

Golder Associates Inc.

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June 3, 2002

023-5524

Alaska Department of Transportation & Public Facilities
6860 Glacier Highway
Juneau, AK 99801

Attention: Mr. Jim Heumann

**RE: RESULTS OF INTERTIDAL SEDIMENT SAMPLING AND ANALYSES
PROPOSED SITKA FERRY TERMINAL EXPANSION, ALASKA**

Dear Jim:

This letter presents the results of reconnaissance sampling and analysis of marine sediments from the intertidal zone of the Allen Marine Shipyard in Starrigavan Bay, Sitka, Alaska. Accompanying this letter are a CAD drawing (Figure 1) and photos illustrating the location from which the samples were obtained. Michael Kyte, Senior Marine Biologist with Golder Associates Inc., (Golder) took the photos during sampling.

1. INTRODUCTION

The Alaska Department of Transportation and Public Facilities (ADOT&PF) requested Golder to conduct a reconnaissance study on contamination levels in intertidal sediments at the Allen Marine Shipyard. The purpose of the study was to gather preliminary data at a location proposed for dredging and construction of a new Alaska Ferry terminal in Starrigavan Bay.

Golder Associates conducted the reconnaissance sampling of sediments at the same time soil sampling was conducted at the Allen Marine Shipyard. In addition, clam tissue samples were collected from the beach of an adjacent property at the request of ADOT&PF for the Alaska Department of Fish and Game. The results of these other studies are presented separately, as they were discrete tasks.

2. METHODS

Surficial sediments were collected by hand during a low tide. Three locations were sampled: two within the boundaries of the shipyard's marine railway ("ITZ 1" and "ITZ 2") and another ("ITZ 3") on a berm seaward of the shipyard (Figure 1 and photos).

A handheld laser range finder was used to determine distances of the sample locations from known survey control points. Table 1 presents both the locations and measurements.

TABLE 1
Intertidal Sediment Sample Distances from Known Points

Description	Distance from DOLPHIN (ft)	Distance from CAP (ft)	Approximate Tide Level (ft relative to MLLW)
ITZ 1	348	215	-0.9 to -0.0
ITZ 2	342	166	-0.9 to -0.0
ITZ 3	86	247	-1.2

At all locations sediments were sampled to a depth of approximately 4 to 6 inches using stainless steel spoons that had been suitably cleaned. Clean stainless steel bowls and spoons were used to homogenize the sediments and place portions in sample containers supplied by Columbia Analytical Services of Kelso, Washington. Puget Sound Estuary Program analysis methods and protocols were used.

The list of analytes was compiled from the U.S. Army Corps of Engineers (Corps) Puget Sound Dredge Disposal Analysis (PSDDA) Program User Manual¹ and the Washington State Department of Ecology (WDE) Sediment Management Standards (SMS)². Screening levels established by the Corps PSDDA Program and WDE SMS were used to interpret the results. The sediment quality standards listed in the PSDDA Program User Manual are also used in the Lower Columbia Dredged Material Evaluation Framework (LCDMEF).³

3. RESULTS AND DISCUSSION

Physical characteristics of the three sediments samples are presented in Table 2. Coarse sediments dominated by sands and gravel, especially in sample ITZ 3, characterized all three samples. Samples ITZ 1 and ITZ 2 also contained high concentrations of sand blasting grit. Notably, all three samples had approximately equal amounts of fine sediments, silt and clay. An important difference among the samples was that ITZ 1 and ITZ 2 had

¹ U.S. Army Corps of Engineers, Seattle District, U.S. Environmental Protection Agency, Region 10; Washington Department of Natural Resources; Washington Department of Ecology. 2000. Dredged Material Evaluation and Disposal Procedures. A Users Manual for the Puget Sound Dredged Disposal Analysis Program. <http://www.nws.usace.army.mil/publicmenu/Attachments/UMPDF.pdf>

² Washington Department of Ecology. 1995. Washington Administrative Code. Chapter 173-204, Sediment Management Standards. <http://www.ecy.wa.gov/biblio/wac173204.html>

³ U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. 1998. Dredged Material Evaluation Framework. Lower Columbia River Management Area. <http://www.nwp.usace.army.mil/ec/h/hr/Final/>

relatively normal concentrations of total organic carbon (TOC), while ITZ 3 was unusually high⁴.

TABLE 2
Physical Characteristics of Intertidal Sediment Samples

	ITZ 1	ITZ 2	ITZ 3
Grain Size (percent)			
Gravel	6.45	31.1	44.7
Sand (0.064 to 2 mm)	93.7	64.1	57.1
Silt and clay	3.5	3	3.7
Total Volatile Solids (percent)	1.09	2.87	0.74
Total Organic Carbon (percent)	0.33	0.68	5.65

The physical differences among the samples were also reflected in the chemical test results (Table 3). Both samples from Allen Marine Shipyard marine railway (ITZ 1 and ITZ 2) contained high concentrations of metals, tributyl tin (TBT), and petroleum aromatic hydrocarbons (PAHs). In addition, these samples contained relatively high levels of polychlorinated biphenyls (PCBs). The metal concentrations were expected to be high because of the presence of used sand blasting grit indicating the deposition of antifouling paint debris containing copper, arsenic, lead, and TBT.

When the test results were compared to Washington SMS and Corps PSDDA sediment standards, several chemicals exceeded screening levels (Table 3). A summary of results from the sample with the highest exceedances is listed below in Table 3. A complete listing of laboratory test results is presented in Attachment 1 (Table A-1), along with pertinent pages from the laboratory test report.

⁴ Washington Department of Ecology. 1995. WAC Chapter 173-204-412, Table 1.

TABLE 3
Summary of Sediment Chemical Exceedances

Chemical	Sample with the Highest Concentration	Concentration (ppm)	Screening Levels (ppm)*	
			SMS (ppm dry weight)	PSDDA (ppm dry weight)
Arsenic	ITZ 1	1,060	57	57
Copper	ITZ 1	2,940	390	390
Lead	ITZ 2	1,910	450	450
Zinc	ITZ 1	7,590	410	410
TBT	ITZ 2	13	—	0.00015
		(ppm OC/ ppm dry weight)**	(ppm OC)	(ppm dry weight)
Total LPAH	ITZ 2	565.7/3.8	370	5.2
Total HPAH	ITZ 2	4,114/27.9	960	12
Total PCBs	ITZ 2	75.0/0.51	12	0.13

Notes:

* All concentrations have been converted to parts per million (ppm) (mg/kg) for this summary. Table 3 presents results in both ppm and parts per billion (ug/kg) according to the appropriate screening level and laboratory results.

** SMS screening levels for organic chemicals are ppm organic carbon - normalized (ppm OC) and PSDDA screening levels are ppm dry weight. Thus, for organic chemicals, both the dry weight and normalized concentrations are listed.

The concentrations of the metals including TBT exceeded not only the screening levels, but also, in some cases, the PSDDA "bioaccumulation trigger" and "maximum" levels. Exceeding the bioaccumulation trigger levels requires the dredging proponent to conduct specialized biological testing to determine the bioaccumulation potential and effects of the sediment proposed as dredge material.

As seen in both Table 3 and the attachments, the samples from the Allen Marine Shipyard were highly contaminated with metals in addition to low molecular weight (LPAHs) and high molecular weight (HPAHs) PAHs. For the most part, it appeared that the highest concentrations of metals were on the south side of the railway (ITZ 1) while the organic contamination was highest on the north side (ITZ 2). This may have been due to

procedures in the shipyard. The contamination was restricted to metals, PAHs, and PCBs with only a few other chemicals appearing in concentrations near detection limits.

Although nearby, the sample from the berm on the seaward side of the shipyard basin (ITZ 3) did not contain any exceedances of screening levels. Indeed, many of the chemicals found in the first two samples were not detected at this location.

4. ISSUES ASSOCIATED WITH PROPOSED DREDGING

If ADOT&PF proposed dredging the intertidal and subtidal portions of Allen Marine Shipyard to allow construction of a new ferry terminal, the Corps of Engineers would assess the suitability of the sediments in the proposed dredging prism for removal and disposal in open water. The Corps would use either the tiered decision process of the PSDDA program or the LCDMEF.

The LCDMEF specifies that materials consisting of at least 80 percent sand and/or gravel with less than 5 percent total volatile solids could be excluded from further testing. Thus, according to Tier 1 physical characteristics the intertidal and subtidal sediments could be suitable for dredging and disposal without further testing. However, the proximity of the proposed dredging site to the Allen Marine Shipyard, and the results of the reconnaissance sampling reported in this letter would move the site ranking to Tier II or higher of either PSDDA or LCDMEF.

We expect that the proposed dredge materials would be ranked as "high" because of the several exceedances of PSDDA sediment quality standards. This ranking would require extensive sampling and chemical and bioassay testing to define the risk that would be presented by these sediments if they were dredged. It is likely that the sediments would fail bioassay tests because of the known toxicity⁵ of arsenic, lead, copper, and TBT to marine organisms, especially shellfish larvae, which are used for bioassays. The Corps would then likely require that all dredged materials be confined in an upland disposal facility.

Obtaining a permit for dredging would likely require a cleanup or remediation plan for the contaminated sediments. In addition, a mitigation plan would be required for the loss of eelgrass in the proposed dredge area⁶. Thus, the proposed site for the new ferry terminal is problematic because of natural (eelgrass) and anthropogenic environmental factors.

⁵ Bryan, G.W. and J. Langston. 1992. Bioavailability, accumulation and effects of heavy metals in sediments with special reference to United Kingdom estuaries: a review. *Environmental Pollution* 76:89-131.

⁶ Golder Associates, May 15, 2002, Letter titled "A Preliminary Eelgrass Survey at the Sitka Alaska Ferry Terminal".

5. CLOSURE

Thank you for this opportunity to assist ADOT&PF in the selection of a site for a new ferry terminal. We hope the results presented in this letter are helpful. Please feel free to contact Michael Kyte by phone (425) 883-0777 or email (mkyte@golder.com) with any questions or comments on this reconnaissance sediment investigation.

