

## Station Data for Trace Metal Sediment Samples.

Sample Identification	Station Identification	Station Grouping	Collection Date	Comments
02-N01-01-MET-S	N01	Northstar	8/3/2002	
02-N02-01-MET-S	N02	Northstar	8/3/2002	
02-N03-01-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N03-02-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N03-03-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N04-01-MET-S	N04	Northstar	8/3/2002	
02-N05-01-MET-S	N05	Northstar	8/3/2002	
02-N06-01-MET-S	N06	Northstar	8/2/2002	
02-N07-01-MET-S	N07	Northstar	8/5/2002	
02-N08-01-MET-S	N08	Northstar	8/5/2002	
02-N09-01-MET-S	N09	Northstar	8/5/2002	
02-N10-01-MET-S	N10	Northstar	8/2/2002	
02-N11-01-MET-S	N11	Northstar	8/2/2002	
02-N12-01-MET-S	N12	Northstar	8/2/2002	
02-N13-01-MET-S	N13	Northstar	8/4/2002	
02-N14-01-MET-S	N14	Northstar	8/5/2002	
02-N15-01-MET-S	N15	Northstar	8/7/2002	
02-N16-01-MET-S	N16	Northstar	8/5/2002	
02-N17-01-MET-S	N17	Northstar	8/5/2002	
02-N17-01-MET-S(subsurface)	N17	Northstar	8/5/2002	Clay Layer
02-N18-01-MET-S	N18	Northstar	8/2/2002	
02-N19-01-MET-S	N19	Northstar	8/2/2002	
02-N20-01-MET-S	N20	Northstar	8/2/2002	
02-N21-01-MET-S	N21	Northstar	8/2/2002	
02-N23-01-MET-S	N23	Northstar	8/5/2002	
02-L01-01-MET-S	L01	Liberty	7/31/2002	
02-L04-01-MET-S	L04	Liberty	7/29/2002	
02-L06-01-MET-S	L06	Liberty	7/30/2002	
02-L07-01-MET-S	L07	Liberty	7/30/2002	
02-L08-01-MET-S	L08	Liberty	7/30/2002	No Clams
02-L08-02-MET-S	L08	Liberty	7/30/2002	Clams
02-L09-01-MET-S	L09	Liberty	7/30/2002	
02-3A-01-MET-S	3A	Liberty	7/29/2002	
02-3B-01-MET-S	3B	Liberty	7/29/2002	Near Pole Island
02-4A-01-MET-S	4A	Liberty	7/31/2002	
02-4B-01-MET-S	4B	Liberty	7/31/2002	Boulder Patch
02-4C-01-MET-S	4C	In Between N & L	7/31/2002	
02-5A-01-MET-S	5A	Northstar	8/3/2002	
02-5B-01-MET-S	5B	Northstar	8/3/2002	
02-5D-01-MET-S	5D	Northstar	8/5/2002	Lee of STP/West Dock, F.Trip.
02-5D-02-MET-S	5D	Northstar	8/5/2002	Field Triplicate
02-5D-03-MET-S	5D	Northstar	8/5/2002	Field Triplicate
02-5E-01-MET-S	5E	Northstar	8/4/2002	
02-5F-01-MET-S	5F	Northstar	8/7/2002	Gwydyr Bay
02-5H-01-MET-S	5H	In Between N & L	8/1/2002	
02-5(0)-01-MET-S	5(0)	In Between N & L	8/1/2002	
02-5(1)-01-MET-S	5(1)	In Between N & L	8/1/2002	
02-5(5)-01-MET-S	5(5)	Northstar	8/1/2002	
02-5(10)-01-MET-S	5(10)	Northstar	8/1/2002	
02-CAN-01-MET-S	Canning River	Source	8/9/2002	
02-KUPB-01-MET-S	Kuparuk	Source	8/7/2002	Borrow Pit

MMS Beaufort Sea ANIMDA Project: Summer 2000 Sampling

Grain Size Distribution in Sediment Samples

Sample Identification*	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Total (%)	Comments
00-N01-01-GRS-S	0.2	97.3	0.8	1.6	99.9	
00-N02-01-GRS-S	0.2	32.3	54.2	13.3	100.0	
00-N03-01-GRS-S	0.0	17.5	47.0	35.5	100.0	
00-N04-01-GRS-S	0.6	22.0	58.0	19.3	99.9	
00-N05-01-GRS-S	0.0	14.2	63.1	22.7	100.0	
00-N06-01-GRS-S #1	0.0	69.1	24.7	6.2	100.0	Lab Duplicate
00-N06-01-GRS-S #2	0.0	71.9	22.2	6.0	100.1	Lab Duplicate
00-N07-01-GRS-S	0.0	52.0	26.5	21.5	100.0	
00-N08-01-GRS-S	0.0	85.6	10.5	3.9	100.0	
00-N09-01-GRS-S #1	0.0	87.3	8.7	3.9	99.9	Lab Duplicate
00-N09-01-GRS-S #2	0.0	89.1	7.9	3.0	100.0	Lab Duplicate
00-N10-01-GRS-S	0.0	54.9	42.4	2.7	100.0	
00-N11-01-GRS-S	0.9	41.7	47.5	10.0	100.1	
00-N12-01-GRS-S	2.6	7.6	64.8	25.0	100.0	
00-N13-01-GRS-S	0.0	13.2	66.4	20.4	100.0	Field Triplicate
00-N13-02-GRS-S	0.0	6.0	75.9	18.1	100.0	Field Triplicate
00-N13-03-GRS-S	0.0	7.0	71.6	21.4	100.0	Field Triplicate
00-N14-01-GRS-S	0.0	11.6	65.9	22.5	100.0	
00-N15-01-GRS-S	0.3	97.6	0.7	1.5	100.1	
00-N16-01-GRS-S	0.1	33.5	49.3	17.1	100.0	
00-N17-01-GRS-S	0.0	28.0	47.2	24.8	100.0	
00-N18-01-GRS-S	0.0	39.3	43.0	17.5	99.8	
00-N19-01-GRS-S	1.6	35.1	45.6	17.7	100.0	
00-N20-01-GRS-S	0.0	30.2	65.7	4.1	100.0	
00-N21-01-GRS-S	0.0	5.7	72.4	21.8	99.9	
00-N22-01-GRS-S	60.3	38.9	0.6	0.3	100.1	
00-N23-01-GRS-S	0.0	1.4	86.8	11.8	100.0	
00-L01-01-GRS-S	4.5	29.5	43.0	23.1	100.1	
00-L04-01-GRS-S	0.0	40.0	41.8	18.1	99.9	
00-L06-01-GRS-S	0.0	5.6	75.5	18.8	99.9	
00-L07-01-GRS-S	0.5	63.7	28.0	7.8	100.0	
00-L08-01-GRS-S	0.2	62.2	26.9	10.6	99.9	Field Triplicate
00-L08-02-GRS-S	0.0	77.2	15.9	6.9	100.0	Field Triplicate
00-L08-03-GRS-S	0.5	67.2	24.6	7.7	100.0	Field Triplicate
00-L09-01-GRS-S	36.0	58.7	3.3	2.0	100.0	
00-3A-01-GRS-S	0.0	30.5	52.3	17.2	100.0	
00-3B-01-GRS-S	0.0	26.7	52.0	21.3	100.0	
00-4A-01-GRS-S	1.2	14.2	49.9	34.8	100.1	
00-4B-01-GRS-S	0.0	50.6	33.3	16.1	100.0	
00-4C-01-GRS-S	12.9	45.3	36.7	5.1	100.0	
00-5A-01-GRS-S	0.8	14.1	59.6	25.5	100.0	
00-5B-01-GRS-S	0.0	98.8	0.4	0.8	100.0	
00-5D-01-GRS-S	0.0	46.0	49.0	4.9	99.9	
00-5E-01-GRS-S	0.0	53.9	24.2	21.9	100.0	
00-5F-01-GRS-S	0.4	50.6	37.6	11.4	100.0	
00-5H-01-GRS-S	1.2	73.6	18.0	7.2	100.0	
00-5(0)-01-GRS-S	0.0	74.2	21.7	4.1	100.0	
00-5(1)-01-GRS-S	3.2	66.2	24.3	6.3	100.0	
00-5(5)-01-GRS-S	7.3	60.1	21.0	11.6	100.0	
00-5(10)-01-GRS-S	0.0	70.7	21.4	7.9	100.0	
00-COL-01-GRS-S	0.0	97.5	1.7	0.7	99.9	
00-COL-02-GRS-S	0.0	61.1	33.3	5.7	100.1	

\* Sample collection dates are the same as the Metal & Carbon samples.

Sample Identification	TOC (%)	Comments
02-N01-01-MET-S	0.30	
02-N02-01-MET-S	0.83	
02-N03-01-MET-S	0.87	Field Triplicate
02-N03-02-MET-S	1.00	Field Triplicate
02-N03-03-MET-S	0.82	Field Triplicate
02-N04-01-MET-S	0.58	
02-N05-01-MET-S #1	1.00	Lab Duplicate
02-N05-01-MET-S #2	0.81	Lab Duplicate
02-N06-01-MET-S	0.73	
02-N07-01-MET-S	1.04	
02-N08-01-MET-S	0.84	
02-N09-01-MET-S	0.78	
02-N10-01-MET-S	0.84	
02-N11-01-MET-S	0.45	
02-N12-01-MET-S	1.00	
02-N13-01-MET-S	1.81	
02-N14-01-MET-S	1.43	
02-N15-01-MET-S	0.19	
02-N16-01-MET-S	0.89	
02-N17-01-MET-S	0.85	
02-N17-01-MET-S(subsurface)	0.90	Clay Layer
02-N18-01-MET-S	0.98	
02-N19-01-MET-S	1.15	
02-N20-01-MET-S	0.09	
02-N21-01-MET-S	1.03	
02-N23-01-MET-S	0.91	
02-L01-01-MET-S	0.59	
02-L04-01-MET-S	0.71	
02-L06-01-MET-S	1.17	
02-L07-01-MET-S	0.88	
02-L08-01-MET-S	0.11	No Clams
02-L08-02-MET-S	0.67	Clams
02-L09-01-MET-S	0.18	
02-3A-01-MET-S	0.86	
02-3B-01-MET-S	0.74	
02-4A-01-MET-S	0.54	
02-4B-01-MET-S	0.77	
02-4C-01-MET-S	0.30	
02-5A-01-MET-S	0.97	
02-5B-01-MET-S	0.41	
02-5D-01-MET-S	1.10	Field Triplicate
02-5D-02-MET-S	0.84	Field Triplicate
02-5D-03-MET-S	0.95	Field Triplicate

Sample Identification	TOC (%)	Comments
02-5E-01-MET-S	0.08	
02-5F-01-MET-S	1.26	
02-5H-01-MET-S	0.91	
02-5(0)-01-MET-S	0.62	
02-5(1)-01-MET-S	0.14	
02-5(5)-01-MET-S	0.58	
02-5(10)-01-MET-S #1	0.59	Lab Duplicate
02-5(10)-01-MET-S #2	0.57	Lab Duplicate
02-CAN-01-MET-S	1.83	
02-KUPB-01-MET-S	6.13	Borrow Pit

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Grain Size Distribution in Sediment Samples.

