

Arthur D. Little, Inc.

Environmental Monitoring and Analysis

Minerals Management Service - Shelikof Strait and Outermost Cook Inlet

1997 Final Data (Not Surrogate Corrected) - Liver samples - METALS

Field ID	98-1-23a-01-00-PHC-T-H	98-1-23a-01-00-PHC-T-PC	98-1-23a-01-00-PHC-T-S	98-1-23a-02-00-PHC-T-H
Lab ID	98-1-23a-01-00-PHC-T-H	98-1-23a-01-00-PHC-T-PC	98-1-23a-01-00-PHC-T-S	98-1-23a-02-00-PHC-T-H
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	1.563 g	1.77 g	4.117 g	1.468 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/2/1998	7/2/1998	7/2/1998	7/2/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.082	0.964	0.327	0.076
Al - Aluminum (%)	7.7	10.5	2.3	6.6
As - Arsenic (ug/g)	24.8	58.7	24.4	15.4
Ba - Barium (ug/g)	0.052	0.046	0.036	0.043
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	7	0.68	0.79	6.3
Cr - Chromium (ug/g)	0.025	0.017	0.019	0.031
Cu - Copper (ug/g)	10.9	24.4	10.3	15
Fe - Iron (%)	301	138	130	305
Hg - Mercury (ug/g)	0.186	0.14	0.012	0.126
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	3.9	3.9	0.88	2.6
Ni - Nickel (ug/g)	1.4	0.78	0.42	0.83
Pb - Lead (ug/g)	0.072	0.035	0.009	0.055
Sb - Antimony (ug/g)	0.002	0.018	0.002	0.005
Se - Selenium (ug/g)	6.5	2.1	0.48	6
Sn - Tin (ug/g)	0.147	0.03	0.036	0.09
Tl - Thallium (ug/g)	0.002	0.002	0.001	0.002
V - Vanadium (ug/g)	0.225	0.109	0.054	0.131
Zn - Zinc (ug/g)	97.7	51.2	17.3	76.2

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Field ID	98-1-23a-02-00-PHC- T-PC	98-1-23a-03-00-PHC- T-H	98-1-23a-03-00-PHC- T-PC	98-1-23a-04-00-PHC- T-H
Lab ID	98-1-23a-02-00-PHC- T-PC	98-1-23a-03-00-PHC- T-H	98-1-23a-03-00-PHC- T-PC	98-1-23a-04-00-PHC- T-H
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	2.613 g	1.536 g	1.865 g	1.932 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/2/1998	7/2/1998	7/2/1998	7/2/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.483	0.086	0.498	0.046
Al - Aluminum (%)	8	6.3	5.2	6.9
As - Arsenic (ug/g)	18.9	12.6	46	14.4
Ba - Barium (ug/g)	0.042	0.084	0.057	0.021
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	0.42	7.9	1	5.1
Cr - Chromium (ug/g)	0.241	0.025	0.049	0.016
Cu - Copper (ug/g)	17.3	18.9	25.9	15.7
Fe - Iron (%)	103	321	170	285
Hg - Mercury (ug/g)	0.032	0.112	0.123	0.208
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	2.7	3.5	4.8	3.1
Ni - Nickel (ug/g)	0.55	1.4	1.1	1.1
Pb - Lead (ug/g)	0.017	0.058	0.024	0.014
Sb - Antimony (ug/g)	0.01	0.005	0.016	0.003
Se - Selenium (ug/g)	2.4	5.3	3.2	2.2
Sn - Tin (ug/g)	0.108	0.211	0.045	0.119
Tl - Thallium (ug/g)	0.001	0.003	0.003	0.002
V - Vanadium (ug/g)	0.086	0.212	0.148	0.151
Zn - Zinc (ug/g)	42.2	77.5	65.7	85.4