Sincerely,



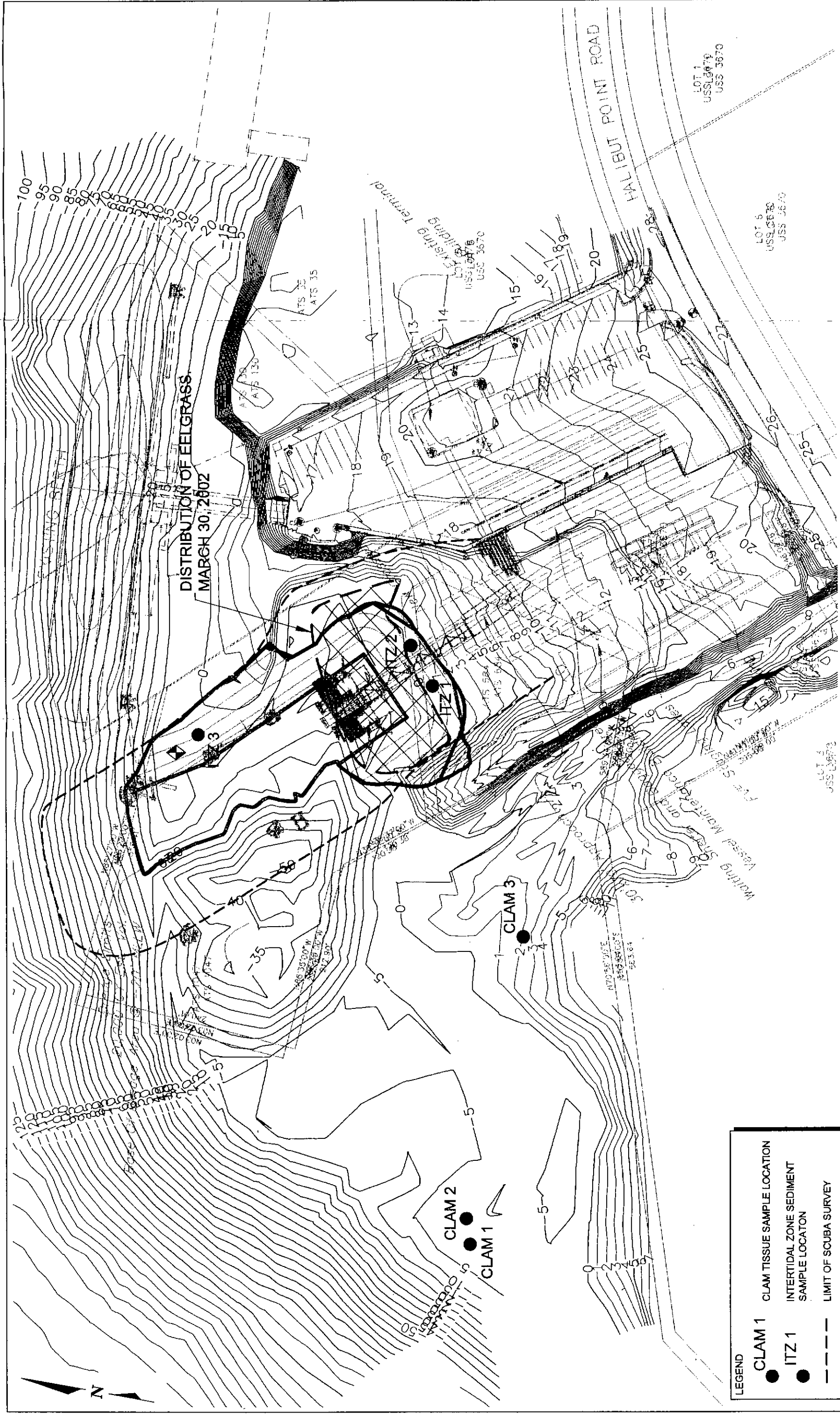
Mark R. Musial, P.E.
Associate and Project Manager



Michael A. Kyte
Senior Marine Biologist

Attachments: Figure 1 -Sitka Alternate 3A-Revised
Photo Log (Photographs 1-3)
Attachment 1 - Laboratory Testing Results
Table A-1 -Summary of Laboratory Testing, Chemical Characteristics of
Intertidal Sediment Samples for Starrigavin Bay, Alaska
Summary Pages from Laboratory Test Report

C:\02-2q\jobs\023-5524\ITZ Sediment Sampling Lt_Final.doc





Photograph 1. Sampling at the location of ITZ 1. Note the proximity of the Allen Marine Shipyard railway.



Photograph 2. The location of ITZ 2 on the north side of the Allen Marine Shipyard railway.

Note: Photographs illustrate conditions and locations for sampling of intertidal sediments at the Allen Marine Shipyard, April 1, 2002.



Photograph 3. Location of sample ITZ 3 on the berm seaward of the Allen Marine Shipyard basin and adjacent to the Alaska Ferry Terminal.

Note: Photographs illustrate conditions and locations for sampling of intertidal sediments at the Allen Marine Shipyard, April 1, 2002.

Laboratory Testing Results

ATTACHMENT 1

TABLE A-1
Summary of Laboratory Testing
Chemical Characteristics of Intertidal Sediment Samples from Starrigavan Bay, Alaska

Allen Marine Intertidal Sediment Samples												
CHEMICAL	CAS	ITZ 1		ITZ 2		ITZ 3		Washington Sediment Quality Standards ²	Screening Level	Bioaccum. Trigger	Maximum Level	PSDDA
		dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)					
METALS (mg/kg)												
Antimony	7440-36-0	58.9	..	114	..	0.18	..	nl	150	150 ³	200	
Arsenic	7440-38-2	1060	..	963	..	5.1	..	57	57	507	700	
Cadmium	7440-43-9	8.14	..	3.08	..	0.05	..	5.1	5	nl	14	
Chromium	7440-47-3	75.8	..	83.1	..	66.5	..	260	nl	nl	nl	
Copper	7440-50-8	2940	..	2100	..	13.7	..	390	390	nl	1,300	
Lead	7439-92-1	833	..	1910	..	4.26	..	450	450	nl	1,200	
Mercury	7439-97-6	0.02	..	0.07	..	0.01	..	0.41	0.41	2	2	
Nickel	7440-02-0	27	..	32.9	..	29	..	nl	140	370 ⁴	370	
Silver	7440-22-4	1.69	..	1.29	..	0.03	..	6.1	6.1	6.1 ³	8	
Zinc	7440-66-6	7590	..	4860	..	58.2	..	410	410	nl	3,800	
ORGANOMETALLIC COMPOUNDS (ug/L)												
Tributyltin ⁵ (interstitial water)	56573-85-4	11000	..	13000	..	1.1	..	nl	0.15	0.15	nl	
Total Organic Carbon (decimal percent)		0.0033	..	0.0068	..	0.0565	..	mg/kg organic carbon (ppm)
ORGANICS (ug/kg)												
Total LPAH	nl	1684	510.3	3847	565.7	6.6	0.12	370	5,200	nl	29,000	
Naphthalene	91-20-3	120	36.4	57	8.4	ND	ND	99	2,100	nl	2,400	
Acenaphthylene	208-96-8	44	13.3	180	26.5	ND	ND	66	560	nl	1,300	
Acenaphthene	83-32-9	100	30.3	190	27.9	ND	ND	16	500	nl	2,000	
Fluorene	86-73-7	120	36.4	210	30.9	ND	ND	23	540	nl	3,600	
Phenanthrene	85-01-8	1100	333.3	2400	352.9	6.6	0.12	100	1,500	nl	21,000	
Anthracene	120-12-7	200	60.6	810	119.1	ND	ND	220	960	nl	13,000	
2-Methylnaphthalene	91-57-6	ND	ND	ND	ND	ND	ND	3	670	nl	1,900	
Total HPAH	nl	7710	2336.4	27980	4114.7	207.2	3.67	960	12,000	nl	69,000	
Fluoranthene	206-44-0	1600	484.8	5600	823.5	52	0.92	160	1,700	4,600	30,000	
Pyrene	129-00-0	1300	393.9	4500	661.8	39	0.69	1,000	2,600	nl	16,000	
Benz(a)anthracene	56-55-3	770	233.3	2900	425.5	17	0.30	110	1,300	nl	5,100	
Chrysene	218-01-9	930	281.8	3600	529.4	27	0.48	110	1,400	nl	21,000	
205-99-2,												
207-08-9		1340	406.1	5100	750.0	41	0.73	230	3,200	nl	9,900	

PSDDA concentrations are ug/kg dry weight unless other indicated

TABLE A-1
Summary of Laboratory Testing
Chemical Characteristics of Intertidal Sediment Samples from Starrigavan Bay, Alaska

CHEMICAL	CAS Number ¹	ITZ 1		ITZ 2		ITZ 3		Washington Sediment Quality Standards ²	Screening Level	Bioaccum. Trigger	Maximum Level
		dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)				
Benzo(a)pyrene	50-32-8	720	218.2	2600	382.4	14	0.25	99	1,600	3,600 ⁴	3,600
Indeno(1,2,3-c,d)pyrene	193-39-5	480	145.5	1700	250.0	8.8	0.16	34	600	nl	4,400
Dibenz(a,h)anthracene	53-70-3	140	42.4	480	70.6	ND	ND	12	230	nl	1,900
Benzo(g,h,i)perylene	191-24-2	430	130.3	1500	220.6	8.4	0.15	31	670	nl	3,200
Chlorinated Hydrocarbons											
1,3-Dichlorobenzene	541-73-1	ND	ND	ND	ND	ND	ND	nl	170	1,241	nl
1,4-Dichlorobenzene	106-46-7	ND	ND	ND	ND	ND	ND	3.1	110	120 ⁴	120
1,2-Dichlorobenzene	95-50-1	ND	ND	ND	ND	ND	ND	2.3	35	37	110
1,2,4-Trichlorobenzene	120-82-1	ND	ND	ND	ND	ND	ND	0.81	31	nl	64
Hexachlorobenzene (HCB)	118-74-1	ND	ND	ND	ND	ND	ND	0.38	22	168	230
Phthalates											
Dimethyl phthalate	131-11-3	ND	ND	ND	ND	ND	ND	53	1,400	1,400 ³	nl
Diethyl phthalate	84-66-2	ND	ND	ND	ND	ND	ND	61	1,200	nl	nl
Di-n-butyl phthalate	84-74-2	ND	ND	ND	ND	ND	ND	220	5,100	10,200	nl
Butyl benzyl phthalate	85-68-7	ND	ND	82	12.1	ND	ND	4.9	970	nl	nl
Bis(2-ethylhexyl) phthalate	117-81-7	ND	ND	ND	ND	ND	ND	47	8,300	13,870	nl
Di-n-octyl phthalate	117-84-0	ND	ND	ND	ND	ND	ND	58	6,200	nl	nl
Phenols (ug/kg dry weight)											
Phenol	108-95-2	ND	ND	73	10.7	ND	ND	420	420	876	1,200
2-Methylphenol	95-48-7	ND	ND	ND	ND	ND	ND	63	63	nl	77
4-Methylphenol	106-44-5	ND	ND	100	14.7	ND	ND	670	670	nl	3,600
2,4-Dimethylphenol	105-67-9	ND	ND	ND	ND	ND	ND	29	29	nl	210
Pentachlorophenol	87-86-5	ND	ND	190	27.9	ND	ND	360	400	504	690
Miscellaneous Extractables											
Benzyl alcohol	100-51-6	ND	ND	ND	ND	ND	ND	57	57	nl	870
Benzoic acid	65-85-0	ND	ND	ND	ND	ND	ND	650	650	nl	760
Dibenzofuran	132-64-9	98	29.7	110	16.2	ND	ND	15 ⁶	540	nl	1,700
Hexachloroethane	67-72-1	ND	ND	ND	ND	ND	ND	nl	1,400	10,220	14,000
Hexachlorobutadiene	87-68-3	ND	ND	ND	ND	ND	ND	3.9	29	212	270
N-Nitrosodiphenylamine	86-30-6	ND	ND	ND	ND	ND	ND	11 ⁶	28	130 ⁴	130
Volatile Organics											
Trichloroethene	79-01-6	ND	ND	ND	ND	ND	ND	nl	160	1,168	1,600
Tetrachloroethene	127-18-4	ND	ND	ND	ND	ND	ND	nl	57	102	210
Ethylbenzene	100-41-4	ND	ND	ND	ND	ND	ND	nl	10	27	50