Sample Identification*	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Total (%)	Comments
02-N01-01-GRS-S	0.4	96.1	2.4	1.0	99.9	
02-N02-01-GRS-S #1	0.5	33.9	45.8	19.8	100.0	Lab Duplicate
02-N02-01-GRS-S #2	0.5	35.0	44.2	20.3	100.0	Lab Duplicate
02-N03-01-GRS-S	0.0	24.9	50.7	24.4	100.0	Field Triplicate
02-N03-02-GRS-S	0.0	15.5	59.0	25.5	100.0	Field Triplicate
02-N03-03-GRS-S	0.0	13.0	55.7	31.3	100.0	Field Triplicate
02-N04-01-GRS-S	0.0	34.0	43.7	22.3	100.0	
02-N05-01-GRS-S	0.0	12.8	59.5	27.7	100.0	Lab Duplicate
02-N06-01-GRS-S #1	0.0	37.6	40.7	21.7	100.0	Lab Duplicate
02-N06-01-GRS-S #2	0.0	38.2	40.0	21.8	100.0	
02-N07-01-GRS-S	0.1	67.3	23.6	9.0	100.0	
02-N08-01-GRS-S	0.0	24.8	45.5	29.7	100.0	
02-N09-01-GRS-S	0.0	39.8	39.7	20.5	100.0	
02-N10-01-GRS-S	0.0	32.2	44.4	23.4	100.0	
02-N11-01-GRS-S	0.2	52.6	35.2	11.9	99.9	
02-N12-01-GRS-S	10.5	9.0	62.7	17.8	100.0	
02-N13-01-GRS-S	0.2	8.9	70.8	20.1	100.0	
02-N14-01-GRS-S #1	0.0	18.7	67.9	13.4	100.0	Lab Duplicate
02-N14-01-GRS-S #2	0.0	19.0	67.7	13.4	100.1	Lab Duplicate
02-N15-01-GRS-S	9.0	86.7	2.9	1.4	100.0	
02-N16-01-GRS-S	0.0	10.6	54.6	34.8	100.0	
02-N17-01-GRS-S	0.0	17.1	54.4	28.5	100.0	
02-N18-01-GRS-S	0.2	48.3	33.2	18.2	99.9	
02-N19-01-GRS-S	0.1	49.4	34.1	16.5	100.1	
02-N20-01-GRS-S	0.1	91.1	5.6	3.2	100.0	
02-N21-01-GRS-S	0.0	13.3	67.6	19.2	100.1	
02-N23-01-GRS-S	0.0	10.7	74.3	15.1	100.1	
02-L01-01-GRS-S	0.0	89.3	6.9	3.8	100.0	
02-L04-01-GRS-S	1.9	45.5	35.7	16.9	100.0	
02-L06-01-GRS-S	0.0	41.6	39.5	18.9	100.0	
02-L07-01-GRS-S	0.0	51.2	34.2	14.5	99.9	
02-L08-01-GRS-S	1.0	92.7	3.9	2.5	100.1	
02-L08-02-GRS-S	0.6	50.9	35.8	12.7	100.0	
02-L09-01-GRS-S	0.0	90.3	5.0	4.7	100.0	
02-3A-01-GRS-S	1.7	22.9	54.2	21.2	100.0	
02-3B-01-GRS-S	0.0	15.5	57.7	26.8	100.0	
02-4A-01-GRS-S	0.3	9.7	32.4	57.6	100.0	
02-4B-01-GRS-S	0.4	89.1	7.4	3.0	99.9	
02-4C-01-GRS-S	0.0	99.2	0.2	0.6	100.0	
02-5A-01-GRS-S #1	0.0	7.5	60.3	32.2	100.0	Lab Duplicate
02-5A-01-GRS-S #2	0.3	7.9	60.3	31.5	100.0	Lab Duplicate
02-5B-01-GRS-S	0.0	95.7	1.9	2.4	100.0	
02-5D-01-GRS-S	0.0	29.1	64.4	6.5	100.0	Field Triplicate
02-5D-02-GRS-S	7.6	24.7	62.3	5.5	100.1	Field Triplicate
02-5D-03-GRS-S	0.0	27.8	64.6	7.7	100.1	Field Triplicate
02-5E-01-GRS-S	0.1	96.2	1.7	2.0	100.0	
02-5F-01-GRS-S	0.0	29.0	60.6	10.4	100.0	
02-5H-01-GRS-S	0.6	76.9	15.0	7.5	100.0	
02-5(0)-01-GRS-S	0.0	81.5	13.7	4.7	99.9	
02-5(1)-01-GRS-S	1.3	95.8	1.5	1.5	100.1	
02-5(5)-01-GRS-S	0.6	58.6	28.5	12.4	100.1	
02-5(10)-01-GRS-S #1	0.0	79.1	14.5	6.4	100.0	Lab Duplicate
02-5(10)-01-GRS-S #2	0.0	78.7	15.0	6.3	100.0	Lab Duplicate

\* Sample collection dates are the same as the Metal & Carbon samples.

MMS Beaufort Sea ANIMDA Project: Summer 2002 Sampling

Statistics for Total Organic Carbon (TOC) Content in Sediment Samples (dry weight).  
 Field Triplicates and Lab Duplicate have been averaged prior to statistical analysis.

Station Grouping	Statistic	TOC (%)
Northstar Stations N01-N21	Mean	0.84
	Std. Dev.	0.37
	n	23
	Maximum	1.81
	Minimum	0.09
Liberty Stations L01-L09	Mean	0.62
	Std. Dev.	0.37
	n	7
	Maximum	1.17
	Minimum	0.11
BSMP Stations 3A-5(10)	Mean	0.65
	Std. Dev.	0.33
	n	15
	Maximum	1.26
	Minimum	0.08
Cumulative*	Mean	0.74
	Std. Dev.	0.36
	n	45
	Maximum	1.81
	Minimum	0.08

\* Excluding CAN and KUPB sediment samples.

MMS Beaufort Sea ANIMDA Project: Summer 2002 Sampling

Quality Assurance and Quality Control Data for Sediment Metal Analyses.

Results for the Marine Sediment Certified Reference Materials (CRMs) MESS-2 and MESS-3 certified by the National Research Council of Canada (NRC) and Standard Reference Material (SRM) Trace Elements in Water #1643d certified by the National Institute of Standards and Technology (NIST).

Reference Material	TOC (%)
CRM MESS-2	-
This Study	-
	-
	-
CRM MESS-2	2.14**
NRC Certified Values	± 0.03
CRM MESS-3	2.05
This Study	2.08
	2.08
	2.07
CRM MESS-3	2*
NRC Certified Values	-
SRM #1643d	-
This Study	-
SRM #1643d	-
NIST Certified Values	-

\* Reference Value, not Certified.

Method Detection Limits (MDLs).

	TOC (%)
Method Detection Limit	0.03

MMS Beaufort Sea ANIMDA Project: Summer 2002 Sampling

Quality Assurance and Quality Control Data for Sediment Metal Analyses.

Percent Spike Recovery.

	TOC
Mean	-
Standard Deviation	-
(n =)	-

\*\*\*Final concentrations are corrected for percent spike recovery.

Estimate of Precision as Percent Relative Standard Deviation (RSD) of Lab Duplicates.

	TOC
02-N05-01-MET-S	14.8
02-5(10)-01-MET-S	2.4

RSD = (standard deviation / mean) X 100



MMS Beaufort Sea ANIMDA Project: Summer 2000 Sampling

Quality Assurance and Quality Control Data for Sediment TOC Analyses.

Results for the Marine Sediment Standard Reference Material (SRM) MESS-2 certified by the National Research Council of Canada (NRC).

Standard Reference Material	TOC (%)
SRM MESS-2	1.99
This Study	1.97
	1.89
	1.93
SRM MESS-2 NRC Certified Values	2.14** ± 0.03

\* Reference Value, not Certified.

\*\* Total Carbon (Inorganic plus Organic).

Method Detection Limits (MDLs).

	TOC (%)
Method Detection Limit	0.06

MMS Beaufort Sea ANIMDA Project: Summer 2000 Sampling

Quality Assurance and Quality Control Data for Sediment Metal Analyses.

Percent Spike Recovery.

	TOC
Mean	-
Standard Deviation	-
(n =)	-

\*\*\*Final concentrations are corrected for percent spike recovery.

Estimate of Precision as Percent Relative Standard Deviation (RSD) of Lab Duplicates.

	TOC
00-N06-01-MET-S	1.1
00-N09-01-MET-S	1.8
00-5(10)-01-MET-S	-
00-KUP-02-MET-S	0.6

RSD = (standard deviation / mean) X 100

MMS Beaufort Sea ANIMDA Project: Summer 2000 Sampling

Trace Metal Concentrations in Sedir

Sample Identification	TOC (%)	Comments
00-N01-01-MET-S	N.D.	
00-N01-01-MET-EB	-	
00-N02-01-MET-S	1.38	
00-N03-01-MET-S	0.74	
00-N04-01-MET-S	1.68	
00-N05-01-MET-S	1.56	
00-N06-01-MET-S #1	0.64	Lab Duplicate, Metals
00-N06-01-MET-S #2	0.63	Lab Duplicate, Metals
00-N07-01-MET-S	1.19	
00-N08-01-MET-S	0.34	
00-N09-01-MET-S #1	0.77	Lab Duplicate, Metals
00-N09-01-MET-S #2	0.79	Lab Duplicate, Metals
00-N10-01-MET-S	1.36	
00-N11-01-MET-S	1.41	
00-N12-01-MET-S	1.60	
00-N13-01-MET-S	1.61	Field Triplicate
00-N13-02-MET-S	1.87	Field Triplicate
00-N13-03-MET-S	2.18	Field Triplicate
00-N14-01-MET-S	4.41	
00-N15-01-MET-S	N.D.	
00-N16-01-MET-S	0.86	
00-N17-01-MET-S	0.97	
00-N18-01-MET-S	0.50	
00-N19-01-MET-S	0.83	
00-N20-01-MET-S	1.73	
00-N21-01-MET-S	2.34	
00-N22-01-MET-S	N.D.	
00-N23-01-MET-S	1.80	
00-L01-01-MET-S	1.01	
00-L04-01-MET-S	0.47	
00-L06-01-MET-S	0.90	
00-L07-01-MET-S	1.48	
00-L08-01-MET-S	0.30	Field Triplicate
00-L08-02-MET-S	0.22	Field Triplicate
00-L08-03-MET-S	0.19	Field Triplicate
00-L09-01-MET-S	0.49	

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Trace Metal Concentrations in Sediment Page 2 of 2