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Field ID	98-1-23a-04-00-PHC- T-PC	98-2-14a-01-00-PHC- T-AF	98-2-14a-01-00-PHC- T-H	98-2-14a-01-00-PHC- T-PC
Lab ID	98-1-23a-04-00-PHC- T-PC	98-2-14a-01-00-PHC- T-AF	98-2-14a-01-00-PHC- T-H	98-2-14a-01-00-PHC- T-PC
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	1.781 g	2.372 g	1.466 g	1.974 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/2/1998	7/1/1998	7/1/1998	7/1/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.539	0.023	0.08	0.442
Al - Aluminum (%)	10.8	2.8	10.1	6.3
As - Arsenic (ug/g)	75.8	32.8	10.3	36.4
Ba - Barium (ug/g)	0.041	0.024	0.096	0.112
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	0.84	2.2	4.1	0.85
Cr - Chromium (ug/g)	0.12	0.041	0.124	0.087
Cu - Copper (ug/g)	16	9.5	11.6	14
Fe - Iron (%)	180	195	128	118
Hg - Mercury (ug/g)	0.043	0.054	0.284	0.122
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	5.6	2.4	5.4	3.1
Ni - Nickel (ug/g)	1.1	0.83	2	1.1
Pb - Lead (ug/g)	0.072	0.026	0.019	0.231
Sb - Antimony (ug/g)	0.019	0.002	0.003	0.013
Se - Selenium (ug/g)	4.6	2.5	6.7	3
Sn - Tin (ug/g)	0.043	0.036	0.13	0.027
Tl - Thallium (ug/g)	0.003	0.001	0.002	0.003
V - Vanadium (ug/g)	0.155	0.111	0.208	0.183
Zn - Zinc (ug/g)	59.9	53.8	96.7	61.1

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Field ID	98-2-14a-02-00-PHC-T-H	98-2-14a-02-00-PHC-T-PC	98-2-14a-03-00-PHC-T-H	98-2-14a-03-00-PHC-T-PC
Lab ID	98-2-14a-02-00-PHC-T-H	98-2-14a-02-00-PHC-T-PC	98-2-14a-03-00-PHC-T-H	98-2-14a-03-00-PHC-T-PC
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	1.646 g	1.853 g	1.542 g	1.512 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/1/1998	7/1/1998	7/1/1998	7/1/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.059	0.128	0.082	0.079
Al - Aluminum (%)	8.7	2	8.5	6
As - Arsenic (ug/g)	15.8	28.4	17.5	101
Ba - Barium (ug/g)	0.071	0.087	0.072	0.095
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	4.1	0.48	4.7	1.2
Cr - Chromium (ug/g)	0.054	0.106	0.139	0.088
Cu - Copper (ug/g)	7.9	10.5	12	27.7
Fe - Iron (%)	94.6	101	135	204
Hg - Mercury (ug/g)	0.333	0.102	0.347	0.179
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	3.8	2.1	4.6	4.8
Ni - Nickel (ug/g)	2	1.6	2	1.7
Pb - Lead (ug/g)	0.01	0.126	0.014	0.078
Sb - Antimony (ug/g)	0.006	0.019	0.003	0.033
Se - Selenium (ug/g)	5.3	2.9	7.5	6.3
Sn - Tin (ug/g)	0.195	0.055	0.117	0.038
Tl - Thallium (ug/g)	0.001	0.003	0.002	0.004
V - Vanadium (ug/g)	0.244	0.274	0.277	0.325
Zn - Zinc (ug/g)	81.8	49.9	88.5	96

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1997 Final Data (Not Surrogate Corrected) - Liver samples - METALS