TABLE A-1
Summary of Laboratory Testing
Chemical Characteristics of Intertidal Sediment Samples from Starrigavan Bay, Alaska

		Allen Marine Intertidal Sediment Samples								
CHEMICAL	CAS Number ¹	ITZ 1		ITZ 2		ITZ 3		PSDDA		
		dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)	dry weight	mg/kg organic carbon (ppm)			
							Washington Sediment Quality Standards ²	Screening Level	Bioaccum. Trigger	Maximum Level
Total Xylene (sum of o-, m-, p-)	95-47-6 108-38-3 106-42-3	ND	ND	ND	ND	ND	nl	40	nl	160
Pesticides										
Total DDT(sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	72-54-8 72-55-9	ND	ND	ND	ND	ND	nl	7	50	69
Aldrin	50-29-3	ND	ND	ND	ND	ND	nl	10	37	nl
alpha-Chlordane	309-00-2	ND	ND	ND	ND	ND	nl	10	37	nl
Dieldrin	12789-03-6	ND	ND	ND	ND	ND	nl	10	37	nl
Heptachlor	76-44-8	ND	ND	ND	ND	ND	nl	10	37	nl
gamma-BHC (Lindane)	58-89-9	ND	ND	ND	ND	ND	nl	10	37	nl
Total PCBs [μg/kg dry weight (ppm carbon)]	nl	190	57.6	51.0	75.0	ND	12 ⁵	130	38 ⁶	3,100

nl¹ = not listed in the indicated document
 ND² = not detected

- (1) Note: Washington SQS Guidelines for non-ionic chemicals are carbon-normalized
- (2) Chemical Abstract Service Registry Number.
- (3) BT adjusted to new SL for antimony, silver and dimethylphthalate.
- (4) BT adjusted to new ML for nickel, benz(a)pyrene, 1,4-dichlorobenzene and N-nitrosodiphenylamine.
- (5) See Testing, Reporting, and Evaluation of Tributyltin Data in PSDDA and SMS Programs at http://www.nws.usace.army.mil/dmno/8th_arm/tbt_96.htm
- (6) This value is normalized to total organic carbon, and is expressed in mg/kg TOC.



May 3, 2002

Service Request No: K2202038

Mark Musial
Golder Associates, Inc.
1750 Abbott Road, Suite 200
Anchorage, AK 99507

Re: Sitka Dredge/023-5524

Dear Mark:

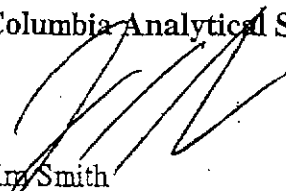
Enclosed are the results of the sample(s) submitted to our laboratory on April 2, 2002. For your reference, these analyses have been assigned our service request number K2202038.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3372.

Respectfully submitted,

Columbia Analytical Services, Inc.



Jim Smith
Project Chemist

JS/afs

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

00003

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Golder Associates, Inc.
Project: Sitka Dredge
Sample Matrix: Sediment

Service Request No.: K2202038
Date Received: 4/2/02

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Six samples were received for analysis at Columbia Analytical Services on 4/2/02. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Inorganic Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals Sediment

Relative Percent Difference (RPD) Exceptions:

The Relative Percent Differences (RPD) for the replicate analysis of Antimony and Cadmium in sample ITZ 1 (K2202038-001) were outside the normal CAS control limits. The variability in the results is attributed to the heterogeneous character these analytes of the sample. Mixing techniques within the scope of the EPA methodology were used, but were not sufficient for complete homogenization of this sample.

Matrix Spike (MS) Exceptions:

The low Matrix Spike (MS) recovery of Antimony is a result of a method defect in the EPA 3050B-digestion procedure that can be magnified by certain matrix components. The associated QA/QC (i.e. LCS) indicate the analysis was in control. No further corrective action was taken.

The low Matrix Spike (MS) recovery of Cadmium for sample ITZ 1 is a result of the heterogeneous character this analyte in the sample (see high RPD note above). The associated Laboratory Control Sample (LCS) was acceptable indicating the analysis was in control. No further corrective action was taken.

The Matrix Spike (MS) recovery criteria for Copper, Lead and Zinc for sample ITZ 1 are not applicable. The analyte concentrations in the sample were significantly higher than the added spike concentrations, preventing accurate evaluation of the spike recoveries.

No other anomalies associated with the analysis of these samples were observed.

Total Metals Tissue

No anomalies associated with the analysis of these samples were observed.

Approved by _____

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Date

5/2/02

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Organochlorine Pesticides by EPA Method 8081A

Method Reporting Limit (MRL) Exceptions:

The Method Reporting Limits have been elevated for 4,4'-DDE and 4,4'-DDT in samples ITZ 1 and ITZ2. The chromatogram indicated non-target components that prevented accurate quantification at the reporting limit. The results have been flagged to indicate the matrix interference. All efforts were made through various clean-up methods to reduce the matrix interference however the screening level of 6.9ppb for total DDT could not be met due to this interference.

No other anomalies associated with the analysis of these samples were observed.

PCB Aroclors by EPA Method 8082

No anomalies associated with the analysis of these samples were observed.

Organotin Compounds

Sample Notes and Discussion:

The initial porewater extraction did not yield enough water for porewater analysis. Per Golder the analysis for Organotin would be performed on the soil and reported on a total basis.

Results for the Organotins will be reported at a later date.

Volatile Organic Compounds by EPA Method 8260B

Initial Calibration (ICAL) Exceptions:

The primary evaluation criterion was exceeded for the following analytes in Initial Calibration (ICAL) ID 1479: 2-Butanone (MEK), Tetrachloroethene (PCE) and sec-Butylbenzene. In accordance with CAS standard operating procedures and as specified in the analytical method, an alternative evaluation was performed using the average relative standard deviation of all analytes in the calibration. The calibration meets the alternative evaluation criteria.

Surrogate Exceptions:

The upper control criterion was exceeded for the following surrogate(s) in samples ITZ 1, ITZ 2, ITZ 3 and MB KWG0202342-4: Toluene-d8. No target analytes were detected above the Method Reporting Limit in the samples. The error associated with an elevated recovery equates to a high bias. The quality of the sample data has not been significantly affected. No further corrective action was feasible.

The upper control criterion was exceeded for the following surrogate in ITZ 3MS KWG0202342-4, ITZ 3DMS KWG0202342-5, LCS KWG0202342-3: Toluene-d8. The associated matrix spike recoveries of target compounds were in control, indicating the analysis was in control. The surrogate outlier has been flagged accordingly. No further corrective action was feasible.

No other anomalies associated with the analysis of these samples were observed.

Semivolatile Organic Compounds by EPA Method 8270C

Initial Calibration (ICAL) Exceptions:

The primary evaluation criterion was exceeded for the following analytes in Initial Calibration (ICAL) ID CAL1435: Benzoic Acid, Pentachlorophenol, N-Nitrosodi-n-propylamine, and Hexachlorocyclopentadiene. In accordance with CAS standard operating procedures and as specified in the analytical method, an alternative evaluation was performed using the average relative standard deviation of all analytes in the calibration. The calibration meets the alternative evaluation criteria.

Matrix Spike (MS) Exceptions:

The Matrix Spike recovery of Phenol for sample ITZ 1DMS was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier does not indicate a significant data quality problem. No further corrective action was feasible.

Approved by _____

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Date 5/2/02

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The matrix spike recovery of Pentachlorophenol for sample ITZ 1MS/DMS was outside the lower control criteria because of suspected matrix interference. The sample was re-analyzed, and produced similar results. No recovery was detected in the spiked samples. The results indicate a potential low bias for this compound in this matrix. The results of the original analysis are reported.

The control criteria for the Matrix Spike recovery of Pyrene for sample ITZ 1MS/DMS is not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

Laboratory Control Sample (LCS) Exceptions:

The spike recovery of Benzoic Acid in the Duplicate Laboratory Control Sample (DLCS) KWG0202327-6 was outside the lower control criterion. The analyte in question was not detected in the associated field samples. The error associated with reduced recovery equates to a potential low bias. The recovery for this analyte was within control criterion in the LCS KWG0202327-6 with acceptable RPDs. The data has been flagged to indicate the low recovery.

Method Reporting Limit (MRL) Exceptions:

Sample(s) ITZ 1, ITZ 2, ITZ 3 required dilutions due the presence non-target analytes interfering with compounds of interest. The reporting limits have been elevated accordingly.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____

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Date _____

5/2/92

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PAGE _____ OF _____

SR# 12202098

COC #

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CHAIN OF CUSTODY

PROJECT NAME: Stka Dredge
 PROJECT NUMBER: 023-5524
 PROJECT MANAGER: Mark Musick
 COMPANY/ADDRESS: Goldner Associates 1750 Abbott Rd Suite 200
 PHONE: (907) 344-6001 FAX: (907) 344-6011
 ANALYZE AT: AK 99507-3443
 SAMPLER'S SIGNATURE: WVJ

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	REMARKS
ITZ1	4/1/02	11:03	1	SEA	10	
ITZ2	4/1/02	11:35	2	SEA	10	
ITZ3	4/1/02	11:35	3	SEA	10	

REPORT REQUIREMENTS:
 I. Routine Report: Method Blank, Surrogate, as required
 II. Report Dup., MS, MSD as required
 III. Data Validation Report (Includes all raw data)
 IV. CLP Deliverable Report
 V. EDD

INVOICE INFORMATION:
 P.O. #: 1750 Abbott Rd Suite 200 Anchorage AK 99507
 Bill To: Goldner
 TURNAROUND REQUIREMENTS:
 24 hr. _____ 48 hr. _____
 5 Day _____
 Standard (10-15 working days)
 Provide FAX Results

RECEIVED BY: Steve Black 4/12/02 10:20
 Signature: Steve Black Date/Time: 4/12/02 10:20
 Printed Name: Steve Black Firm: AS

RELIQUISHED BY: _____
 Signature: _____ Date/Time: _____
 Printed Name: _____ Firm: _____

RECEIVED BY: _____
 Signature: _____ Date/Time: _____
 Printed Name: _____ Firm: _____

SPECIAL INSTRUCTIONS/COMMENTS:
 *INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)
 Disposed Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 Circle which metals are to be analyzed.