Sample Identification	TOC (%)	Comments
00-3A-01-MET-S	0.29	
00-3B-01-MET-S	0.58	
00-4A-01-MET-S	0.59	
00-4B-01-MET-S	1.15	
00-4C-01-MET-S	0.50	
00-5A-01-MET-S	1.70	
00-5B-01-MET-S	0.06	
00-5D-01-MET-S	1.96	
00-5E-01-MET-S	N.D.	
00-5F-01-MET-S	0.51	
00-5H-01-MET-S	0.40	
00-5(0)-01-MET-S	0.96	
00-5(1)-01-MET-S	0.96	
00-5(5)-01-MET-S	1.13	
00-5(10)-01-MET-S #1	0.91	Lab Duplicate, Metals
00-5(10)-01-MET-S #2		Lab Duplicate, Metals
00-SAG-01-MET-S	2.79	
00-SAG-02-MET-S	2.43	
00-COL-01-MET-S	0.42	
00-COL-02-MET-S	1.76	
00-KUP-01-MET-S	7.39	
00-KUP-02-MET-S #1	2.34	Lab Duplicate, Metals
00-KUP-02-MET-S #2	2.36	Lab Duplicate, Metals
00-TWO-01-MET-S	-	
3A-SS-P (2 of 3)	-	1989 Sample
5F-SS-P (1 of 3)	-	1989 Sample
5(0)-SS-2	-	1989 Sample

Year	Region	FieldID	StationID	Matrix	Weight (ug/Kg)	Perylene (ug/Kg)	N/P	C2D/C2P	C3D/C3P	Total PAH (ug/Kg)	Total PAH (ug/Kg)	Pyrogenic PAH (ug/Kg)	Petrogenic PAH (ug/Kg)	Pyrogenic/Petrogenic (%)	Slit+Clay (%)	TPH Resolved	TPHC (mg/Kg)	Isoprenoid (mg/Kg)	LALK (mg/Kg)	TALK (mg/Kg)	LALK/TALK	Phytane/Pristane	C16/(C15+C17)	CPI	TotalST (uol/Kg)	T21/T22	Ts/(Tm+Tn)	Olthane/Honane	
1999	Northstar	99-5A-01-PHC-S	A	SEDIMENT	DRY	646.02	1.40	28	38	646.02	646.02	0.07	61	0.85	0.01	1.00	21	0.00	0.00	0.06	0.00	0.34	345	4.04					
1999	Northstar	99-N01-01-PHC-S	N01	SEDIMENT	DRY	58	1.31	43	62	8.65	8.65	0.07	61	0.85	0.01	1.00	21	0.00	0.00	0.06	0.00	0.34	345	1.66	1.18	1.00	407	0.00	
1999	Northstar	99-N02-01-PHC-S	N02	SEDIMENT	DRY	42.00	1.38	37	65	465.53	423.53	35.89	0.96	48	0.08	48	63.00	3.20	6.21	4.46	2.31	20.00	44	3.69	5.82				
1999	Northstar	99-N03-01-PHC-S	N03	SEDIMENT	DRY	74.00	1.66	29	75	676.17	602.17	58.00	528.13	1.05	1.51	89.70	5.90	11.00	18.70	4.32	16.45	20.00	45	3.50	6.87				
1999	Northstar	99-N04-01-PHC-S	N04	SEDIMENT	DRY	49.00	1.43	30	67	541.16	486.16	55.00	431.16	0.92	1.93	58.70	5.90	11.00	18.70	4.32	16.45	20.00	45	3.50	6.87				
1999	Northstar	99-N05-01-PHC-S	N05	SEDIMENT	DRY	62.00	9.94	28	35	601.84	539.84	51.04	469.80	1.09	1.09	93.60	4.40	7.80	17.00	6.00	2.90	20.00	39	3.51	5.55				
1999	Northstar	99-N06-01-PHC-S	N06	SEDIMENT	DRY	88.00	1.52	29	31	956.05	868.05	67.80	771.15	0.88	1.51	97.40	7.50	13.00	2.24	9.6	5.47	18.38	38	3.60	6.05	81.58	60	260	0.4
1999	Northstar	99-N07-01-PHC-S	N07	SEDIMENT	DRY	5.20	6.65	38	46	56.56	51.56	5.68	43.74	1.30	0.99	11.90	4.5	4.5	0.02	0.05	2.5	23.50	41	3.16					
1999	Northstar	99-N08-01-PHC-S	N08	SEDIMENT	DRY	7.90	1.35	41	36	901.36	823.36	78.00	745.36	1.01	1.01	17.40	8.00	14.00	0.00	0.00	0.00	0.00	38	3.73	5.89				
1999	Northstar	99-N09-01-PHC-S	N09	SEDIMENT	DRY	36.00	1.35	30	36	368.40	332.40	27.32	294.62	0.93	4.4	59.40	3.20	6.00	10.4	4.1	2.33	18.42	36	3.66	5.30				
1999	Northstar	99-N10-01-PHC-S	N10	SEDIMENT	DRY	69.00	9.0	29	34	724.53	655.53	58.87	573.46	1.03	1.51	98.80	5.60	11.00	2.0	7.5	3.82	20.40	36	2.99					
1999	Northstar	99-N11-01-PHC-S	N11	SEDIMENT	DRY	2.80	1.47	47	47	16.67	13.87	1.50	11.82	1.27	0.9	2.10	2.26	2.60	0.01	1.5	0.9	20.00	41	3.78	2.07				
1999	Northstar	99-N12-01-PHC-S	N12	SEDIMENT	DRY	14.00	1.04	37	39	150.89	136.89	12.66	124.23	1.00	3.0	20.80	1.30	2.60	0.04	1.5	8.6	17.49	49	3.69		5.52	95	0.0	
1999	Northstar	99-N13-01-PHC-S	N13	SEDIMENT	DRY	16.00	9.8	38	57	162.34	146.34	11.14	131.15	0.85	5.1	14.60	1.80	3.50	0.4	1.8	1.29	14.42	34	3.02	16.17	34	366	0.0	
1999	Northstar	99-N14-01-PHC-S	N14	SEDIMENT	DRY	4.80	9.8	37	52	46.80	42.00	3.28	37.51	0.87	2.7	1.80	6.3	6.3	0.01	0.05	3.3	15.39	36.6	2.56	6.46	13	240	0.0	
1999	Northstar	99-N15-01-PHC-S	N15	SEDIMENT	DRY	3.4	1.33	49	45	6.82	5.33	6.48	0.86	4.5	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.6	1.6				
1999	Liberty	99-L01-01-PHC-S	L01	SEDIMENT	DRY	30.00	2.45	29	29	357.72	325.72	36.01	290.95	0.89	4.5	2.10	2.70	5.00	0.9	3.2	1.79	18.43	35.6	5.27	32.89	40	271	0.5	
1999	Liberty	99-L02-01-PHC-S	L02	SEDIMENT	DRY	53.00	8.4	24	29	490.62	437.62	43.09	378.39	1.14	7.8	86.30	3.40	7.50	14	5.1	2.29	22.44	37.3	5.31					
1999	Liberty	99-L03-01-PHC-S	L03	SEDIMENT	DRY	77.00	1.07	25	29	857.28	780.28	64.20	693.99	1.06	9.3	93.30	8.20	16.00	2.6	8.9	6.00	15.38	34.2	5.93					
1999	Liberty	99-L04-01-PHC-S	L04	SEDIMENT	DRY	34.00	1.12	29	33	396.19	362.19	28.03	324.22	0.86	4.5	50.00	3.10	5.70	0.9	3.6	2.38	15.47	35.4	3.15					
1999	Liberty	99-L05-01-PHC-S	L05	SEDIMENT	DRY	21.00	8.7	29	32	132.34	111.34	11.45	95.48	1.20	4.8	31.60	1.75	1.75	0.3	1.6	1.10	14.37	34.7	6.35					
1999	Liberty	99-L06-01-PHC-S	L06	SEDIMENT	DRY	54.00	8.3	23	26	449.72	395.72	37.97	343.05	1.11	9.3	69.00	3.60	8.60	1.4	5.1	2.43	21.40	34.3	6.14	44.70	60	224	0.6	
1999	Liberty	99-L07-01-PHC-S	L07	SEDIMENT	DRY	39.00	1.06	25	29	448.97	409.97	31.72	367.13	0.86	5.2	54.00	3.50	6.90	1.1	3.9	2.51	15.45	35.5	5.56					
1999	Liberty	99-L08-01-PHC-S	L08	SEDIMENT	DRY	17.00	2.02	39	44	300.73	283.73	19.35	253.98	0.76	4.4	68.50	4.50	17.00	3.8	9.1	1.71	15.69	46.2	2.92					
1999	Liberty	99-L09-01-PHC-S	L09	SEDIMENT	DRY	29.00	8.7	27	30	264.97	235.97	23.91	203.33	1.18	5.0	35.80	2.50	4.70	0.8	2.7	1.63	17.41	39.1	6.67	32.76	59	283	0.4	
1999	Liberty	99-L10-01-PHC-S	L10	SEDIMENT	DRY	36.00	7.5	26	29	338.01	302.01	27.85	263.14	1.06	6.3	59.80	2.50	5.20	0.9	3.7	1.60	23.47	35.2	2.97					
1999	Liberty	99-L11-03-PHC-S	L11	SEDIMENT	DRY	26.67	8.4	25	31	233.23	206.56	19.24	179.93	1.07	5.4	30.77	1.77	2.60	0.6	2.4	1.17	20.43	36.1	5.85					
1999	Liberty	99-L12-01-PHC-S	L12	SEDIMENT	DRY	30.00	9.8	23	31	300.00	270.33	23.00	247.33	1.08	5.3	30.00	2.30	3.00	0.6	2.6	1.18	18.38	34.6	3.05					
1999	BSPM	99-3A-01-PHC-S	3A	SEDIMENT	DRY	50.00	8.5	25	30	475.99	425.99	42.43	367.53	1.15	1.02	90.50	3.80	7.60	1.5	5.3	2.61	20.45	35.3	3.03	49.21	70	273	0.4	
1999	BSPM	99-3B-01-PHC-S	3B	SEDIMENT	DRY	52.00	8.1	25	32	473.16	421.16	42.64	362.41	1.18	9.0	84.00	3.70	7.90	1.4	5.0	2.48	20.50	36.9	3.20					
1999	BSPM	99-4A-01-PHC-S	4A	SEDIMENT	DRY	16.00	11.0	28	31	410.86	394.86	33.47	348.03	0.96	5.4	32.60	2.60	5.30	1.0	3.9	1.91	20.41	41.6	4.83					
1999	BSPM	99-4B-01-PHC-S	4B	SEDIMENT	DRY	8.70	10.6	33	38	102.08	82.08	8.70	14.20	0.90	1.0	14.20	0.90	0.00	0.00	0.00	0.00	0.00	1.6	1.6	1.6	8.96	7.8	306	0.4
1999	BSPM	99-4C-01-PHC-S	4C	SEDIMENT	DRY	1.80	10.4	39	55	20.68	18.88	1.26	17.07	1.04	1.0	1.80	4.0	4.0	0.0	0.1	1.4	0.80	0.00	5.53	4.38				
1999	BSPM	99-5(0)-01-PHC-S	5(0)	SEDIMENT	DRY	64.00	9.4	47	46	443.17	379.17	24.10	346.42	1.08	5.8	39.10	3.60	6.40	1.1	4.0	2.74	15.49	40.4	2.69					
1999	BSPM	99-5(1) average	5(1)	SEDIMENT	DRY	2.03	1.26	51	47	26.73	24.68	2.67	0.73	0.9	2.0	5.2	0.00	0.02	0.3	0.5	0.56	10.13	21.9	1.51					
1999	BSPM	99-5(10)	5(10)	SEDIMENT	DRY	63.00	9.85	45	50	708.95	646.95	51.00	578.34	1.12	1.30	88.00	6.80	12.00	2.1	8.3	4.67	18.46	38.2	5.60					
1999	BSPM	99-5(5)-01-PHC-S	5(5)	SEDIMENT	DRY	17.00	11.4	35	42	165.54	148.54	12.60	131.59	0.96	3.0	21.80	1.40	1.40	0.16	0.90	1.8	4.3	4.00	5.64	20.77	17	235	0.2	
1999	BSPM	99-5B-01-PHC-S	5B	SEDIMENT	DRY	1.00	6.49	45	71	24.08	23.08	2.99	19.05	1.57	0.5	1.70	2.5	2.5	0.0	0.1	1.1	11.00	0.00	3.57	1.85				
1999	BSPM	99-5D-01-PHC-S	5D	SEDIMENT	DRY	430.00	1.40	30	29	2747.40	2317.40	215.10	2102.90	1.05	6.00	57.70	30.00	50.00	6.8	2.24	13.11	36.37	5.93	3.72					
1999	BSPM	99-5E-01-PHC-S	5E	SEDIMENT	DRY	12.00	1.08	39	50	174.54	162.54	14.59	143.14	1.02	4.5	18.30	4.40	11.00	0.5	1.7	3.16	0.5	3.8	3.64	1.24	25.50	73	331	0.7
1999	BSPM	99-5F-01-PHC-S	5F	SEDIMENT	DRY	17.00	1.01	42	41	178.58	161.58	12.51	145.51	0.86	2.4	12.50	1.90	1.90	0.4	1.6	1.22	13.49	3.33	2.54	5.57	4.5			
1999	BSPM	99-5H-01-PHC-S	5H	SEDIMENT	DRY	23.00	1.08	27	33	266.40	243.40	20.26	215.84	0.94	4.9	31.10	2.30	3.10	0.8	2.6	1.69	15.47	40.3	3.47					
1999	Rivers	99-COL-01-PHC-S	COL-S	SEDIMENT	DRY	18.00	1.14	28	21	263.83	241.83	21.00	215.93	0.90	9.6	76.70	2.10	3.00	0.9	4.6	1.45	14.51	30.9	3.47					
1999	Rivers	99-COL-02-PHC-S	COL-S	SEDIMENT	DRY	230.00	1.27	30	25	2222.00	1992.00	200.90	1733.30	1.16	2.44	14.00	4.00	4.00	4.1	1.66	15.06	11.44	36.8	4.42	344.79	24	132	0.0	
1999	Rivers	99-KUP-01-PHC-S	KUP-S	SEDIMENT	DRY	27.00	7.9	37	50	102.05	75.05	12.46	60.24	2.07	4.72	8.50	10.80	0.4	3.5	5.63	0.6	4.0	1.73	3.78	72.44	0.7	250	0.0	
1999	Rivers	99-SAG-01-PHC-S	SAG-S	SEDIMENT	DRY	33.00	8.3	56	71	317.49	284.49	20.75	257.14	0.81	1.70	2.30	5.80	0.7	3.3	1.58	21.52	39.5	5.80	25.39	19	349	0.3		
2000	Northstar	00-5A-01-PHC-S	5A	SEDIMENT	DRY	17.00	1.35	37	35	1778.20	1638.20	135.00	1461.20	1.00	1.00	12.00	6.00	6.00	0.6	1.42	1.35	17.36	37.2	5.93					
2000	Northstar	00-N01-01-PHC-S	N01	SEDIMENT	DRY	6.00	1.02	30	38	80.44	74.44	6.39																	

