.3	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	94.4		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	95.6		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Solids									
Total Solids	63.3		%	SM21 2540G	A			05/21/16	RJA

SGS Ref.#	1162539003		
Client Name	R&M Engineering-Ketchikan, Inc.	**Printed Date/Time**	06/03/2016 15:22
Project Name/#	Whitestone Camp Bio-Cell	**Collected Date/Time**	05/14/2016 10:30
Client Sample ID	TH2-1 2 Duplicate	**Received Date/Time**	05/20/2016 13:14
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Semivolatile Organic Fuels Department									
Diesel Range Organics	183	61.4	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
Residual Range Organics	1390	61.4	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	122		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	106		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Semivolatile Organic Fuels Department, Silica Gel									
DRO Silica Gel	81.2	61.4	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
RRO Silica Gel	595	61.4	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	96.6		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	99.1		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Solids									
Total Solids	64.5		%	SM21 2540G	A			05/21/16	RJA

SGS Ref.#	1162539004		
Client Name	R&M Engineering-Ketchikan, Inc.	**Printed Date/Time**	06/03/2016 15:22
Project Name/#	Whitestone Camp Bio-Cell	**Collected Date/Time**	05/14/2016 10:45
Client Sample ID	TH3-2 1	**Received Date/Time**	05/20/2016 13:14
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Semivolatile Organic Fuels Department									
Diesel Range Organics	835	257	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
Residual Range Organics	5470	257	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	128		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	138		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Semivolatile Organic Fuels Department, Silica Gel									
DRO Silica Gel	526	257	mg/Kg	AK102	A		05/27/16	06/01/16	S.G
RRO Silica Gel	3330	257	mg/Kg	AK103	A		05/27/16	06/01/16	S.G
Surrogates									
5a Androstane (surr)	88		%	AK102	A	50-150	05/27/16	06/01/16	S.G
n-Triacontane-d62 (surr)	117		%	AK103	A	50-150	05/27/16	06/01/16	S.G
Solids									
Total Solids	61.3		%	SM21 2540G	A			05/21/16	RJA

SGS

SGS Environmental Servi
CHAIN OF CUSTODY RI

1162539

Locations Nationwide

aska Maryland
ew Jersey New York
orth Carolina Ohio
'est Virgina

www.us.sgs.com

CLIENT **R&M Engineering-Ketchikan, Inc.**

CONTACT: **Robert Badgett** PHONE NO: 907-225-7917

PROJECT: **Whitestone Camp Bio-Cell** SITE/PWSID#:

REPORTS TO: E-MAIL:
Robert Badgett rbadgett@rmketchikan.com

INVOICE TO: **R&M Engineering-KTN.** QUOTE
P.O. #:

SGS Reference #:

page 1_ of 1

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	# CONTAINERS	Preserv Used	SAMPLE TYPE C = COMP G = GRAB MI = Multi Incremental Samples	DRO /RRO	REMARKS/ LOC ID
1A	TH1-1	14-May	10:15		1	G		☒	
1B	TH1-2	14-May	10:15		1	G		☒	Silica Gel Cleanup
2A	TH2-1	14-May	10:30		1	G		☒	
2B	TH2-2	14-May	10:30		1	G		☒	Silica Gel Cleanup
3A	TH2-1 Duplicate	14-May	10:30		1	G		☒	
3B	TH2-2 Duplicate	14-May	10:30		1	G		☒	Silica Gel Cleanup
4A	TH3-2	14-May	10:45		1	G		☒	
4B	TH3-1	14-May	10:45		1	G		☒	Silica Gel Cleanup

	Date	Time	Received By:
Collected/Relinquished By: (1)			
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 5/20/16	Time 1314	Received For Laboratory By:

DOD Project? YES NO Special Deliverable Requirements:

Cooler ID

Requested Turnaround Time and-or Special Instructions:

Samples Received Cold? YES NO Chain of Custody Seal: (Circle)

Cooler TB INTACT BROKEN ABSE

Temperature °C: 5.3 | 2.42

- 200 W. Potter Drive **Anchorage, AK 99518** Tel: (907) 562-2343 Fax: (907) 561-5301
- 5500 Business Drive **Wilmington, NC 28405** Tel: (910) 350-1903 Fax: (910) 350-1557