SEMIVOLATILE ORGANICS BY GC/MS:
 625 8270
 VOLATILE ORGANICS:
 624 8260 8021 BTEX
 Hydrocarbons (*see below): Diesel Oil
 Fuel Fingerprint (FIQ)
 NW-HCID Screen
 Oil & Grease/TRPH: 1664 SGT 413.1 418.1 1664 HEM
 PCB's: Congeners
 Aroclors: 608 8081A 8141A 8151A
 Pesticides/Herbicides: 8151M
 Chlorophenolics: 8151M
 TH: Tetra PCP
 PAHS: 8310 SIM
 GC/MS-SIM: PAH Phenol Phthalates
 Metals, Total or Dissolved (See list below): Cyanide Hex-Chrom
 pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS (circle)
 NH3-N, COD, Total-P, TKN, TOC, DOC (circle)
 TOX 9020 AOX 1650 506
 AS PER QUOTE

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: WET

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
ITZ 1	K2202038-001	04/01/2002	04/02/2002	04/10/2002	85.5	
ITZ 2	K2202038-002	04/01/2002	04/02/2002	04/10/2002	76.4	
ITZ 3	K2202038-003	04/01/2002	04/02/2002	04/10/2002	87.0	

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/02
Date Received: 04/02/02

Carbon, Total Organic

Prep Method: NONE
Analysis Method: PSEP
Test Notes:

Units: PERCENT
Basis: Dry

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
ITZ 1	K2202038-001	0.05	0.03	1	NA	04/06/02	0.33	
ITZ 2	K2202038-002	0.05	0.03	1	NA	04/06/02	0.68	
ITZ 3	K2202038-003	0.05	0.03	1	NA	04/06/02	5.65	
Method Blank	K2202038-MB	0.05	0.03	1	NA	04/06/02	0.03	U

Approved By: _____

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Date: 4/17/02

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/02
Date Received: 04/02/02

Total Volatile Solids

Prep Method: NONE
Analysis Method: 160.4M
Test Notes:

Units: PERCENT
Basis: As Received

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
ITZ 1	K2202038-001	0.1	0.1	1	NA	04/10/02	1.09	
ITZ 2	K2202038-002	0.1	0.1	1	NA	04/10/02	2.87	
ITZ 3	K2202038-003	0.1	0.1	1	NA	04/10/02	0.74	
Method Blank	K2202038-MB	0.1	0.1	1	NA	04/10/02	0.1	U

M Modified.

Approved By: _____ Date: 4/17/02

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/02
 Date Received: 04/02/02
 Date Analyzed: 04/05/02

Particle Size Determination
 Puget Sound Estuary Program Protocol

Sample Name: ITZ 1
 Lab Code: K2202038-001

Sand Fraction: Dry Weight (Grams) 82.8226
 Sand Fraction: Weight Recovered (Grams) 82.9310
 Sand Fraction: Percent Recovery 100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	5.3053	6.45
Very Coarse Sand	-1 to 0 Ø	12.6631	15.4
Coarse Sand	0 to 1 Ø	33.9444	41.3
Medium Sand	1 to 2 Ø	16.6430	20.2
Fine Sand	2 to 3 Ø	8.0590	9.80
Very Fine Sand	3 to 4 Ø	5.7245	6.96
Silt	4 to 8 Ø	2.0600	2.50
Clay	> 8 Ø	0.8200	1.00
	Total	85.2193	104

Approved By: EL Date: 4/16/02

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/02
Date Received: 04/02/02
Date Analyzed: 04/05/02

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: ITZ 2
Lab Code: K2202038-002

Sand Fraction: Dry Weight (Grams) 74.3881
Sand Fraction: Weight Recovered (Grams) 74.5864
Sand Fraction: Percent Recovery 100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	24.0930	31.1
Very Coarse Sand	-1 to 0 Ø	20.7979	26.9
Coarse Sand	0 to 1 Ø	14.1032	18.2
Medium Sand	1 to 2 Ø	6.3471	8.19
Fine Sand	2 to 3 Ø	3.6395	4.70
Very Fine Sand	3 to 4 Ø	4.7710	6.16
Silt	4 to 8 Ø	1.3650	1.76
Clay	> 8 Ø	0.9400	1.21
	Total	76.0567	98.2

Approved By: _____ *ec* Date: 4/16/02

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/02
 Date Received: 04/02/02
 Date Analyzed: 04/05/02

Particle Size Determination
 Puget Sound Estuary Program Protocol

Sample Name: ITZ 3
 Lab Code: K2202038-003

Sand Fraction: Dry Weight (Grams) 88.1308
 Sand Fraction: Weight Recovered (Grams) 88.0881
 Sand Fraction: Percent Recovery 100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	38.6594	44.7
Very Coarse Sand	-1 to 0 Ø	14.3449	16.6
Coarse Sand	0 to 1 Ø	16.4083	19.0
Medium Sand	1 to 2 Ø	12.9562	15.0
Fine Sand	2 to 3 Ø	4.9481	5.73
Very Fine Sand	3 to 4 Ø	0.7073	0.82
Silt	4 to 8 Ø	1.9100	2.21
Clay	> 8 Ø	1.3150	1.52
	Total	91.2492	106

Approved By: EL Date: 4/16/02

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: Golder Associates Inc.

Service Request: K2202038

Project No.: 023-5524

Date Collected: 04/01/02

Project Name: Sitka Dredge

Date Received: 04/02/02

Matrix: SEDIMENT

Units: MG/KG

Basis: Dry

Sample Name: ITZ 1

Lab Code: K2202038-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.11	0.11	10	4/17/02	4/18/02	58.9		*N
Arsenic	200.8	29.0	5.8	250	4/17/02	4/18/02	1060		
Cadmium	200.8	0.06	0.02	5	4/17/02	4/18/02	8.14		*N
Chromium	200.8	0.2	0.0	5	4/17/02	4/18/02	75.8		
Copper	200.8	5.8	2.3	250	4/17/02	4/18/02	2940		
Lead	200.8	2.90	1.74	250	4/17/02	4/18/02	833		
Mercury	7471A	0.02	0.01	1	4/9/02	4/9/02	0.02		
Nickel	200.8	0.2	0.1	5	4/17/02	4/18/02	27.0		
Silver	200.8	0.04	0.02	10	4/17/02	4/18/02	1.69		
Zinc	200.8	145	57.9	1250	4/17/02	4/18/02	7590		

% Solids: 85.5

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: Golder Associates Inc.

Service Request: K2202038

Project No.: 023-5524

Date Collected: 04/01/02

Project Name: Sitka Dredge

Date Received: 04/02/02

Matrix: SEDIMENT

Units: MG/KG

Basis: Dry

Sample Name: ITZ 2

Lab Code: K2202038-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.10	0.10	10	4/17/02	4/18/02	114		*N
Arsenic	200.8	27.3	5.5	250	4/17/02	4/18/02	963		
Cadmium	200.8	0.05	0.02	5	4/17/02	4/18/02	3.08		*N
Chromium	200.8	0.2	0.0	5	4/17/02	4/18/02	83.1		
Copper	200.8	5.5	2.2	250	4/17/02	4/18/02	2100		
Lead	200.8	2.73	1.64	250	4/17/02	4/18/02	1910		
Mercury	7471A	0.01	0.01	1	4/9/02	4/9/02	0.07		
Nickel	200.8	0.2	0.1	5	4/17/02	4/18/02	32.9		
Silver	200.8	0.04	0.02	10	4/17/02	4/18/02	1.29		
Zinc	200.8	27.3	10.9	250	4/17/02	4/18/02	4860		

% Solids: 76.4

Comments:

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Organochlorine Pesticides

Sample Name: ITZ 1
 Lab Code: K2202038-001
 Extraction Method: EPA 3540C
 Analysis Method: 8081A

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4'-DDD	ND	U	7.8	0.36	2	04/10/02	04/17/02	KWG0202322	
1,4'-DDE	ND	Ui	5.4	5.4	2	04/10/02	04/17/02	KWG0202322	
1,4'-DDT	ND	Ui	16	2.8	2	04/10/02	04/17/02	KWG0202322	
Aldrin	ND	U	4.0	0.55	2	04/10/02	04/17/02	KWG0202322	
Alpha-Chlordane	ND	U	4.0	0.26	2	04/10/02	04/17/02	KWG0202322	
Dieldrin	ND	U	5.4	0.72	2	04/10/02	04/17/02	KWG0202322	
Gamma-BHC (Lindane)	ND	U	4.0	0.57	2	04/10/02	04/17/02	KWG0202322	
Heptachlor	ND	U	4.0	0.32	2	04/10/02	04/17/02	KWG0202322	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	64	48-119	04/17/02	Acceptable
Hexachlorobiphenyl	98	48-136	04/17/02	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Organochlorine Pesticides

Sample Name: ITZ 2
 Lab Code: K2202038-002
 Extraction Method: EPA 3540C
 Analysis Method: 8081A

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
p,p'-DDD	ND	U	8.7	0.40	2	04/10/02	04/17/02	KWG0202322	
p,p'-DDE	ND	Ui	15	15	2	04/10/02	04/17/02	KWG0202322	
p,p'-DDT	ND	Ui	18	18	2	04/10/02	04/17/02	KWG0202322	
Aldrin	ND	U	4.5	0.61	2	04/10/02	04/17/02	KWG0202322	
alpha-Chlordane	ND	U	4.5	0.29	2	04/10/02	04/17/02	KWG0202322	
Dieldrin	ND	U	6.1	0.81	2	04/10/02	04/17/02	KWG0202322	
gamma-BHC (Lindane)	ND	U	4.5	0.64	2	04/10/02	04/17/02	KWG0202322	
Heptachlor	ND	U	4.5	0.36	2	04/10/02	04/17/02	KWG0202322	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
tetrachloro-m-xylene	63	48-119	04/17/02	Acceptable
hexachlorobiphenyl	48	48-136	04/17/02	Acceptable

Comments:

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Organochlorine Pesticides

Sample Name: ITZ 3
 Lab Code: K2202038-003
 Extraction Method: EPA 3540C
 Analysis Method: 8081A

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4'-DDD	ND	U	7.6	0.35	2	04/10/02	04/17/02	KWG0202322	
1,4'-DDE	ND	U	5.3	0.57	2	04/10/02	04/17/02	KWG0202322	
1,4'-DDT	ND	U	16	0.39	2	04/10/02	04/17/02	KWG0202322	
Aldrin	ND	U	4.0	0.54	2	04/10/02	04/17/02	KWG0202322	
Alpha-Chlordane	ND	U	4.0	0.25	2	04/10/02	04/17/02	KWG0202322	
Dieldrin	ND	U	5.3	0.71	2	04/10/02	04/17/02	KWG0202322	
gamma-BHC (Lindane)	ND	U	4.0	0.56	2	04/10/02	04/17/02	KWG0202322	
Heptachlor	ND	U	4.0	0.32	2	04/10/02	04/17/02	KWG0202322	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
tetrachloro-m-xylene	73	48-119	04/17/02	Acceptable
hexachlorobiphenyl	75	48-136	04/17/02	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Polychlorinated Biphenyls (PCBs)

Sample Name: ITZ 1
 Lab Code: K2202038-001
 Extraction Method: EPA 3540C
 Analysis Method: 8082

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1221	ND	U	24	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1232	ND	U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1242	ND	U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1248	ND	U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1254	190		12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1260	ND	U	12	2.8	1	04/10/02	04/16/02	KWG0202317	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	82	57-136	04/16/02	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Polychlorinated Biphenyls (PCBs)

Sample Name: ITZ 2
 Lab Code: K2202038-002
 Extraction Method: EPA 3540C
 Analysis Method: 8082