2002	Northstar	02-N06-01-PHC-S	N06	SEDIMENT	DRY	43.00	1.14	.38	.38	514.82	471.82	42.35	415.59	.102	7.3	62.09	3.80	8.10	.13	.49	2.51	19	.45	.395	4.26	50.37	.45	289	.00
2002	Northstar	02-N07-01-PHC-S	N07	SEDIMENT	DRY	27.00	.86	.33	.42	277.81	250.81	28.29	217.36	.116	7.4	32.61	2.90	6.20	.08	.62	1.71	19	.41	.367	2.58	25.55	.41	249	.00
2002	Northstar	02-N08-01-PHC-S	N08	SEDIMENT	DRY	51.00	.87	.39	.40	495.27	447.27	41.72	417.55	.117	8.4	75.16	5.62	11.00	.10	.69	3.72	19	.45	.395	4.26	50.37	.45	289	.00
2002	Northstar	02-N09-01-PHC-S	N09	SEDIMENT	DRY	32.00	.91	.34	.38	313.68	281.68	28.03	243.87	.115	7.8	60.21	3.30	6.00	.10	.36	2.07	17	.45	.386	3.20	31.53	.56	263	.00
2002	Northstar	02-N10-01-PHC-S	N10	SEDIMENT	DRY	59.00	.92	.34	.38	529.49	470.49	46.39	408.34	.114	8.4	67.84	6.10	11.00	.17	.65	3.82	17	.41	.373	2.68	55.39	.38	239	.00
2002	Northstar	02-N11-01-PHC-S	N11	SEDIMENT	DRY	110.00	.87	.33	.34	377.10	227.10	24.70	195.00	.127	.45	47.13	4.00	6.60	.07	.26	2.66	10	.46	.414	6.86	32.04	.29	454	.00
2002	Northstar	02-N12-01-PHC-S	N12	SEDIMENT	DRY	87.00	.39	.46	.40	515.87	455.86	42.92	408.10	.100	80.51	7.90	15.00	1.00	.63	4.94	13	.52	.633	51.30	11.42	.33	294	.00	
2002	Northstar	02-N13-01-PHC-S	N13	SEDIMENT	DRY	110.00	.94	.37	.38	830.97	720.97	73.40	625.68	.117	1.81	90.99	14.00	22.00	.21	1.16	10.26	11	.42	.322	3.01	112.12	.25	235	.00
2002	Northstar	02-N14-01-PHC-S	N14	SEDIMENT	DRY	110.00	.07	.37	.40	849.95	739.95	73.50	643.29	.114	1.43	81.15	14.00	22.00	.22	1.18	9.82	12	.44	.364	2.64	105.16	.26	246	.00
2002	Northstar	02-N15-01-PHC-S	N15	SEDIMENT	DRY	20.00	1.21	.35	.36	199.33	179.33	17.20	156.62	.110	19	4.30	2.40	3.70	.05	.21	1.67	13	.45	.432	2.74	22.18	.32	193	.00
2002	Northstar	02-N16-01-PHC-S	N16	SEDIMENT	DRY	78.00	1.11	.37	.38	895.56	805.56	80.66	714.90	.111	1.44	89.44	8.90	89.44	.09	.60	4.22	19	.47	.408	88.00	2.72	.39	331	.00
2002	Northstar	02-N17-01-PHC-S	N17	SEDIMENT	DRY	76.00	.88	.33	.38	620.92	544.92	56.48	469.06	.121	.85	82.90	6.40	11.00	.17	.69	3.87	18	.45	.395	4.58	70.44	.47	279	.00
2002	Northstar	02-N18-01-PHC-S	N18	SEDIMENT	DRY	41.00	1.04	.36	.43	413.51	372.51	34.70	327.52	.104	.98	51.47	4.00	7.60	.10	.38	2.45	16	.44	.402	5.17	51.24	.27	286	.00
2002	Northstar	02-N19-01-PHC-S	N19	SEDIMENT	DRY	42.00	1.15	.36	.37	513.50	471.50	38.30	419.67	.115	50.54	5.30	10.00	5.70	.14	.25	2.17	16	.40	.423	3.76	32.63	.27	286	.00
2002	Northstar	02-N20-01-PHC-S	N20	SEDIMENT	DRY	6.60	1.00	.46	.46	64.62	34.62	3.62	24.63	.114	.09	3.82	1.30	3.20	.02	.09	.71	13	.52	.401	3.59	8.71	.29	208	.00
2002	Northstar	02-N21-01-PHC-S	N21	SEDIMENT	DRY	71.00	1.03	.40	.41	646.52	575.52	49.45	509.50	.097	1.03	86.74	8.20	14.00	.17	.74	5.28	14	.42	.375	5.89	64.45	.26	328	.00
2002	Northstar	02-N23-01-PHC-S	N23	SEDIMENT	DRY	56.00	.88	.32	.38	419.67	363.67	37.92	311.74	.122	.91	89.34	5.10	9.60	.14	.48	2.98	16	.50	.402	5.35	50.90	.49	267	.00
2002	Liberty	02-L01-01-PHC-S	L01	SEDIMENT	DRY	15.00	.88	.35	.36	150.72	133.72	13.24	116.22	.114	.59	10.71	1.60	2.90	.02	.50	1.00	19	.46	.442	2.75	15.17	.39	331	.00
2002	Liberty	02-L04-01-PHC-S	L04	SEDIMENT	DRY	46.00	.92	.39	.43	404.88	358.88	35.88	324.40	.104	.71	52.56	4.40	7.10	.09	.41	3.09	13	.46	.350	2.57	34.50	.34	303	.00
2002	Liberty	02-L06-01-PHC-S	L06	SEDIMENT	DRY	41.00	.86	.33	.36	419.25	378.25	36.78	329.49	.112	1.17	58.41	3.40	6.50	.09	.36	2.13	17	.49	.396	4.31	32.32	.49	313	.04
2002	Liberty	02-L07-01-PHC-S	L07	SEDIMENT	DRY	37.00	.85	.31	.36	340.67	303.67	27.92	266.16	.105	.88	48.77	3.00	5.90	.08	.35	1.98	18	.45	.452	2.35	28.34	.44	314	.04
2002	Liberty	02-L08-02-PHC-S	L08	SEDIMENT	DRY	32.00	1.21	.34	.39	337.34	305.34	23.04	271.11	.092	.67	48.50	3.30	10.00	.14	.41	1.89	22	.59	.466	2.27	51.78	.58	373	.66
2002	Liberty	02-L09-01-PHC-S	L09	SEDIMENT	DRY	8.40	.76	.30	.39	84.48	76.08	8.04	65.48	.123	.18	9.74	1.50	3.40	.03	.22	8.4	26	.47	.419	2.62	11.25	.31	324	.05
2002	BSMP	02-3A-01-PHC-S	3A	SEDIMENT	DRY	38.00	.92	.29	.37	371.83	333.83	33.68	288.10	.117	.86	75.41	3.80	7.10	.11	.40	2.47	16	.48	.346	2.63	34.68	.73	324	.03
2002	BSMP	02-3B-01-PHC-S	3B	SEDIMENT	DRY	40.00	.89	.30	.34	390.89	350.89	35.18	302.71	.116	.74	84.51	4.10	8.00	.11	.41	2.61	16	.50	.385	2.87	36.88	.76	297	.05
2002	BSMP	02-4A-01-PHC-S	4A	SEDIMENT	DRY	26.00	.01	.29	.32	496.67	470.67	45.01	405.63	.115	.54	89.98	4.50	7.80	.18	.71	2.84	25	.39	.467	3.13	28.51	.78	269	.00
2002	BSMP	02-4B-01-PHC-S	4B	SEDIMENT	DRY	8.80	.70	.36	.42	82.64	73.84	7.52	63.61	.118	.77	10.48	1.20	1.80	.03	.14	.69	20	.46	1.000	2.22	7.64	.45	275	.00
2002	BSMP	02-4C-01-PHC-S	4C	SEDIMENT	DRY	1.10	.68	.34	.64	12.07	10.97	1.25	9.30	.135	.30	.78	.44	.44	.00	.18	.26	.67	3.607	1.65	1.52	.94	.397	.00	
2002	BSMP	02-50-01-PHC-S	5(0)	SEDIMENT	DRY	22.00	.71	.37	.45	168.43	146.43	14.31	127.32	.112	.62	18.46	2.60	4.00	.06	.26	1.66	16	.41	.689	2.50	15.10	.34	227	.00
2002	BSMP	02-5(1)-01-PHC-S	5(1)	SEDIMENT	DRY	11.00	.79	.33	.37	110.93	99.93	9.93	86.70	.113	.58	21.09	1.30	2.10	.04	.15	.76	19	.45	.412	2.60	11.94	.38	258	.00
2002	BSMP	02-5(5)-01-PHC-S	5(5)	SEDIMENT	DRY	35.00	.81	.34	.45	304.34	269.34	27.06	233.03	.116	.58	40.83	3.10	5.30	.09	.37	2.02	18	.43	.374	2.60	29.79	.39	234	.00
2002	BSMP	02-5B-01-PHC-S	5B	SEDIMENT	DRY	5.00	1.08	.35	.36	67.96	62.96	6.49	54.25	.120	.41	4.30	.88	3.30	.02	.09	.44	20	.42	.383	2.60	6.36	.72	328	.00
2002	BSMP	02-5D-01-PHC-S	5D	SEDIMENT	DRY	31.00	.91	.36	.37	314.63	282.63	28.66	244.06	.117	.68	61.17	4.08	6.17	.08	.38	2.32	17	.46	.442	2.75	17.88	.39	331	.00
2002	BSMP	02-5E-01-PHC-S	5E	SEDIMENT	DRY	3.40	.99	.36	.44	46.14	42.74	4.90	36.29	.135	.08	3.72	.85	3.80	.02	.06	.45	13	.46	.438	1.58	5.14	.74	308	.00
2002	BSMP	02-5F-01-PHC-S	5F	SEDIMENT	DRY	48.00	.92	.40	.39	369.15	321.15	32.08	278.79	.115	1.26	70.95	5.00	8.30	.10	.45	3.42	13	.44	.433	2.66	49.12	.25	476	.00
2002	BSMP	02-5H-01-PHC-S	5H	SEDIMENT	DRY	17.00	.75	.36	.46	157.97	140.97	14.17	121.79	.116	.91	22.51	3.00	3.50	.05	.22	1.18	19	.48	.547	2.68	16.49	.33	246	.05
2002	Rivers	02-CAN-02-PHC-CAN-S	CAN-S	SEDIMENT	DRY	49.00	1.10	.23	.49	491.73	429.69	41.00	472.73	.118	1.83	6.20	9.10	16.00	.62	.49	9.72	40	.40	.342	6.92	23.31	.85	468	.08
2002	Rivers	02-CAN-02-PHC-CAN-S	CAN-S	SEDIMENT	DRY	4.50	.90	.18	.24	195.16	190.66	14.75	169.85	.087	.80	16.00	19.00	.09	.55	13.46	.04	.41	.464	9.38	18.50	.52	234	.23	
2002	Rivers	02-CAN-03-PHC-CAN-S	CAN-S	WATER/SED	WET	.00	.150	.154	.36	223.90	223.90	14.10	195.70	.077	.00	1900.00	2900.00	.80	6.84	.00	.00	.00	.00	.00	15.04	.00	.00	.00	.00
2002	Rivers	02-COL-01-PHC-S	COL-S	SEDIMENT	DRY	63.00	1.14	.36	.28	695.47	633.47	63.40	552.67	.115	.54	52.67	7.20	11.00	.15	.75	5.20	14	.50	.208	3.98	73.11	.38	316	.00
2002	Rivers	02-KUP-01-PHC-S	KUP-S	SEDIMENT	DRY	25.00	.64	.38	.27	89.35	64.35	11.78	50.26	.234	.12	7.40	12.00	.05	.35	1.57	.08	.46	.732	6.21	88.98	.19	477	.00	
2002	Rivers	02-KUP-02-PHC-S	KUP-S	SEDIMENT	DRY	49.00	.79	.35	.29	161.15	112.15	10.90	89.58	.112	.15	15.00	22.00	.05	.15	9.17	.11	.47	.287	2.33	144.05	.11	295	.00	
2002	Rivers	02-SAG-01-PHC-S	SAG-S	SEDIMENT	DRY	100.00	.78	.57	.55	669.18	569.18	55.26	498.19	.111	.11	9.50	18.00	.19	1.00	5.95	17	.33	.286	4.41	64.75	.13	292	.00	
2002	Northstar	99-N11-01-PHC-T	N11-T	TISSUE	WET	14.00	.25	.16	.25	14.75	14.75	1.75	13.00	.116	.15	1.16	1.16	.15	.18	1.35	14	.00	.117	1.27	26.41	4.57	.00	.00	
2002	Northstar	99-N12-01-PHC-T	N12-T	TISSUE	WET	27	1.09	.49	.43	15.15	14.88	1.38	12.88	.107	.206	2.03	1.16	1.15	.11	.49	.23	.00	.117	1.27	26.41	4.57	.00	.00	
2002	Liberty	99-L04-01-PHC-L04-T	L04-T	TISSUE	WET	.48	.49	.50	.00	80.40	79.90	0.69	75.79	.299	.00	1.74	2.19	.39	.60	1.19	.00	.045	1.37	20.99	7.36	6.897	.48	.00	.00
1999	Liberty	99-L08-01-PHC-L08-T	L08-T	TISSUE	WET	.87	.66	.48	.00	15.00	14.13	.85	12.43	.078	.00	1.11	1.11	.01	.03	.62	.05	.00	.346	1.20	69.15	8.48	.00	.00	
1999	Liberty	99-L09-01-PHC-L09-T	L09-T	TISSUE	WET	1.00	.63	.00	.00	19.50	18.86	0.64	19.50	.135	.00	1.95	1.95	.											