027 KTN 5389 8320 027-5389 8320

Shipper's Name and Address
R and M Engineering Inc
355 Carlanna Lake Road
Ketchikan, AK 99901
USA
Tel: 9072257917

Shipper's Account Number
27442063030
Customer's ID Number
15992

Not Negotiable
Air Waybill
Issued By
Alaska AIR CARGO
P.O. BOX 68900 SEATTLE, WA 98168
800-225-2752 ALASKACARGO.COM

Consignee's Name and Address
SGS North America Inc
200 W Potter Drive
Anchorage, AK 99518
USA
Tel: 9075622343

Consignee's Account Number
27400215947

Also notify
Tel:

Issuing Carrier's Agent and City

Accounting Information
15992
R and M Engineering Inc
355 Carlanna Lake Road
Ketchikan, AK 99901
USA
SRN/162104
GoldStreak
1162539

Agent's IATA Code

Account No.

Airport of Departure (Addr. of First Carrier) and Requested Routing
Ketchikan

To	By First Carrier	To / By		To / By		Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
JNU	Alaska Airlines	ANC	AS			USD	PX	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Anchorage	AS 069/19	AS 073/20	XXX

Handling Information
KEEP COOL

SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	8.0	L		8.0		AS AGREED	COOL W1 SOIL SAMPLE Dims: 10 x 8 x9 x 1 GSX
1	8.0					AS AGREED	Volume: 0.417

Prepaid Weight Charge **Collect**
AS AGREED

Valuation Charge

Tax

Other Charges
XBC 0.00

Total Other Charges Due Agent

Total Other Charges Due Carrier

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: R and M Engineering Inc

Signature of Shipper or his Agent

☐ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Total Prepaid	Total Collect
AS AGREED	

19 May 2016 16:14 — Executed On (Date)
Ketchikan — at (Place)
Alaska Airlines — Signature of Issuing Carrier or its Agent

027-5389 8320

Alert Expeditors Inc. #364373

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 5 20 16

From R+M Eng.

To SES

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job #	PO#	

1 Cooler

GSX

5389 8320

1162539

Shipped Signature

Total Charge

Received By: [illegible] 1311

1162539

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	☐ ☑	☐ ☐	☑ ☐	***Exemption permitted if sampler hand carries/delivers.***
Temperature blank compliant* (i.e., 0-6°C after CF)? *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: [1] _____ @ 5.3 _____ w/ Therm.ID: 242 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled."	☑ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	***Exemption permitted if chilled & collected <8 hrs ago.*** ***Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.***
Delivery method (specify all that apply): ☐Client (hand carried) ☐USPS ☐Lynden ☐AK Air ☑Alert Courier ☐UPS ☐FedEx ☐RAVN ☐C&D Delivery ☐Carlile ☐Pen Air ☐Warp Speed ☐Other: _____ → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*			☐	
	Yes	N/A	No	
Were samples received within hold time? Do samples **match COC*** (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	☑ ☑ ☑	☐ ☐ ☐	☐ ☐ ☐	***Note: Refer to form F-083 "Sample Guide" for hold times.*** ***Note: If times differ <1hr, record details and login per COC.***
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): ☐Bubble Wrap ☐Separate plastic bags ☐Vermiculite ☐Other:	☐	☐	☐	
Were **proper containers** (type/mass/volume/preservative*) used? Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	☐ ☐ ☐ ☐	☐ ☑ ☑ ☑	☑ ☐ ☐ ☐	☐ ***Exemption permitted for metals (e.g., 200.8/6020A).***
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	☐ ☐	☑ ☑	☐ ☐	
For **special handling** (e.g., "MI" soils, foreign soils, lab filter for dissolved…, lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	☐	☑	☐	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	☐	☑	☐	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	☐	☑	☐	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	☑	☐	☐	SRF Completed by: aal PM notified:
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	☐	☐	☐	Peer Reviewed by:

Additional notes (if applicable):

Containers 1 and 2 B arrived broken. Analyses are DRO/RRO + DRO/RRO SG for all samples.

Note to Client: *Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.*

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1162539001-A	No Preservative Required	OK			
1162539001-B	No Preservative Required	DM			
1162539002-A	No Preservative Required	OK			
1162539002-B	No Preservative Required	DM			
1162539003-A	No Preservative Required	OK			
1162539003-B	No Preservative Required	OK			
1162539004-A	No Preservative Required	OK			
1162539004-B	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.