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	14	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1221	ND	U	27	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1232	ND	U	14	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1242	ND	U	14	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1248	ND	U	14	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1254	510		14	3.2	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1260	ND	U	14	3.2	1	04/10/02	04/16/02	KWG0202317	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	93	57-136	04/16/02	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Polychlorinated Biphenyls (PCBs)

Sample Name: ITZ 3
 Lab Code: K2202038-003
 Extraction Method: EPA 3540C
 Analysis Method: 8082

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1221	ND U	23	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1232	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1242	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1248	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1254	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	
Aroclor 1260	ND U	12	2.8	1	04/10/02	04/16/02	KWG0202317	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	101	57-136	04/16/02	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 1
 Lab Code: K2202038-001
 Extraction Method: EPA 3541
 Analysis Method: 8270C

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	700	65	10	04/10/02	04/12/02	KWG0202327	
1,3-Dichlorobenzene	ND	U	240	59	10	04/10/02	04/12/02	KWG0202327	
1,4-Dichlorobenzene	ND	U	240	55	10	04/10/02	04/12/02	KWG0202327	
1,2-Dichlorobenzene	ND	U	240	57	10	04/10/02	04/12/02	KWG0202327	
Benzyl Alcohol	ND	U	240	65	10	04/10/02	04/12/02	KWG0202327	
2-Methylphenol	ND	U	240	56	10	04/10/02	04/12/02	KWG0202327	
Hexachloroethane	ND	U	240	54	10	04/10/02	04/12/02	KWG0202327	
4-Methylphenol†	ND	U	240	55	10	04/10/02	04/12/02	KWG0202327	
2,4-Dimethylphenol	ND	U	1200	360	10	04/10/02	04/12/02	KWG0202327	
Benzoic Acid	ND	U	4700	390	10	04/10/02	04/12/02	KWG0202327	*
1,2,4-Trichlorobenzene	ND	U	240	62	10	04/10/02	04/12/02	KWG0202327	
Naphthalene	120	JD	240	35	10	04/10/02	04/12/02	KWG0202327	
Hexachlorobutadiene	ND	U	240	65	10	04/10/02	04/12/02	KWG0202327	
2-Methylnaphthalene	ND	U	240	70	10	04/10/02	04/12/02	KWG0202327	
Acenaphthylene	44	JD	240	38	10	04/10/02	04/12/02	KWG0202327	
Dimethyl Phthalate	ND	U	240	60	10	04/10/02	04/12/02	KWG0202327	
Acenaphthene	100	JD	240	61	10	04/10/02	04/12/02	KWG0202327	
Dibenzofuran	98	JD	240	67	10	04/10/02	04/12/02	KWG0202327	
Fluorene	120	JD	240	55	10	04/10/02	04/12/02	KWG0202327	
Diethyl Phthalate	ND	U	240	71	10	04/10/02	04/12/02	KWG0202327	
N-Nitrosodiphenylamine	ND	U	240	57	10	04/10/02	04/12/02	KWG0202327	
Hexachlorobenzene	ND	U	240	71	10	04/10/02	04/12/02	KWG0202327	
Pentachlorophenol	ND	U	1200	53	10	04/10/02	04/12/02	KWG0202327	
Phenanthrene	1100	D	240	48	10	04/10/02	04/12/02	KWG0202327	
Anthracene	200	JD	240	54	10	04/10/02	04/12/02	KWG0202327	
Di-n-butyl Phthalate	ND	U	240	61	10	04/10/02	04/12/02	KWG0202327	
Fluoranthene	1600	D	240	56	10	04/10/02	04/12/02	KWG0202327	
Pyrene	1300	D	240	60	10	04/10/02	04/12/02	KWG0202327	
Butyl Benzyl Phthalate	ND	U	240	32	10	04/10/02	04/12/02	KWG0202327	
Benz(a)anthracene	770	D	240	25	10	04/10/02	04/12/02	KWG0202327	
Chrysene	930	D	240	26	10	04/10/02	04/12/02	KWG0202327	
Bis(2-ethylhexyl) Phthalate	ND	U	4700	2900	10	04/10/02	04/12/02	KWG0202327	
Di-n-octyl Phthalate	ND	U	240	38	10	04/10/02	04/12/02	KWG0202327	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 1
Lab Code: K2202038-001
Extraction Method: EPA 3541
Analysis Method: 8270C

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(b)fluoranthene	1000	D	240	22	10	04/10/02	04/12/02	KWG0202327	
Benzo(k)fluoranthene	340	D	240	38	10	04/10/02	04/12/02	KWG0202327	
Benzo(a)pyrene	720	D	240	23	10	04/10/02	04/12/02	KWG0202327	
Indeno(1,2,3-cd)pyrene	480	D	240	11	10	04/10/02	04/12/02	KWG0202327	
Dibenz(a,h)anthracene	140	JD	240	23	10	04/10/02	04/12/02	KWG0202327	
Benzo(g,h,i)perylene	430	D	240	24	10	04/10/02	04/12/02	KWG0202327	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	72	12-104	04/12/02	Acceptable
Phenol-d6	87	38-116	04/12/02	Acceptable
Nitrobenzene-d5	89	38-121	04/12/02	Acceptable
2-Fluorobiphenyl	78	52-113	04/12/02	Acceptable
2,4,6-Tribromophenol	62	34-141	04/12/02	Acceptable
Terphenyl-d14	82	47-152	04/12/02	Acceptable

Analyte Comments

4-Methylphenol This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 2
 Lab Code: K2202038-002
 Extraction Method: EPA 3541
 Analysis Method: 8270C

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	73 JD	790	73	10	04/10/02	04/12/02	KWG0202327	
1,3-Dichlorobenzene	ND U	270	66	10	04/10/02	04/12/02	KWG0202327	
1,4-Dichlorobenzene	ND U	270	61	10	04/10/02	04/12/02	KWG0202327	
1,2-Dichlorobenzene	ND U	270	64	10	04/10/02	04/12/02	KWG0202327	
Benzyl Alcohol	ND U	270	72	10	04/10/02	04/12/02	KWG0202327	
2-Methylphenol	ND U	270	63	10	04/10/02	04/12/02	KWG0202327	
Hexachloroethane	ND U	270	61	10	04/10/02	04/12/02	KWG0202327	
4-Methylphenol†	100 JD	270	61	10	04/10/02	04/12/02	KWG0202327	
2,4-Dimethylphenol	ND U	1400	400	10	04/10/02	04/12/02	KWG0202327	
Benzoic Acid	ND U	5300	430	10	04/10/02	04/12/02	KWG0202327	*
1,2,4-Trichlorobenzene	ND U	270	69	10	04/10/02	04/12/02	KWG0202327	
Naphthalene	57 JD	270	39	10	04/10/02	04/12/02	KWG0202327	
Hexachlorobutadiene	ND U	270	72	10	04/10/02	04/12/02	KWG0202327	
2-Methylnaphthalene	ND U	270	79	10	04/10/02	04/12/02	KWG0202327	
Acenaphthylene	180 JD	270	43	10	04/10/02	04/12/02	KWG0202327	
Dimethyl Phthalate	ND U	270	68	10	04/10/02	04/12/02	KWG0202327	
Acenaphthene	190 JD	270	68	10	04/10/02	04/12/02	KWG0202327	
Dibenzofuran	110 JD	270	75	10	04/10/02	04/12/02	KWG0202327	
Fluorene	210 JD	270	62	10	04/10/02	04/12/02	KWG0202327	
Diethyl Phthalate	ND U	270	80	10	04/10/02	04/12/02	KWG0202327	
N-Nitrosodiphenylamine	ND U	270	64	10	04/10/02	04/12/02	KWG0202327	
Hexachlorobenzene	ND U	270	79	10	04/10/02	04/12/02	KWG0202327	
Pentachlorophenol	190 JD	1400	60	10	04/10/02	04/12/02	KWG0202327	
Phenanthrene	2400 D	270	53	10	04/10/02	04/12/02	KWG0202327	
Anthracene	810 D	270	61	10	04/10/02	04/12/02	KWG0202327	
Di-n-butyl Phthalate	ND U	270	68	10	04/10/02	04/12/02	KWG0202327	
Fluoranthene	5600 D	270	63	10	04/10/02	04/12/02	KWG0202327	
Pyrene	4500 D	270	68	10	04/10/02	04/12/02	KWG0202327	
Butyl Benzyl Phthalate	82 JD	270	36	10	04/10/02	04/12/02	KWG0202327	
Benz(a)anthracene	2900 D	270	28	10	04/10/02	04/12/02	KWG0202327	
Chrysene	3600 D	270	29	10	04/10/02	04/12/02	KWG0202327	
Bis(2-ethylhexyl) Phthalate	ND U	5300	3300	10	04/10/02	04/12/02	KWG0202327	
Di-n-octyl Phthalate	ND U	270	43	10	04/10/02	04/12/02	KWG0202327	

Comments:

00845

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 2
 Lab Code: K2202038-002
 Extraction Method: EPA 3541
 Analysis Method: 8270C

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(b)fluoranthene	4000	D	270	24	10	04/10/02	04/12/02	KWG0202327	
Benzo(k)fluoranthene	1100	D	270	42	10	04/10/02	04/12/02	KWG0202327	
Benzo(a)pyrene	2600	D	270	25	10	04/10/02	04/12/02	KWG0202327	
Indeno(1,2,3-cd)pyrene	1700	D	270	13	10	04/10/02	04/12/02	KWG0202327	
Dibenz(a,h)anthracene	480	D	270	26	10	04/10/02	04/12/02	KWG0202327	
Benzo(g,h,i)perylene	1500	D	270	27	10	04/10/02	04/12/02	KWG0202327	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	87	12-104	04/12/02	Acceptable
Phenol-d6	102	38-116	04/12/02	Acceptable
Nitrobenzene-d5	114	38-121	04/12/02	Acceptable
2-Fluorobiphenyl	88	52-113	04/12/02	Acceptable
2,4,6-Tribromophenol	72	34-141	04/12/02	Acceptable
Terphenyl-d14	107	47-152	04/12/02	Acceptable

† Analyte Comments

4-Methylphenol This analyte cannot be separated from 3-Methylphenol.