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Field ID	00-N06-01-PHC-S	00-N18-01-PHC-S	00-N23-01-PHC-S	00-COL-02-PHC-S	00-KUP-01-PHC-S	00-KUP-02-PHC-S	00-N00-01-PHC-S	00-N13-02-PHC-S	00-N13-01-PHC-S	00-N19-01-PHC-S	00-N10-01-PHC-S	00-N03-01-PHC-S	00-N07-01-PHC-S	00-N16-01-PHC-S	00-N02-01-PHC-S	00-N01-01-PHC-S	00-N17-01-PHC-S	00-SD-01-PHC-S
Lab ID	20A3468 F2	20A3469 F2	20A3473 F2	20A3474 F2	20A3475 F2	20A3476 F2	20A3482 F2	20A3484 F2	20A3485 F2	20A3486 F2	20A3488 F2	20A3489 F2	20A3490 F2	20A3491 F2	20A3492 F2	20A3493 F2	20A3494 F2	20A3496 F2
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	PEAT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	19.44 g	16.79 g	17.05 g	21.16 g	23.02 g	20.9 g	21.1 g	13.88 g	16.49 g	16.82 g	19.31 g	16.02 g	16.37 g	18.17 g	19.09 g	23.3 g	17.86 g	16.86 g
Weight Basis	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Associated Blank	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA	DH-S-5SPB PCA
Field Date	08/17/00	08/17/00	08/23/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00	08/24/00
Extract Date	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01
Analysis Date	03/06/01	03/06/01	03/06/01	03/06/01	03/14/01	03/06/01	03/14/01	03/06/01	03/06/01	03/06/01	03/06/01	03/06/01	03/06/01	03/06/01	03/06/01	03/06/01	03/07/01	03/07/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	55.6	56.5	75.6	68.8	66.2	66.2	66.1	51.4	53.7	61	62	51.4	54.2	59.6	62.4	54.2	57.3	54.2
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.64	0.74	0.73	0.59	0.54	0.6	0.59	0.79	0.76	0.67	0.65	0.76	0.69	0.65	0.54	0.67	0.75	0.75
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>Polynuclear Aromatic Hydrocarbons</b>																		
Naphthalene	12	20	9	81	0.46 JB	2 B	11	28	22	14	11	12	11	12	7.4	2.1 B	12	12
C1-Naphthalenes	25	44	17	100	0.31 JB	2.4 B	20	54	46	30	22	22	21	25	16	4.9 B	23	23
C2-Naphthalenes	42	74	35	183	0.36 JB	4.2 B	43	100	81	51	48	44	40	45	30	6.8 B	47	44
C3-Naphthalenes	39	70	39	200	0.26 JB	3.2 B	46	77	49	42	42	49	42	42	29	4.6	47	46
C4-Naphthalenes	20	38	21	100	ND	2.2	34	48	41	26	23	26	21	22	15	2.9	25	25
Acenaphthylene	ND	ND	ND	ND	0.025 JB	0.042 JB	1 ND	ND	ND	ND	ND	ND	ND	ND	ND	0.026 JB	ND	ND
Acenaphthene	0.88	1.5	1.2	1.9	0.034 JB	0.16 JB	1.4	2.3	1.8	1.1	1.1	1.1	1.1	1.3	0.72	0.15 JB	1.3	1.3
Biphenyl	5.5	9.3	6.2	14	0.16 J	0.82	6.3	13	10	7	5.9	6.1	6.6	7.1	4.4	0.98	6.7	6.2
Fluorene	4.9	8.8	5.6	8.7	0.093 JB	0.44 J	6.6	12	10	6.5	5.2	6.7	6.6	6	3.7	0.83	6.8	6
C1-Fluorenes	8.9	18	9.8	16	0.13 JB	0.81	13	23	19	12	10	14	8.8	1.5	1.2	1.5	12	9.1
C2-Fluorenes	12	24	12	26	0.15 JB	2.4	17	30	24	16	14	17	12	13	8.1	2.1	17	12
C3-Fluorenes	ND	ND	ND	30	0.2 J	1.4	17	31	26	16	13	17	12	13	8.3	1.8	16	13
Anthracene	3	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	21	37	24	82	0.66 B	3.9	27	53	42	26	23	26	25	26	17	3.6	28	27
C1-Phenanthrenes/anthracenes	33	59	33	120	0.53 JB	5.1	46	84	66	42	36	43	38	41	26	5.5	44	43
C2-Phenanthrenes/anthracenes	54	38	110	54	0.54 B	4.9	38	60	38	34	41	41	35	37	24	5.4	41	41
C3-Phenanthrenes/anthracenes	48	26	21	48	0.35 JB	2.5	27	48	35	22	22	25	22	23	15	3.2	24	26
C4-Phenanthrenes/anthracenes	37	18	180	30	0.44 J	5.6	23	35	42	24	22	19	21	13	3.2	2.3	23	26
Dibenzothiophene	3.3	5.6	3.6	6.8	0.12 JB	0.54 J	4.3	7.9	6.1	4	3.7	4.2	3.7	4	2.8	0.58	4.4	3.7
C1-Dibenzothiophenes	15	10	21	10	0.17 JB	1.2	12	21	17	12	10	12	10	12	8.1	1.1	10	12
C2-Dibenzothiophenes	9.4	15	8.8	22	0.25 JB	1.9	11	24	19	11	11	12	9.8	10	7.4	1.6	12	14
C3-Dibenzothiophenes	7.9	11	6.5	16	0.22 JB	1.3	8.4	17	14	8.1	7.8	8.1	7.6	8	5.2	1.2	8.1	10
Fluoranthene	4	8.1	4.8	31	0.18 JB	1.4	6.4	13	9.3	5.8	4.8	5.5	5.2	5.5	3.5	0.77	5.9	6.4
Pyrene	6.1	11	7.5	28	0.19 JB	1.8	9	16	7.5	7.6	7.3	8.2	7.6	8	5.2	1	8.3	7.7
C1-Fluoranthenes/pyrenes	30	17	21	72	0.23 JB	3	21	46	34	20	19	20	18	20	12	2.7	21	20
C2-Fluoranthenes/pyrenes	15	29	17	52	0.22 J	2.5	21	40	32	19	18	20	18	11	20	2.6	20	18
C3-Fluoranthenes/pyrenes	9.1	16	11	28	ND	1.3	13	24	20	12	10	14	11	13	7.3	1.8	12	12
Chrysene	1.5	3	1.9	15	0.5 J	2.3	6	4	1.8	2	2.2	2.2	2.2	1.1	0.26 J	2.6	2.6	2.6
C1-Chyrenes	9.2	17	12	33	0.42 J	2.4	14	23	18	12	14	12	9.3	7.8	1.7	1.7	13	11
C2-Chyrenes	9.6	17	13	37	0.25 J	2.5	14	25	22	13	12	13	13	15	1.6	1.5	17	17
C3-Chyrenes	7.8	15	12	31	0.22 J	2.4	14	21	17	11	13	10	12	13	7.2	1.8	12	13
C4-Chyrenes	14	9.6	7.4	28	ND	2.2	10	19	11	8.7	7.7	11	9.8	11	5.5	1.4	10	10
C5-Chyrenes	3.6	6.7	5.1	12	ND	1.1	6.2	11	7.4	4.5	4	4.9	4.4	5.1	3	0.77	5.1	5.1
Benzo[fluoranthene]	8	11	7.4	32	0.19 J	2.8	17	13	8.1	7.9	8.4	8.1	7.3	8.4	5	1	8.4	8.2
Benzo[fluoranthene]	0.86	0.92	0.83	4	0.034 J	1.4	1.6	1.6	1.4	0.73	0.68	0.68 J	0.86	0.99	0.49 J	0.11 J	0.86	0.89
Benzo[pyrene]	6.7	12	9.9	19	0.17 J	2	11	17	13	9.1	8.1	10	9.3	10	10	1.3	10	8.6
Benzo[pyrene]	1.2	1.9	3.5	2	0.13 J	0.62	2.3	6	4.3	2.3	2.2	2.3	2.1	2.3	1.4	0.29 J	2.4	2.6
Perylene	40	78	66	200 D	0.74	28	81	120	99	56	63	60	58	67	36	6	64	81
Indeno[1,2,3-c,d]pyrene	3	1.7	1.2	8.8	0.051 J	0.95	1.6	3.9	3.7	2.2	1.8	2.1	1.8	1.8	1.1	0.29 J	2	2.2
Dibenz[a,h]anthracene	0.56 J	0.97	1	2.1	0.022 J	1.3	0.77	1.6	1.3	0.94	0.73	1	0.87	1.1	0.55 J	0.11 J	0.96	0.9
Benzo[g,h,i]perylene	4.4	8.1	7.1	1.8	0.11 J	6.2	4.2	9.2	6.2	5.2	7.3	6.8	6.7	6.8	4.2	0.86	7.2	5.7
dB-Naphthalene	53	46	41	39	56	47	83	37	51	48	45	72	47	49	56	58	37	42
d10-Acenaphthene	76	64	77	77	62	77	61	75	73	66	80	59	79	75	81	67	68	80
d10-Phenanthrene	102	100	105	107	91	99	107	107	108	102	113	100	105	103	110	93	105	107
d12-Benzo[pyrene]	103	106	105	112	111	98	99	112	114	107	119	104	106	104	113	105	111	110