Field ID	98-2-14a-04-00-PHC-T-H	98-2-14a-04-00-PHC-T-PC	98-2-14a-05-00-PHC-T-H	98-2-14a-05-00-PHC-T-PC
Lab ID	98-2-14a-04-00-PHC-T-H	98-2-14a-04-00-PHC-T-PC	98-2-14a-05-00-PHC-T-H	98-2-14a-05-00-PHC-T-PC
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	1.504 g	1.201 g	1.482 g	1.98 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/1/1998	7/1/1998	7/1/1998	7/1/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.043	0.691	0.054	0.543
Al - Aluminum (%)	10.3	3.1	3.3	4.5
As - Arsenic (ug/g)	10.8	49.1	21.9	67.2
Ba - Barium (ug/g)	0.079	0.069	0.102	0.091
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	5.1	0.57	3.7	0.25
Cr - Chromium (ug/g)	0.048	0.048	0.057	0.084
Cu - Copper (ug/g)	9.8	28.8	12.5	11.2
Fe - Iron (%)	281	180	331	94.9
Hg - Mercury (ug/g)	0.253	0.184	0.142	0.054
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	4.4	2.8	4.8	2.8
Ni - Nickel (ug/g)	2	1.1	2	1.1
Pb - Lead (ug/g)	0.155	0.015	1.23	0.026
Sb - Antimony (ug/g)	0.002	0.018	0.002	0.018
Se - Selenium (ug/g)	6.5	4.4	7.2	3.8
Sn - Tin (ug/g)	0.118	0.134	0.05	0.095
Tl - Thallium (ug/g)	0.002	0.004	0.002	0.002
V - Vanadium (ug/g)	0.3	0.206	0.195	0.146
Zn - Zinc (ug/g)	84.9	65.3	94.4	56.5

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Minerals Management Service - Shelikof Strait and Outermost Cook Inlet

1997 Final Data (Not Surrogate Corrected) - Liver samples - METALS

Field ID	98-2-14a-06-00-PHC-T-PC	98-3-1a-01-00-PHC-T-AF	98-3-1a-01-00-PHC-T-BC	98-3-1a-01-00-PHC-T-H
Lab ID	98-2-14a-06-00-PHC-T-PC	98-3-1a-01-00-PHC-T-AF	98-3-1a-01-00-PHC-T-BC	98-3-1a-01-00-PHC-T-H
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	1.966 g	2.441 g	2.415 g	1.953 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	7/1/1998	6/29/1998	6/29/1998	6/29/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.413	0.024	0.017	0.086
Al - Aluminum (%)	2.5	1.5	1.1	4
As - Arsenic (ug/g)	42.3	22.6	3.36	23.6
Ba - Barium (ug/g)	0.055	0.011	0.033	0.011
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	0.55	1.7	0.99	4
Cr - Chromium (ug/g)	0.051	0.022	0.027	0.02
Cu - Copper (ug/g)	13	9.9	4.2	7.8
Fe - Iron (%)	163	138	337	111
Hg - Mercury (ug/g)	0.067	0.049	0.099	0.318
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	3.8	1.9	2.4	2.8
Ni - Nickel (ug/g)	1	1	1	1.3
Pb - Lead (ug/g)	0.008	0.015	0.04	0.021
Sb - Antimony (ug/g)	0.016	0.002	0.004	0.002
Se - Selenium (ug/g)	2.4	1.7	2.5	4.2
Sn - Tin (ug/g)	0.147	0.094	0.021	0.052
Tl - Thallium (ug/g)	0.003	0.001	0.004	0.001
V - Vanadium (ug/g)	0.13	0.089	0.093	0.256
Zn - Zinc (ug/g)	55	51.9	46.6	80.7