Comments:

00846

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 3
 Lab Code: K2202038-003
 Extraction Method: EPA 3541
 Analysis Method: 8270C

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	69	6.4	1	04/10/02	04/12/02	KWG0202327	
1,3-Dichlorobenzene	ND	U	23	5.8	1	04/10/02	04/12/02	KWG0202327	
1,4-Dichlorobenzene	ND	U	23	5.4	1	04/10/02	04/12/02	KWG0202327	
1,2-Dichlorobenzene	ND	U	23	5.6	1	04/10/02	04/12/02	KWG0202327	
Benzyl Alcohol	ND	U	23	6.4	1	04/10/02	04/12/02	KWG0202327	
2-Methylphenol	ND	U	23	5.5	1	04/10/02	04/12/02	KWG0202327	
Hexachloroethane	ND	U	23	5.3	1	04/10/02	04/12/02	KWG0202327	
4-Methylphenol†	ND	U	23	5.4	1	04/10/02	04/12/02	KWG0202327	
2,4-Dimethylphenol	ND	U	120	35	1	04/10/02	04/12/02	KWG0202327	
Benzoic Acid	ND	U	460	38	1	04/10/02	04/12/02	KWG0202327	*
1,2,4-Trichlorobenzene	ND	U	23	6.1	1	04/10/02	04/12/02	KWG0202327	
Naphthalene	ND	U	23	3.4	1	04/10/02	04/12/02	KWG0202327	
Hexachlorobutadiene	ND	U	23	6.4	1	04/10/02	04/12/02	KWG0202327	
2-Methylnaphthalene	ND	U	23	6.9	1	04/10/02	04/12/02	KWG0202327	
Acenaphthylene	ND	U	23	3.7	1	04/10/02	04/12/02	KWG0202327	
Dimethyl Phthalate	ND	U	23	5.9	1	04/10/02	04/12/02	KWG0202327	
Acenaphthene	ND	U	23	6.0	1	04/10/02	04/12/02	KWG0202327	
Dibenzofuran	ND	U	23	6.6	1	04/10/02	04/12/02	KWG0202327	
Fluorene	ND	U	23	5.4	1	04/10/02	04/12/02	KWG0202327	
Diethyl Phthalate	ND	U	23	7.0	1	04/10/02	04/12/02	KWG0202327	
N-Nitrosodiphenylamine	ND	U	23	5.6	1	04/10/02	04/12/02	KWG0202327	
Hexachlorobenzene	ND	U	23	7.0	1	04/10/02	04/12/02	KWG0202327	
Pentachlorophenol	ND	U	120	5.3	1	04/10/02	04/12/02	KWG0202327	
Phenanthrene	6.6	J	23	4.7	1	04/10/02	04/12/02	KWG0202327	
Anthracene	ND	U	23	5.4	1	04/10/02	04/12/02	KWG0202327	
Di-n-butyl Phthalate	ND	U	23	6.0	1	04/10/02	04/12/02	KWG0202327	
Fluoranthene	52		23	5.6	1	04/10/02	04/12/02	KWG0202327	
Pyrene	39		23	5.9	1	04/10/02	04/12/02	KWG0202327	
Butyl Benzyl Phthalate	ND	U	23	3.2	1	04/10/02	04/12/02	KWG0202327	
Benz(a)anthracene	17	J	23	2.5	1	04/10/02	04/12/02	KWG0202327	
Chrysene	27		23	2.5	1	04/10/02	04/12/02	KWG0202327	
Bis(2-ethylhexyl) Phthalate	ND	U	460	290	1	04/10/02	04/12/02	KWG0202327	
Di-n-octyl Phthalate	ND	U	23	3.8	1	04/10/02	04/12/02	KWG0202327	

Comments:

00847

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Semi-Volatile Organic Compounds by GC/MS

Sample Name: ITZ 3
Lab Code: K2202038-003
Extraction Method: EPA 3541
Analysis Method: 8270C

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(b)fluoranthene	30	23	2.2	1	04/10/02	04/12/02	KWG0202327	
Benzo(k)fluoranthene	11 J	23	3.7	1	04/10/02	04/12/02	KWG0202327	
Benzo(a)pyrene	14 J	23	2.2	1	04/10/02	04/12/02	KWG0202327	
Indeno(1,2,3-cd)pyrene	8.8 J	23	1.1	1	04/10/02	04/12/02	KWG0202327	
Dibenz(a,h)anthracene	ND U	23	2.3	1	04/10/02	04/12/02	KWG0202327	
Benzo(g,h,i)perylene	8.4 J	23	2.4	1	04/10/02	04/12/02	KWG0202327	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	75	12-104	04/12/02	Acceptable
Phenol-d6	101	38-116	04/12/02	Acceptable
Nitrobenzene-d5	101	38-121	04/12/02	Acceptable
2-Fluorobiphenyl	93	52-113	04/12/02	Acceptable
2,4,6-Tribromophenol	85	34-141	04/12/02	Acceptable
Terphenyl-d14	107	47-152	04/12/02	Acceptable

Analyte Comments

4-Methylphenol This analyte cannot be separated from 3-Methylphenol.

Comments:

00848

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 1
Lab Code: K2202038-001
Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.9	0.79	1	04/08/02	04/08/02	KWG0202342	
Chloromethane	ND	U	5.9	0.68	1	04/08/02	04/08/02	KWG0202342	
Vinyl Chloride	ND	U	5.9	0.82	1	04/08/02	04/08/02	KWG0202342	
Bromomethane	ND	U	5.9	1.1	1	04/08/02	04/08/02	KWG0202342	
Chloroethane	ND	U	5.9	0.67	1	04/08/02	04/08/02	KWG0202342	
Trichlorofluoromethane	ND	U	5.9	0.79	1	04/08/02	04/08/02	KWG0202342	
Acetone	15	J	59	4.6	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethene	ND	U	5.9	0.82	1	04/08/02	04/08/02	KWG0202342	
Carbon Disulfide	ND	U	5.9	1.1	1	04/08/02	04/08/02	KWG0202342	
Methylene Chloride	3.2	J	12	0.54	1	04/08/02	04/08/02	KWG0202342	
trans-1,2-Dichloroethene	ND	U	5.9	0.64	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethane	ND	U	5.9	0.53	1	04/08/02	04/08/02	KWG0202342	
2-Butanone (MEK)	3.2	J	24	1.5	1	04/08/02	04/08/02	KWG0202342	
2,2-Dichloropropane	ND	U	5.9	0.70	1	04/08/02	04/08/02	KWG0202342	
cis-1,2-Dichloroethene	ND	U	5.9	0.54	1	04/08/02	04/08/02	KWG0202342	
Chloroform	ND	U	5.9	0.49	1	04/08/02	04/08/02	KWG0202342	
Bromochloromethane	ND	U	5.9	0.54	1	04/08/02	04/08/02	KWG0202342	
1,1,1-Trichloroethane (TCA)	ND	U	5.9	0.53	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloropropene	ND	U	5.9	0.66	1	04/08/02	04/08/02	KWG0202342	
Carbon Tetrachloride	ND	U	5.9	0.72	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloroethane (EDC)	ND	U	5.9	0.48	1	04/08/02	04/08/02	KWG0202342	
Benzene	ND	U	5.9	0.52	1	04/08/02	04/08/02	KWG0202342	
Trichloroethene (TCE)	ND	U	5.9	0.57	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloropropane	ND	U	5.9	0.47	1	04/08/02	04/08/02	KWG0202342	
Bromodichloromethane	ND	U	5.9	0.47	1	04/08/02	04/08/02	KWG0202342	
Dibromomethane	ND	U	5.9	0.46	1	04/08/02	04/08/02	KWG0202342	
2-Hexanone	ND	U	24	1.8	1	04/08/02	04/08/02	KWG0202342	
cis-1,3-Dichloropropene	ND	U	5.9	0.42	1	04/08/02	04/08/02	KWG0202342	
Toluene	ND	U	5.9	0.50	1	04/08/02	04/08/02	KWG0202342	
trans-1,3-Dichloropropene	ND	U	5.9	0.38	1	04/08/02	04/08/02	KWG0202342	
1,1,2-Trichloroethane	ND	U	5.9	0.53	1	04/08/02	04/08/02	KWG0202342	
4-Methyl-2-pentanone (MIBK)	ND	U	24	1.5	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichloropropane	ND	U	5.9	0.37	1	04/08/02	04/08/02	KWG0202342	

Comments:

01142

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 1
Lab Code: K2202038-001
Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tetrachloroethene (PCE)	ND	U	5.9	0.57	1	04/08/02	04/08/02	KWG0202342	
Dibromochloromethane	ND	U	5.9	0.49	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromoethane (EDB)	ND	U	24	0.58	1	04/08/02	04/08/02	KWG0202342	
Chlorobenzene	ND	U	5.9	0.66	1	04/08/02	04/08/02	KWG0202342	
1,1,1,2-Tetrachloroethane	ND	U	5.9	0.57	1	04/08/02	04/08/02	KWG0202342	
Ethylbenzene	ND	U	5.9	0.64	1	04/08/02	04/08/02	KWG0202342	
m,p-Xylenes	ND	U	5.9	1.3	1	04/08/02	04/08/02	KWG0202342	
o-Xylene	ND	U	5.9	0.72	1	04/08/02	04/08/02	KWG0202342	
Styrene	ND	U	5.9	0.73	1	04/08/02	04/08/02	KWG0202342	
Bromoform	ND	U	5.9	0.50	1	04/08/02	04/08/02	KWG0202342	
Isopropylbenzene	ND	U	24	0.66	1	04/08/02	04/08/02	KWG0202342	
1,1,2,2-Tetrachloroethane	ND	U	5.9	0.60	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichloropropane	ND	U	5.9	0.59	1	04/08/02	04/08/02	KWG0202342	
Bromobenzene	ND	U	5.9	0.70	1	04/08/02	04/08/02	KWG0202342	
n-Propylbenzene	ND	U	24	0.58	1	04/08/02	04/08/02	KWG0202342	
2-Chlorotoluene	ND	U	24	0.68	1	04/08/02	04/08/02	KWG0202342	
4-Chlorotoluene	ND	U	24	0.71	1	04/08/02	04/08/02	KWG0202342	
1,3,5-Trimethylbenzene	ND	U	24	0.67	1	04/08/02	04/08/02	KWG0202342	
tert-Butylbenzene	ND	U	24	0.62	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trimethylbenzene	ND	U	24	0.66	1	04/08/02	04/08/02	KWG0202342	
sec-Butylbenzene	ND	U	24	0.71	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichlorobenzene	ND	U	5.9	0.78	1	04/08/02	04/08/02	KWG0202342	
4-Isopropyltoluene	ND	U	24	0.75	1	04/08/02	04/08/02	KWG0202342	
1,4-Dichlorobenzene	ND	U	5.9	0.87	1	04/08/02	04/08/02	KWG0202342	
n-Butylbenzene	ND	U	24	0.87	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichlorobenzene	ND	U	5.9	0.76	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromo-3-chloropropane	ND	U	24	0.62	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trichlorobenzene	ND	U	24	0.73	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichlorobenzene	ND	U	24	0.92	1	04/08/02	04/08/02	KWG0202342	
Naphthalene	ND	U	24	0.88	1	04/08/02	04/08/02	KWG0202342	
Hexachlorobutadiene	ND	U	24	0.78	1	04/08/02	04/08/02	KWG0202342	

Comments:

01143

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 1
Lab Code: K2202038-001

Units: ug/Kg
Basis: Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	109	75-132	04/08/02	Acceptable
Toluene-d8	111	85-109	04/08/02	Outside Control Limits
4-Bromofluorobenzene	116	49-131	04/08/02	Acceptable

Comments: _____

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 2
 Lab Code: K2202038-002
 Extraction Method: EPA 5030A
 Analysis Method: 8260B