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00-SH-01-PHC-S 20A3487 F2 N SEDIMENT 22.17 g DRY	00-4C-01-PHC-S 20A3499 F2 N SEDIMENT 17.71 g DRY	00-CL-01-PHC-S 20A3500 F2 N SEDIMENT 24.52 g DRY	00-SAG-01-PHC-S 20A3501 F2 N SEDIMENT 22.34 g DRY	00-N14-01-PHC-S 20A3502 F2 N SEDIMENT 14.97 g DRY	00-N13-03-PHC-S 20A3503 F2 N SEDIMENT 17.22 g DRY	00-N12-01-PHC-S 20A3504 F2 N SEDIMENT 15.4 g DRY	00-SF-01-PHC-S 20A3505 F2 N SEDIMENT 20.98 g DRY	00-N15-01-PHC-S 20A3506 F2 N SEDIMENT 25.19 g DRY	00-N21-01-PHC-S 20A3510 F2 N SEDIMENT 14.71 g DRY	00-L09-01-PHC-S 20A3511 F2 N SEDIMENT 23.3 g DRY	00-L07-01-PHC-S 20A3514 F2 N SEDIMENT 21.18 g DRY	00-L08-01-PHC-S 20A3515 F2 N SEDIMENT 22.2 g DRY	00-L01-01-PHC-S 20A3516 F2 N SEDIMENT 15.69 g DRY	00-4A-01-PHC-S 20A3519 F2 N SEDIMENT 21.09 g DRY	00-4B-01-PHC-S 20A3520 F2 N SEDIMENT 19.42 g DRY	00-5(1)-01-PHC-S 20A3521 F2 N SEDIMENT 20.05 g DRY	00-5(2)-01-PHC-S 20A3521 F2 N SEDIMENT 20.44 g DRY
DH-S-58PB PCA 08/22/00 02/20/01 03/14/01 08/30/00 69.1 NA 0.56 ug/Kg	DH-S-58PB PCA 08/21/00 03/07/01 03/15/01 08/30/00 57.4 NA 0.51 ug/Kg	DH-S-58PB PCA F2 08/24/00 03/07/01 03/15/01 08/30/00 57.2 NA 0.56 ug/Kg	DH-S-58PB PCA F2 08/25/00 03/07/01 03/15/01 08/30/00 49.4 NA 0.84 ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/15/01 08/30/00 50.3 NA 0.81 ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/15/01 08/30/00 62.2 NA 0.6 ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/15/01 08/30/00 82 NA 0.5 ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/15/01 08/30/00 20.98 NA 0.53 ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/15/01 08/30/00 25.19 NA 0.59 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 14.71 NA 0.5 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 23.3 NA 0.56 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 21.18 NA 0.56 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 22.2 NA 0.59 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 15.69 NA 0.64 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 21.09 NA 0.64 ug/Kg	DH-S-58PB PCA F2 08/21/00 03/07/01 03/15/01 08/30/00 19.42 NA 0.62 ug/Kg	DH-S-58PB PCA F2 08/22/00 03/07/01 03/15/01 08/30/00 20.05 NA 0.61 ug/Kg	DH-S-58PB PCA F2 08/22/00 03/07/01 03/15/01 08/30/00 20.44 NA 0.61 ug/Kg
3.4	6.5	2.4	2.5	21	21	37	7.9	0.85 B	40	1.6 B	3.1	5.3	9.2	12	6.7	11	9.4
6.1	14	5	5.5	49	48	71	19	1.8	89	4.1	7	10	21	30	16	24	21
12	27	8.9	12	87	82	140	33	2.7 B	160	7.6	14	22	43	52	30	43	37
11	26	6.3	32	80	74	130	32	1.8 B	110	6	16	24	42	44	30	42	35
8.7	12	5.1	8.6	48	47	82	20	1.2	84	4.5	9.1	14	27	25	19	23	22
ND	ND	0.066 J	0.066 J	ND	ND	ND	ND	0.051 J	3.9	0.063 J	0.063 J	0.094 J	ND	ND	0.076 J	ND	0.065 J
0.37 J	0.67 J	0.17 JB	0.27 J	1.9	1.8	2.8	0.79	0.088 JB	3.3	0.21 JB	0.43 J	0.53 J	1.2	0.84	0.93	ND	0.82
2	3.1	1.1	2.2	11	10	15	4.6	0.31 J	11	1.2	2.4	4.8	3.3	6.7	12	4.8	5.4
2	3.1	0.7	1.5	9.4	8.5	14	3.6	0.29 JB	16	0.89	1.9	2.4	5.7	7.4	4.1	6.4	4.3
3.8	5.5	1.4	2.5	17	15	27	6.3	0.47 JB	17	1.5	3.4	4.3	10	13	7.2	9.7	8
4.9	6.6	2.3	5.1	23	20	36	8.6	0.59 B	25	2.2	5.2	6.2	13	15	9.2	12	9.8
5.2	7.7	2.8	6.7	29	26	39	9	0.56	35	3	6.2	6	13	14	9.2	12	10
ND	ND	0.14 JB	ND	1.4	1.8	0.52 J	1.2	0.13 JB	2.1	0.13 JB	0.26 J	0.42 J	0.95	0.63	0.52 J	0.53 J	0.48 J
8.3	13	6	9.8	45	40	64	18	1.3 B	72	4.3	8.8	10	26	33	18	22	20
14	19	9.8	18	71	63	100	19	0.9	110	7	17	17	44	53	30	35	30
13	21	9.8	20	69	60	93	19	0.9	100	7.5	17	30	43	46	28	32	27
8	13	5.1	14	46	41	62	15	1.4	70	4.7	11	11	27	26	18	18	21
6.5	8.7	3.6	7	20	17	25	8.8	0.6	30	2.1	4.8	14	12	9.4	10	8.2	8
1.3	1.9	0.76	1.6	6.7	5.8	2.6	0.21 J	11	11	0.6	1.2	1.8	4.2	4.8	2.8	3.4	3.4
2.9	3.8	2	5.5	22	20	28	10	0.48 J	31	1.3	2.7	3.4	15	15	11	12	11
3.8	6.2	3	0.71	9	22	21	1.8	0.45 J	29	2.1	4.5	5.3	12	12	8.2	8.9	8.3
3	5.2	2.4	7.3	15	13	20	7	0.51	22	1.6	3.3	3.7	7.8	7.8	5.9	7.2	6.2
1.6	3	3	2.5	11	9	16	4.1	0.32 JB	18	0.97	1.9	2.2	5.4	4.8	4.2	4.6	4.1
2.4	4.1	2.9	1.2	4.1	3.2	5.4	1.4	0.43 J	22	1.4	3	3.3	8.8	8.3	6.3	6.5	5.5
5.8	8.6	6.9	7.9	34	34	54	14	1	84	3.2	7.5	7.6	20	22	14	17	15
4.1	5.6	4.2	7.2	29	26	46	12	0.53	33	3	7	7.1	19	20	13	16	14
4.2	5.9	3	5	35	31	51	11	0.7	35	2.3	5.4	5.1	14	14	9.9	11	9.4
0.44 J	0.92	0.98	0.91	3.9	3.5	6.8	0.14 J	0.14 J	6.8	0.88	0.88	0.9	2.8	2.8	1.6	2.2	1.7
4.1	5.6	4.2	5.7	22	18	26	8	0.59	33	2.4	6.6	5.2	14	15	9.4	10	8.4
4.2	6	4.1	6.3	22	20	27	10	0.62	34	2.6	6.2	5.8	15	16	10	11	9.2
3.9	5.8	3.7	5.6	27	24	34	8.3	0.63	31	2.4	5.9	5.7	14	13	9.6	8.6	7.7
2.5	4.6	2.2	3.5	12	10	14	5.3	0.47 J	18	1.5	3.4	3.3	8.2	7.2	5.6	4.8	4.4
1.5	2.2	1.6	2.6	9.7	8.4	12	2.8	ND	16	1.2	2.5	5.3	5.7	5.7	3.6	3.9	3.4
2.2	3.4	3.3	4.3	16	14	23	5.6	0.38 J	25	1.3	2.5	3.2	8.2	8.9	6	7.1	6.2
0.28 J	0.34 J	0.38 J	0.034 J	2	1.7	2.8	0.56 J	0.034 J	3.5	0.12 J	0.24 J	0.24 J	0.8	0.81	0.53 J	0.79	0.57 J
2.9	4.2	2.6	4	16	12	20	5.6	0.41 J	23	1.7	3.3	3.9	11	12	7.2	7.7	6.5
0.98	0.9	1.1	1.1	4.6	4.6	7.6	1.6	0.58	8.3	0.27 J	0.65	0.82	2.3	1.8	1.4	1.9	1.6
18	27	45	2.6	97	150	45	20	ND	170	10	23	31	75	33	48	45	41
0.37 J	0.67 J	0.69	0.96	3.7	3	5.3	1.2	0.063 J	5.2	0.25 J	0.45 J	0.57	2	1.6	1.2	1.4	1.2
0.21 J	0.25 J	0.19 J	0.36 J	1.4	1.2	1.9	0.5 J	0.03 J	2.1	0.14 J	0.36 J	0.33 J	1.3	0.97	0.68 J	0.68 J	0.48 J
1.7	2.9	1.1	0.19 J	3	6	13	0.73	1.4	1.3	1.4	1.8	1.8	6	5.9	3.8	4.2	3.2
38	36	62	63	62	61	44	62	69	58	84	57	36	53	63	55	52	54
62	70	75	81	85	85	80	83	76	81	88	75	83	79	83	74	77	74
103	106	94	103	106	107	103	108	97	101	106	98	107	101	101	97	101	101
108	109	98	77	101	105	97	110	87	105	98	106	104	95	84	98	102	90



Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I  
Summer 1999 Final Data (Surrogate Corrected) - PAH Results - Sediment

00-5(10)-01-PHC-S 20A3525 F2 N SEDIMENT 22.09 g DRY	00-5(0)-01-PHC-S 20A3525 F2 N SEDIMENT 20.72 g DRY	00-N05-01-PHC-S 20A3527 F2 N SEDIMENT 16.74 g DRY	00-N08-01-PHC-S 20A3527 F2 N SEDIMENT 20.26 g DRY	00-N09-01-PHC-S 20A3528 F2 PCA N SEDIMENT 19.82 g DRY	00-5A-01-PHC-S 20A3529 F2 N SEDIMENT 12.41 g DRY	00-3A-01-PHC-S 20A3530 F2 N SEDIMENT 17.64 g DRY	00-L04-01-PHC-S 20A3531 F2 N SEDIMENT 18.59 g DRY	00-N11-01-PHC-S 20A3532 F2 N SEDIMENT 17.69 g DRY	00-N04-01-PHC-S 20A3533 F2 PCA N SEDIMENT 12.86 g DRY	00-3B-01-PHC-S 20A3534 F2 PCA N SEDIMENT 19.64 g DRY	00-5B-01-PHC-S 20A3535 F2 N SEDIMENT 23.04 g DRY	00-5E-01-PHC-S 20A3536 F2 PCA N SEDIMENT 22.39 g DRY	00-N20-01-PHC-S 20A3537 F2 N SEDIMENT 19.09 g DRY	00-L08-02-PHC-S 20A3538 F2 PCA N SEDIMENT 19.5 g DRY	00-L08-03-PHC-S 20A3539 F2 N SEDIMENT 22.72 g DRY	00-L06-01-PHC-S 20A3540 F2 N SEDIMENT 17.1 g DRY	
DH-S-58PB PCA F2 08/22/00 03/07/01 03/16/01 08/30/00 69.1 6.6 0.56 NA ug/Kg	DH-S-58PB PCA F2 08/22/00 03/07/01 03/16/01 08/30/00 69.1 6.6 0.56 NA ug/Kg	DH-S-58PB PCA F2 08/19/00 03/07/01 03/16/01 08/30/00 64.1 NA NA NA ug/Kg	DH-S-58PB PCA F2 08/19/00 03/08/01 03/16/01 08/30/00 67.3 NA NA NA ug/Kg	DH-S-61PB F2 08/19/00 03/08/01 03/24/01 08/30/00 40.9 NA NA NA ug/Kg	DH-S-61PB F2 08/19/00 03/08/01 03/24/01 08/30/00 58.6 NA NA NA ug/Kg	DH-S-61PB F2 08/20/00 03/08/01 03/24/01 08/30/00 61.2 NA NA NA ug/Kg	DH-S-61PB F2 08/19/00 03/08/01 03/24/01 08/30/00 58 NA NA NA ug/Kg	DH-S-61PB F2 08/19/00 03/08/01 03/24/01 08/30/00 41.7 NA NA NA ug/Kg	DH-S-61PB F2 NA 04/02/01 04/05/01 08/30/00 63.3 NA NA NA ug/Kg	DH-S-61PB F2 NA 04/02/01 04/05/01 08/30/00 76.2 NA NA NA ug/Kg	DH-S-61PB F2 NA 04/02/01 04/05/01 08/30/00 62.7 NA NA NA ug/Kg	DH-S-61PB F2 NA 04/02/01 04/05/01 08/30/00 65.5 NA NA NA ug/Kg	DH-S-61PB F2 NA 04/02/01 04/05/01 08/30/00 64.7 NA NA NA ug/Kg	DH-S-61PB F2 08/21/00 03/08/01 03/24/01 08/30/00 64.7 NA NA NA ug/Kg	DH-S-61PB F2 08/21/00 03/08/01 03/24/01 08/30/00 64.7 NA NA NA ug/Kg	DH-S-61PB F2 08/21/00 03/08/01 03/24/01 08/30/00 64.7 NA NA NA ug/Kg	
6.1	6.6	35	13	6.9	48	5.3	6.2	13	52	4.6	0.65 B	3.5	17	7	7.1	6	
14	14	78	24	18	100	12	14	29	130	12	1.5	10	36	19	16	13	
23	28	130	50	25	180	24	28	56	190	21	2.6	17	65	30	28	27	
22	30	110	48	18	150	24	28	48	140	19	1.6	15	56	26	24	29	
14	19	68	30	14	87	14	16	31	120	17	0.89	13	35	18	12	16	
0.074 J	0.076 J	ND	ND	0.085 J	ND	0.1 J	0.067 J	ND	3.4	ND	0.042 J	0.024 J	0.044 J	ND	0.055 J	0.09 J	ND
0.58	0.72	2.5	3.2	0.48 J	0.71	0.79	1.2	1.2	1.2	0.61 J	0.055 J	0.4 J	1.4	0.66	0.44 J	0.82	
3.2	4	16	6	3.1	21	4.1	4.8	6.6	22	4.4	0.27 JB	2.3	7.5	4.3	3.8	4.7	
2.7	3.8	14	5.7	2.4	17	3.1	3.6	5.4	18	2.6	0.24 JB	1.9	6	2.7	2	3.5	
4.6	6.7	24	11	4.8	31	5.5	6	10	34	3.9	0.46 J	3.9	11	5.3	3.5	6.1	
5.8	8.8	30	16	6.4	39	6.8	8	13	44	6.8	0.61	5.7	14	7.5	4.6	8.1	
6	9.4	31	18	7.2	38	7.3	8.2	14	47	7.7	0.68	6	15	7.9	4.7	8.8	
0.31 J	0.49 J	1.6	0.97	0.39 J	2.1	0.55 J	0.67	0.84	2.1	0.38 J	ND	0.35 J	0.84	0.4 J	0.27 J	0.47 J	
12	16	61	25	13	78	15	18	26	91	15	1.2 B	11	30	14	7.4	18	
19	27	94	39	21	120	26	31	40	150	20	1.7	20	47	25	12	30	
18	27	86	39	110	110	25	31	39	110	21	1.8	39	16	12	21	32	
12	16	58	27	13	72	15	18	26	92	15	1.2	30	16	16	7.6	19	
5.3	7.6	24	11	5.8	35	7.3	7.8	12	40	7.2	0.6	13	8.6	3.6	8.7	13	
1.9	2.4	9.3	3.7	1.9	12	2.2	2.6	4.1	14	2.1	0.18 J	1.9	4.6	2.5	1.6	2.4	
3.7	10	27	13	3.6	35	4.5	5.9	13	38	14	0.46 J	3.7	14	4.7	2.8	5.5	
5.3	8.1	25	12	6.2	30	5.7	8.2	11	41	6.3	0.59 J	6.3	13	8	4	8.2	
5.7	5.7	12	8.8	4.2	25	5.1	6.2	8.7	25	4.5	0.43 J	4.4	9	5.7	3.1	6.5	
3.7	3.7	13	5.5	3	16	3.1	3.7	5.9	19	3	0.42 JB	2.6	7.6	3	1.4	3.6	
3.6	5	17	4	22	5	5.6	8	26	4.5	0.5 J	3.9	9.6	4.2	2.3	5.3	5.3	
9.8	13	52	22	9.6	64	11	14	22	70	10	0.96	8.4	27	9.9	5	14	
8.6	11	46	18	8.6	58	11	12	20	62	9.6	0.93	8	23	9.2	4.5	13	
5.7	7.9	29	12	5.8	37	7.9	8.9	13	40	7.1	0.64	5.8	14	6.6	3.3	9.2	
0.88	1.4	4.7	2	1.6	ND	5.9	1.2	1.6	2.1	7.5	0.19 J	3	1.2	1.2	0.5 J	1.2	
5.6	7.8	28	11	5.5	33	7.6	9.3	11	38	7.5	0.6	6.5	12	7.3	3.5	9	
5.6	8.4	27	11	6.2	33	8.5	9.8	12	43	9.3	0.51 J	7.2	13	9.1	3.8	9.8	
5.2	7.7	24	10	5.2	29	7.6	9	11	35	8.1	0.42 J	5.6	12	7.8	3.6	9.2	
3.1	4.4	16	6.2	3.1	3.9	4.6	5.2	6.4	26	4.7	0.3 J	3.9	7	4.9	2.2	5.2	
2.2	2.9	12	5.2	2.3	14	3.6	3.3	5	15	4.5	0.23 J	3	5.6	3.1	1.6	4	
3.5	4.8	19	7.5	3.3	24	4.6	5.2	8.9	24	4.1	0.38 J	3.8	10	3.6	1.8	4.6	
0.31 J	0.52 J	1.5	0.91	0.4 J	2.2	0.46 J	0.5 J	0.94	0.47 J	0.47 J	0.08 J	0.43 J	1	0.55 J	0.19 J	0.46 J	
3.8	5.6	19	7.8	3.8	24	5.9	6.5	8.9	26	5.7	0.42 J	5.1	9.7	4.8	2.5	6.4	
1	1.3	5.7	2.2	1.1	7.2	1.2	1.3	2.6	8.4	3.2	0.09 J	8.4	3.2	1	0.46 J	1.2	
24	41	110	45	20	140	37	48	98	160	35	1.8	25	84	40	15	49	
0.81	0.74	4	1.4	0.85	4.3	0.9	0.93	1.7	5.7	1.7	0.08 J	1	1.9	0.92	0.32 J	0.8	
0.3 J	0.44 J	1.8	0.65	0.42 J	2.3	0.74	0.74	0.73	2.8	0.52 J	0.07 J	0.61	0.84	0.52 J	0.27 J	0.88 J	
2	2.5	11	4.2	2.5	13	3.5	3.2	4.9	3.8	3.7	0.26 J	3.9	5.3	3.1	1.2	3.1	
56	47	59	63	52	52	53	56	52	53	47	70	47	48	53	54	50	
76	72	81	73	78	78	83	81	77	80	79	70	71	70	74	74	74	
100	102	100	88	100	88	93	97	95	95	84	89	95	80	80	80	88	
97	100	102	101	90	93	95	96	94	91	86	88	97	83	83	80	85	