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Field ID	98-3-1a-01-00-PHC-T-PC	98-3-1a-01-00-PHC-T-S	98-3-1a-02-00-PHC-T-H	98-3-1a-02-00-PHC-T-H
Lab ID	98-3-1a-01-00-PHC-T-PC	98-3-1a-01-00-PHC-T-S	98-3-1a-02-00-PHC-T-H	98-3-1a-02-00-PHC-T-H
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	SAMP	SAMP	QC
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	2.083 g	3.017 g	1.791 g	1.821 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	6/29/1998	6/29/1998	6/29/1998	6/29/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.297	0.474	0.117	0.116
Al - Aluminum (%)	2.9	2.2	5	4.9
As - Arsenic (ug/g)	49.9	60.1	34.8	35
Ba - Barium (ug/g)	0.025	0.018	0.008	0.009
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	0.67	0.63	4.4	4.2
Cr - Chromium (ug/g)	0.046	0.025	0.023	0.024
Cu - Copper (ug/g)	12.9	41.3	16.4	15.7
Fe - Iron (%)	119	107	218	212
Hg - Mercury (ug/g)	0.111	0.079	0.196	0.208
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	4.4	1.4	3.3	3.2
Ni - Nickel (ug/g)	1	0.73	1.5	1.5
Pb - Lead (ug/g)	0.029	0.009	0.059	0.06
Sb - Antimony (ug/g)	0.017	0.002	0.002	0.003
Se - Selenium (ug/g)	5	0.59	3.9	4.1
Sn - Tin (ug/g)	0.085	0.023	0.158	0.151
Tl - Thallium (ug/g)	0.003	0.001	0.001	0.001
V - Vanadium (ug/g)	0.231	0.083	0.224	0.225
Zn - Zinc (ug/g)	62.5	24.4	81.1	81.7

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Field ID	98-3-1a-02-00-PHC-T- PC	98-3-1a-02-00-PHC-T- PC	98-3-1a-03-00-PHC-T- H	98-3-1a-03-00-PHC-T- PC
Lab ID	98-3-1a-02-00-PHC-T- PC #1	98-3-1a-02-00-PHC-T- PC #2	98-3-1a-03-00-PHC-T- H	98-3-1a-03-00-PHC-T- PC
SDG	NA	NA	NA	NA
File	NA	NA	NA	NA
Sample Type	SAMP	QC	SAMP	SAMP
Matrix	Liver Composite	Liver Composite	Liver Composite	Liver Composite
Sample Size	2.23 g	1.999 g	1.853 g	1.985 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	NA	NA	NA	NA
Field Date	6/29/1998	6/29/1998	6/29/1998	6/29/1998
Extract Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Analysis Date	11/4/1998	11/4/1998	11/4/1998	11/4/1998
Min Reporting Limit	NA	NA	NA	NA
Units	---	---	---	---

METALS				
Ag - Silver (ug/g)	0.524	0.521	0.05	0.597
Al - Aluminum (%)	2.2	2.1	5.1	2.2
As - Arsenic (ug/g)	46.2	47.6	20.9	47.2
Ba - Barium (ug/g)	0.012	0.01	0.011	0.034
Be - Beryllium (ug/g)	0 ND	0 ND	0 ND	0 ND
Ca - Calcium (%)	NA	NA	NA	NA
Cd - Cadmium (ug/g)	0.94	1	4.5	0.5
Cr - Chromium (ug/g)	0.066	0.061	0.013	0.034
Cu - Copper (ug/g)	13.2	13	10.9	12.6
Fe - Iron (%)	160	162	164	129
Hg - Mercury (ug/g)	0.1	0.1	0.188	0.071
K - potassium (%)	NA	NA	NA	NA
Mg - Magnesium (%)	NA	NA	NA	NA
Mn - Manganese (ug/g)	3.5	3.5	2.7	5.3
Ni - Nickel (ug/g)	1.2	1.1	1.6	1.4
Pb - Lead (ug/g)	0.026	0.025	0.022	0.013
Sb - Antimony (ug/g)	0.014	0.014	0.004	0.014
Se - Selenium (ug/g)	4.1	3.7	5.3	4
Sn - Tin (ug/g)	0.025	0.028	0.063	0.104
Tl - Thallium (ug/g)	0.003	0.003	0.001	0.003
V - Vanadium (ug/g)	0.155	0.147	0.209	0.152
Zn - Zinc (ug/g)	57.6	56.3	74.1	67.4