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.6	0.89	1	04/08/02	04/08/02	KWG0202342	
Chloromethane	ND	U	6.6	0.77	1	04/08/02	04/08/02	KWG0202342	
Vinyl Chloride	ND	U	6.6	0.92	1	04/08/02	04/08/02	KWG0202342	
Bromomethane	ND	U	6.6	1.2	1	04/08/02	04/08/02	KWG0202342	
Chloroethane	ND	U	6.6	0.75	1	04/08/02	04/08/02	KWG0202342	
Trichlorofluoromethane	ND	U	6.6	0.89	1	04/08/02	04/08/02	KWG0202342	
Acetone	ND	U	66	5.1	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethene	ND	U	6.6	0.92	1	04/08/02	04/08/02	KWG0202342	
Carbon Disulfide	ND	U	6.6	1.2	1	04/08/02	04/08/02	KWG0202342	
Methylene Chloride	2.5	J	14	0.60	1	04/08/02	04/08/02	KWG0202342	
trans-1,2-Dichloroethene	ND	U	6.6	0.71	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethane	ND	U	6.6	0.59	1	04/08/02	04/08/02	KWG0202342	
2-Butanone (MEK)	ND	U	27	1.7	1	04/08/02	04/08/02	KWG0202342	
2,2-Dichloropropane	ND	U	6.6	0.78	1	04/08/02	04/08/02	KWG0202342	
cis-1,2-Dichloroethene	ND	U	6.6	0.60	1	04/08/02	04/08/02	KWG0202342	
Chloroform	ND	U	6.6	0.55	1	04/08/02	04/08/02	KWG0202342	
Bromochloromethane	ND	U	6.6	0.60	1	04/08/02	04/08/02	KWG0202342	
1,1,1-Trichloroethane (TCA)	ND	U	6.6	0.60	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloropropene	ND	U	6.6	0.74	1	04/08/02	04/08/02	KWG0202342	
Carbon Tetrachloride	ND	U	6.6	0.80	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloroethane (EDC)	ND	U	6.6	0.54	1	04/08/02	04/08/02	KWG0202342	
Benzene	ND	U	6.6	0.58	1	04/08/02	04/08/02	KWG0202342	
Trichloroethene (TCE)	ND	U	6.6	0.64	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloropropane	ND	U	6.6	0.52	1	04/08/02	04/08/02	KWG0202342	
Bromodichloromethane	ND	U	6.6	0.53	1	04/08/02	04/08/02	KWG0202342	
Dibromomethane	ND	U	6.6	0.52	1	04/08/02	04/08/02	KWG0202342	
2-Hexanone	ND	U	27	2.0	1	04/08/02	04/08/02	KWG0202342	
cis-1,3-Dichloropropene	ND	U	6.6	0.47	1	04/08/02	04/08/02	KWG0202342	
Toluene	ND	U	6.6	0.56	1	04/08/02	04/08/02	KWG0202342	
trans-1,3-Dichloropropene	ND	U	6.6	0.43	1	04/08/02	04/08/02	KWG0202342	
1,1,2-Trichloroethane	ND	U	6.6	0.59	1	04/08/02	04/08/02	KWG0202342	
4-Methyl-2-pentanone (MIBK)	ND	U	27	1.7	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichloropropane	ND	U	6.6	0.42	1	04/08/02	04/08/02	KWG0202342	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 2
Lab Code: K2202038-002
Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tetrachloroethene (PCE)	ND U	6.6	0.64	1	04/08/02	04/08/02	KWG0202342	
Dibromochloromethane	ND U	6.6	0.55	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromoethane (EDB)	ND U	27	0.65	1	04/08/02	04/08/02	KWG0202342	
Chlorobenzene	ND U	6.6	0.74	1	04/08/02	04/08/02	KWG0202342	
1,1,1,2-Tetrachloroethane	ND U	6.6	0.63	1	04/08/02	04/08/02	KWG0202342	
Ethylbenzene	ND U	6.6	0.72	1	04/08/02	04/08/02	KWG0202342	
m,p-Xylenes	ND U	6.6	1.4	1	04/08/02	04/08/02	KWG0202342	
o-Xylene	ND U	6.6	0.80	1	04/08/02	04/08/02	KWG0202342	
Styrene	ND U	6.6	0.82	1	04/08/02	04/08/02	KWG0202342	
Bromoform	ND U	6.6	0.56	1	04/08/02	04/08/02	KWG0202342	
Isopropylbenzene	ND U	27	0.74	1	04/08/02	04/08/02	KWG0202342	
1,1,2,2-Tetrachloroethane	ND U	6.6	0.68	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichloropropane	ND U	6.6	0.66	1	04/08/02	04/08/02	KWG0202342	
Bromobenzene	ND U	6.6	0.78	1	04/08/02	04/08/02	KWG0202342	
n-Propylbenzene	ND U	27	0.65	1	04/08/02	04/08/02	KWG0202342	
2-Chlorotoluene	ND U	27	0.76	1	04/08/02	04/08/02	KWG0202342	
4-Chlorotoluene	ND U	27	0.80	1	04/08/02	04/08/02	KWG0202342	
1,3,5-Trimethylbenzene	ND U	27	0.75	1	04/08/02	04/08/02	KWG0202342	
tert-Butylbenzene	ND U	27	0.69	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trimethylbenzene	ND U	27	0.74	1	04/08/02	04/08/02	KWG0202342	
sec-Butylbenzene	ND U	27	0.79	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichlorobenzene	ND U	6.6	0.88	1	04/08/02	04/08/02	KWG0202342	
4-Isopropyltoluene	ND U	27	0.84	1	04/08/02	04/08/02	KWG0202342	
1,4-Dichlorobenzene	ND U	6.6	0.97	1	04/08/02	04/08/02	KWG0202342	
n-Butylbenzene	ND U	27	0.97	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichlorobenzene	ND U	6.6	0.85	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromo-3-chloropropane	ND U	27	0.69	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trichlorobenzene	ND U	27	0.81	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichlorobenzene	ND U	27	1.1	1	04/08/02	04/08/02	KWG0202342	
Naphthalene	ND U	27	0.98	1	04/08/02	04/08/02	KWG0202342	
Hexachlorobutadiene	ND U	27	0.87	1	04/08/02	04/08/02	KWG0202342	

Comments: _____

01146

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 2
 Lab Code: K2202038-002

Units: ug/Kg
 Basis: Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	75-132	04/08/02	Acceptable
Toluene-d8	112	85-109	04/08/02	Outside Control Limits
4-Bromofluorobenzene	109	49-131	04/08/02	Acceptable

Comments: _____

01147

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524
 Sample Matrix: Sediment

Service Request: K2202038
 Date Collected: 04/01/2002
 Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 3
 Lab Code: K2202038-003
 Extraction Method: EPA 5030A
 Analysis Method: 8260B

Units: ug/Kg
 Basis: Dry
 Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.8	0.78	1	04/08/02	04/08/02	KWG0202342	
Chloromethane	ND	U	5.8	0.67	1	04/08/02	04/08/02	KWG0202342	
Vinyl Chloride	ND	U	5.8	0.81	1	04/08/02	04/08/02	KWG0202342	
Bromomethane	ND	U	5.8	1.1	1	04/08/02	04/08/02	KWG0202342	
Chloroethane	ND	U	5.8	0.66	1	04/08/02	04/08/02	KWG0202342	
Trichlorofluoromethane	ND	U	5.8	0.78	1	04/08/02	04/08/02	KWG0202342	
Acetone	ND	U	5.8	4.5	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethene	ND	U	5.8	0.81	1	04/08/02	04/08/02	KWG0202342	
Carbon Disulfide	ND	U	5.8	0.99	1	04/08/02	04/08/02	KWG0202342	
Methylene Chloride	0.80	J	12	0.53	1	04/08/02	04/08/02	KWG0202342	
trans-1,2-Dichloroethene	ND	U	5.8	0.62	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloroethane	ND	U	5.8	0.52	1	04/08/02	04/08/02	KWG0202342	
2-Butanone (MEK)	ND	U	23	1.5	1	04/08/02	04/08/02	KWG0202342	
2,2-Dichloropropane	ND	U	5.8	0.69	1	04/08/02	04/08/02	KWG0202342	
cis-1,2-Dichloroethene	ND	U	5.8	0.53	1	04/08/02	04/08/02	KWG0202342	
Chloroform	ND	U	5.8	0.49	1	04/08/02	04/08/02	KWG0202342	
Bromochloromethane	ND	U	5.8	0.53	1	04/08/02	04/08/02	KWG0202342	
1,1,1-Trichloroethane (TCA)	ND	U	5.8	0.52	1	04/08/02	04/08/02	KWG0202342	
1,1-Dichloropropene	ND	U	5.8	0.65	1	04/08/02	04/08/02	KWG0202342	
Carbon Tetrachloride	ND	U	5.8	0.71	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloroethane (EDC)	ND	U	5.8	0.47	1	04/08/02	04/08/02	KWG0202342	
Benzene	ND	U	5.8	0.51	1	04/08/02	04/08/02	KWG0202342	
Trichloroethene (TCE)	ND	U	5.8	0.56	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichloropropane	ND	U	5.8	0.46	1	04/08/02	04/08/02	KWG0202342	
Bromodichloromethane	ND	U	5.8	0.46	1	04/08/02	04/08/02	KWG0202342	
Dibromomethane	ND	U	5.8	0.46	1	04/08/02	04/08/02	KWG0202342	
2-Hexanone	ND	U	23	1.8	1	04/08/02	04/08/02	KWG0202342	
cis-1,3-Dichloropropene	ND	U	5.8	0.41	1	04/08/02	04/08/02	KWG0202342	
Toluene	ND	U	5.8	0.49	1	04/08/02	04/08/02	KWG0202342	
trans-1,3-Dichloropropene	ND	U	5.8	0.38	1	04/08/02	04/08/02	KWG0202342	
1,1,2-Trichloroethane	ND	U	5.8	0.52	1	04/08/02	04/08/02	KWG0202342	
4-Methyl-2-pentanone (MIBK)	ND	U	23	1.5	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichloropropane	ND	U	5.8	0.37	1	04/08/02	04/08/02	KWG0202342	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 3
Lab Code: K2202038-003
Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tetrachloroethene (PCE)	ND U	5.8	0.56	1	04/08/02	04/08/02	KWG0202342	
Dibromochloromethane	ND U	5.8	0.48	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromoethane (EDB)	ND U	23	0.57	1	04/08/02	04/08/02	KWG0202342	
Chlorobenzene	ND U	5.8	0.65	1	04/08/02	04/08/02	KWG0202342	
1,1,1,2-Tetrachloroethane	ND U	5.8	0.56	1	04/08/02	04/08/02	KWG0202342	
Ethylbenzene	ND U	5.8	0.63	1	04/08/02	04/08/02	KWG0202342	
m,p-Xylenes	ND U	5.8	1.2	1	04/08/02	04/08/02	KWG0202342	
o-Xylene	ND U	5.8	0.70	1	04/08/02	04/08/02	KWG0202342	
Styrene	ND U	5.8	0.72	1	04/08/02	04/08/02	KWG0202342	
Bromoform	ND U	5.8	0.50	1	04/08/02	04/08/02	KWG0202342	
Isopropylbenzene	ND U	23	0.65	1	04/08/02	04/08/02	KWG0202342	
1,1,2,2-Tetrachloroethane	ND U	5.8	0.59	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichloropropane	ND U	5.8	0.58	1	04/08/02	04/08/02	KWG0202342	
Bromobenzene	ND U	5.8	0.69	1	04/08/02	04/08/02	KWG0202342	
n-Propylbenzene	ND U	23	0.57	1	04/08/02	04/08/02	KWG0202342	
2-Chlorotoluene	ND U	23	0.66	1	04/08/02	04/08/02	KWG0202342	
4-Chlorotoluene	ND U	23	0.70	1	04/08/02	04/08/02	KWG0202342	
1,3,5-Trimethylbenzene	ND U	23	0.66	1	04/08/02	04/08/02	KWG0202342	
tert-Butylbenzene	ND U	23	0.61	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trimethylbenzene	ND U	23	0.65	1	04/08/02	04/08/02	KWG0202342	
sec-Butylbenzene	ND U	23	0.69	1	04/08/02	04/08/02	KWG0202342	
1,3-Dichlorobenzene	ND U	5.8	0.77	1	04/08/02	04/08/02	KWG0202342	
4-Isopropyltoluene	ND U	23	0.74	1	04/08/02	04/08/02	KWG0202342	
1,4-Dichlorobenzene	ND U	5.8	0.85	1	04/08/02	04/08/02	KWG0202342	
n-Butylbenzene	ND U	23	0.85	1	04/08/02	04/08/02	KWG0202342	
1,2-Dichlorobenzene	ND U	5.8	0.75	1	04/08/02	04/08/02	KWG0202342	
1,2-Dibromo-3-chloropropane	ND U	23	0.61	1	04/08/02	04/08/02	KWG0202342	
1,2,4-Trichlorobenzene	ND U	23	0.71	1	04/08/02	04/08/02	KWG0202342	
1,2,3-Trichlorobenzene	ND U	23	0.90	1	04/08/02	04/08/02	KWG0202342	
Naphthalene	ND U	23	0.86	1	04/08/02	04/08/02	KWG0202342	
Hexachlorobutadiene	ND U	23	0.76	1	04/08/02	04/08/02	KWG0202342	

Comments:

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Volatile Organic Compounds

Sample Name: ITZ 3
Lab Code: K2202038-003

Units: ug/Kg
Basis: Dry

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	112	75-132	04/08/02	Acceptable
Toluene-d8	115	85-109	04/08/02	Outside Control Limits
4-Bromofluorobenzene	119	49-131	04/08/02	Acceptable

Comments: _____



May 10, 2002

Service Request No: K2202038

Mark Musial
Golder Associates, Inc.
1750 Abbott Road, Suite 200
Anchorage, AK 99507

Re: Sitka Dredge/023-5524

Dear Mark:

Enclosed are the additional pages for the sample(s) submitted to our laboratory on April 2, 2002. For your reference, these analyses have been assigned our service request number K2202038.

Enclosed are additional report pages for the Butyltin analysis. The case narrative has been updated to reflect the additional results.

Please call if you have any questions. My extension is 3372.

Respectfully submitted,

Columbia Analytical Services, Inc.


Jim Smith
Project Chemist

JS/jeb

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- * The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- p The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Golder Associates, Inc.
Project: Sitka Dredge
Sample Matrix: Sediment

Service Request No.: K2202038
Date Received: 4/2/02

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Six samples were received for analysis at Columbia Analytical Services on 4/2/02. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Inorganic Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals Sediment

Relative Percent Difference (RPD) Exceptions:

The Relative Percent Differences (RPD) for the replicate analysis of Antimony and Cadmium in sample ITZ 1 (K2202038-001) were outside the normal CAS control limits. The variability in the results is attributed to the heterogeneous character these analytes of the sample. Mixing techniques within the scope of the EPA methodology were used, but were not sufficient for complete homogenization of this sample.

Matrix Spike (MS) Exceptions:

The low Matrix Spike (MS) recovery of Antimony is a result of a method defect in the EPA 3050B-digestion procedure that can be magnified by certain matrix components. The associated QA/QC (i.e. LCS) indicate the analysis was in control. No further corrective action was taken.

The low Matrix Spike (MS) recovery of Cadmium for sample ITZ 1 is a result of the heterogeneous character this analyte in the sample (see high RPD note above). The associated Laboratory Control Sample (LCS) was acceptable indicating the analysis was in control. No further corrective action was taken.

The Matrix Spike (MS) recovery criteria for Copper, Lead and Zinc for sample ITZ 1 are not applicable. The analyte concentrations in the sample were significantly higher than the added spike concentrations, preventing accurate evaluation of the spike recoveries.

No other anomalies associated with the analysis of these samples were observed.

Total Metals Tissue

No anomalies associated with the analysis of these samples were observed.

Approved by _____

[Signature]

Date _____

5/10/02

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Organochlorine Pesticides by EPA Method 8081A

Method Reporting Limit (MRL) Exceptions:

The Method Reporting Limits have been elevated for 4,4'-DDE and 4,4'-DDT in samples ITZ 1 and ITZ2. The chromatogram indicated non-target components that prevented accurate quantification at the reporting limit. The results have been flagged to indicate the matrix interference. All efforts were made through various clean-up methods to reduce the matrix interference however the screening level of 6.9ppb for total DDT could not be met due to this interference.

No other anomalies associated with the analysis of these samples were observed.

PCB Aroclors by EPA Method 8082

No anomalies associated with the analysis of these samples were observed.

Organotin Compounds

Sample Notes and Discussion:

The initial porewater extraction did not yield enough water for porewater analysis. Per Golder the analysis for Organotin would be performed on the soil and reported on a total basis.

Holding Time Exceptions:

The analysis of samples ITZ 1, ITZ 2, ITZ 3, ITZ 3MSand ITZ 3DMS was initially performed within the recommended holding time. Re-analysis was required due to a QA/QC failure relating to surrogates and the Matrix Spikes. The QA/QC results for the re-analysis were within control criteria. The sample results from the re-analysis differ significantly from the initial analysis, indicating a potential quality problem with the initial sample data. The re-extract data has been reported.

No other anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260B

Initial Calibration (ICAL) Exceptions:

The primary evaluation criterion was exceeded for the following analytes in Initial Calibration (ICAL) ID 1479: 2-Butanone (MEK), Tetrachloroethene (PCE) and sec-Butylbenzene. In accordance with CAS standard operating procedures and as specified in the analytical method, an alternative evaluation was performed using the average relative standard deviation of all analytes in the calibration. The calibration meets the alternative evaluation criteria.

Surrogate Exceptions:

The upper control criterion was exceeded for the following surrogate(s) in samples ITZ 1, ITZ 2, ITZ 3 and MB KWG0202342-4: Toluene-d8. No target analytes were detected above the Method Reporting Limit in the samples. The error associated with an elevated recovery equates to a high bias. The quality of the sample data has not been significantly affected. No further corrective action was feasible.

The upper control criterion was exceeded for the following surrogate in ITZ 3MS KWG0202342-4, ITZ 3DMS KWG0202342-5, LCS KWG0202342-3: Toluene-d8. The associated matrix spike recoveries of target compounds were in control, indicating the analysis was in control. The surrogate outlier has been flagged accordingly. No further corrective action was feasible.

No other anomalies associated with the analysis of these samples were observed.

Semivolatile Organic Compounds by EPA Method 8270C

Initial Calibration (ICAL) Exceptions:

The primary evaluation criterion was exceeded for the following analytes in Initial Calibration (ICAL) ID CAL1435: Benzoic Acid, Pentachlorophenol, N-Nitrosodi-n-propylamine, and Hexachlorocyclopentadiene. In accordance with CAS standard operating procedures and as specified in the analytical method, an alternative

Approved by _____ *js* Date 5/10/02

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evaluation was performed using the average relative standard deviation of all analytes in the calibration. The calibration meets the alternative evaluation criteria.

Matrix Spike (MS) Exceptions:

The Matrix Spike recovery of Phenol for sample ITZ 1DMS was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. The matrix spike outlier does not indicate a significant data quality problem. No further corrective action was feasible.

The matrix spike recovery of Pentachlorophenol for sample ITZ 1MS/DMS was outside the lower control criteria because of suspected matrix interference. The sample was re-analyzed, and produced similar results. No recovery was detected in the spiked samples. The results indicate a potential low bias for this compound in this matrix. The results of the original analysis are reported.

The control criteria for the Matrix Spike recovery of Pyrene for sample ITZ 1MS/DMS is not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

Laboratory Control Sample (LCS) Exceptions:

The spike recovery of Benzoic Acid in the Duplicate Laboratory Control Sample (DLCS) KWG0202327-6 was outside the lower control criterion. The analyte in question was not detected in the associated field samples. The error associated with reduced recovery equates to a potential low bias. The recovery for this analyte was within control criterion in the LCS KWG0202327-6 with acceptable RPDs. The data has been flagged to indicate the low recovery.

Method Reporting Limit (MRL) Exceptions:

Sample(s) ITZ 1, ITZ 2, ITZ 3 required dilutions due the presence non-target analytes interfering with compounds of interest. The reporting limits have been elevated accordingly.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____ Date 5/10/02

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COLUMBIA ANALYTICAL SERVICES, INC.

Client: Golder Associates Inc.
 Project: Sitka Dredge/023-5524

Service Request: K2202038

Cover Page - Organic Analysis Data Package
 Butyltins

Sample Name	Lab Code	Date Collected	Date Received
ITZ 1	K2202038-001	04/01/2002	04/02/2002
ITZ 2	K2202038-002	04/01/2002	04/02/2002
ITZ 3	K2202038-003	04/01/2002	04/02/2002
ITZ 3MS	KWG0203101-1	04/01/2002	04/02/2002
ITZ 3DMS	KWG0203101-2	04/01/2002	04/02/2002

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: M. Manthe

Name: M. Manthe

Date: 5/16/02

Title: Scientist

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Butyltins

Sample Name: ITZ 1
Lab Code: K2202038-001
Extraction Method: METHOD
Analysis Method: Krone

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tri-n-butyltin	11000	D	350	120	300	05/02/02	05/08/02	KWG0203101	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tri-n-propyltin	49	31-111	05/07/02	Acceptable

Comments: _____

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Butyltins

Sample Name: ITZ 2
Lab Code: K2202038-002
Extraction Method: METHOD
Analysis Method: Krone

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tri-n-butyltin	13000 D	390	130	300	05/02/02	05/08/02	KWG0203101	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tri-n-propyltin	44	31-111	05/07/02	Acceptable

Comments: _____

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Golder Associates Inc.
Project: Sitka Dredge/023-5524
Sample Matrix: Sediment

Service Request: K2202038
Date Collected: 04/01/2002
Date Received: 04/02/2002

Butyltins

Sample Name: ITZ 3
Lab Code: K2202038-003
Extraction Method: METHOD
Analysis Method: Krone

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Tri-n-butyltin	1.1	J	1.2	0.37	1	05/02/02	05/07/02	KWG0203101	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tri-n-propyltin	38	31-111	05/07/02	Acceptable

Comments: _____