Field ID	00-N18-01-PHC-AN	00-N13-01-PHC-T-AN	00-N03-01-PHC-AN	00-3A-01-PHC-T-AS	00-N12-01-PHC-T-AN	00-5F-01-PHC-T-CY	00-L08-01-PHC-T-AS	00-L09-01-PHC-T-AS	00-4A-01-PHC-T-AN	00-5(0)-01-PHC-T-AN	00-5H-01-PHC-T-AS
Lab ID	20A3472F2	20A3483F2	20A3495F2	20A3498F2	20A3502F2	20A3509F2	20A3512F2	20A3513F2	20A3517F2	20A3522F2	20A3524F2
Sample Type	N	N	N	N	N	N	N	N	N	N	N
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	9.76 g	9.86 g	2.68 g	8.72 g	9.26 g	9.72 g	8.94 g	9.72 g	7.96 g	9.92 g	9.17 g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2	DH-S-64PBF2
Field Date	08/25/00	08/17/00	08/17/00	08/20/00	08/19/00	08/19/00	08/21/00	08/21/00	08/21/00	08/22/00	08/22/00
Extract Date	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01
Analysis Date	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	23.6	23.3	22	13.8	24.2	20.8	14.6	15.5	20.5	22.9	15
Percent Lipids	4.48	0.987	NA	4.54	12.8	1.24	1.78	2.97	3.24	1.96	1.56
Min Reporting Limit	1.3	1.3	4.7	1.4	1.3	1.3	1.4	1.5	1.6	1.3	1.4
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	1.5 B	0.94 JB	3.5 JB	0.7 JB	1.8 B	0.7 JB	0.85 JB	0.82 JB	1.8 B	2.6 B	0.89 JB
C1-Naphthalenes	1.1 JB	0.72 JB	2 JB	0.42 JB	1.8 B	0.83 JB	0.62 JB	0.76 JB	1.4 JB	2.8	0.7 JB
C2-Naphthalenes	2.4 B	3.7	2 JB	0.59 JB	4.4	4.2	2.3 B	2.8 B	3.4	2.8 B	2.5 B
C3-Naphthalenes	0.74 J	0.82 J	ND	0.48 J	1 J	2.3	0.96 J	1.4 J	1.4 J	1.4	0.76 J
C4-Naphthalenes	ND	ND	ND	ND	ND	2.6	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	0.09 JB	0.063 JB	0.27 JB	0.074 JB	0.094 JB	0.12 JB	0.085 JB	0.087 JB	0.15 JB	0.14 JB	0.069 JB
Biphenyl	0.31 JB	0.25 JB	1.1 JB	0.24 JB	0.45 JB	0.32 JB	0.27 JB	0.24 JB	0.48 JB	0.52 JB	0.25 JB
Fluorene	0.35 JB	0.25 JB	0.81 JB	0.25 JB	0.34 JB	0.35 JB	0.2 JB	0.32 JB	0.52 JB	0.44 JB	0.25 JB
C1-Fluorenes	0.37 J	0.4 J	1.2 J	0.3 J	ND	0.74 J	0.47 J	0.53 J	0.95 J	ND	0.43 J
C2-Fluorenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3-Fluorenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	0.1 JB	0.091 JB	0.19 JB	0.04 JB	0.057 JB	0.14 JB	0.13 JB	0.058 JB	0.23 JB	0.14 JB	0.051 JB
Phenanthrene	1.1 JB	1.1 JB	3.2 JB	1.1 JB	1.1 JB	2.1 B	1.4 B	1.8 B	2.3 B	1.4 B	1.2 JB
C1-Phenanthrenes/anthracenes	0.58 JB	0.64 JB	1.3 JB	0.65 JB	0.76 JB	2.8	1.2 JB	1.2 JB	1.1 JB	0.76 JB	1.1 JB
C2-Phenanthrenes/anthracenes	0.78 JB	0.77 JB	1.8 JB	0.76 JB	0.86 JB	4.2	1.3 JB	1.4 JB	1.2 JB	0.79 JB	1.4 B
C3-Phenanthrenes/anthracenes	0.55 JB	0.79 JB	1.1 JB	0.51 JB	0.82 JB	2.7	0.89 JB	0.89 JB	0.78 JB	0.54 JB	0.9 JB
C4-Phenanthrenes/anthracenes	ND	0.89 J	0.84 J	ND	ND	4.3	ND	ND	ND	0.51 J	0.62 J
Dibenzothiophene	0.098 JB	0.099 JB	0.23 JB	0.081 JB	0.11 JB	0.28 J	0.15 JB	0.16 JB	0.18 JB	0.15 JB	0.12 JB
C1-Dibenzothiophenes	0.2 JB	0.2 JB	0.33 JB	0.14 JB	0.21 JB	0.75 J	0.28 JB	0.3 JB	0.29 JB	0.24 JB	0.24 JB
C2-Dibenzothiophenes	0.34 JB	0.39 JB	0.65 JB	0.34 JB	0.44 JB	2.3	ND	0.58 JB	0.53 JB	0.34 JB	0.47 JB
C3-Dibenzothiophenes	0.35 J	0.4 J	ND	ND	0.52 J	2.9	ND	0.31 J	ND	0.21 J	0.38 J
Fluoranthene	0.28 JB	0.28 JB	0.7 JB	0.19 JB	0.28 JB	1.2 JB	0.38 JB	0.42 JB	0.56 JB	0.54 JB	0.28 JB
Pyrene	0.21 JB	0.28 JB	0.54 JB	0.17 JB	0.26 JB	1.1 J	0.34 JB	0.36 JB	0.32 JB	0.38 JB	0.3 JB
C1-Fluoranthenes/pyrenes	0.3 J	0.32 J	0.56 J	0.26 J	0.51 J	1.8	0.39 J	0.38 J	0.33 J	0.3 J	0.47 J
C2-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3-Fluoranthenes/pyrenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo[a]anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	0.47 J	0.48 J	0.087 J	0.18 J	0.39 J
C1-Chrysenes	ND	ND	0.34 J	ND	ND	ND	0.32 J	0.3 J	ND	ND	0.38 J
C2-Chrysenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3-Chrysenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4-Chrysenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	0.14 J	0.19 J	0.29 J	0.1 J	0.18 J	ND	0.19 J	0.14 J	ND	0.25 J	0.17 J
Benzo[k]fluoranthene	0.044 J	0.033 J	0.1 J	0.033 J	0.026 J	ND	ND	ND	ND	ND	ND
Benzo[e]pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo[a]pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno[1,2,3-c,d]pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo[a,h]anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo[g,h,i]perylene	0.064 J	0.058 J	ND	ND	0.068 J	0.14 J	0.13 J	0.091 J	ND	0.088 J	0.14 J
d8-Naphthalene	54	47	39 &	52	41 &	50	35 &	64	28 &	41 &	47
d10-Acenaphthene	73	59	57	63	61	67	46	82	38 &	58	58
d10-Phenanthrene	83	65	71	75	66	75	54	105	42 &	66	65
d12-Benzo[a]pyrene	83	64	72	74	61	74	54	90	42 &	65	66

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - PAH Results - Field QC

Field ID	00-N01-01-PHC-EB	00-N13-01-PHC-FB
Lab ID	20A3487	20A3503
Sample Type	N	N
Matrix	WATER	WATER
Associated Blank	DH-S-68PB	DH-S-68PB
Field Date	08/17/00	08/19/00
Extract Date	04/06/01	04/06/01
Analysis Date	04/11/01	04/11/01
Date Received	08/30/00	08/30/00
Percent Solids	NA	NA
Percent Lipids	NA	NA
Min Reporting Limit	190	150
Units	ng/L	ng/L

Polynuclear Aromatic Hydrocarbons		
Naphthalene	100 J	23 JB
C1-Naphthalenes	ND	ND
C2-Naphthalenes	ND	ND
C3-Naphthalenes	ND	ND
C4-Naphthalenes	ND	ND
Acenaphthylene	ND	ND
Acenaphthene	ND	ND
Biphenyl	ND	ND
Fluorene	ND	ND
C1-Fluorenes	ND	ND
C2-Fluorenes	ND	ND
C3-Fluorenes	ND	ND
Anthracene	ND	ND
Phenanthrene	33 J	11 JB
C1-Phenanthrenes/anthracenes	24 J	ND
C2-Phenanthrenes/anthracenes	ND	ND
C3-Phenanthrenes/anthracenes	ND	ND
C4-Phenanthrenes/anthracenes	ND	ND
Dibenzothiophene	12 J	ND
C1-Dibenzothiophenes	14 J	ND
C2-Dibenzothiophenes	43 J	ND
C3-Dibenzothiophenes	ND	ND
Fluoranthene	19 J	ND
Pyrene	12 J	ND
C1-Fluoranthenes/pyrenes	ND	ND
C2-Fluoranthenes/pyrenes	ND	ND
C3-Fluoranthenes/pyrenes	ND	ND
Benzo[a]anthracene	ND	ND
Chrysene	ND	ND
C1-Chrysenes	ND	ND
C2-Chrysenes	ND	ND
C3-Chrysenes	ND	ND
C4-Chrysenes	ND	ND
Benzo[b]fluoranthene	ND	ND
Benzo[k]fluoranthene	ND	ND
Benzo[e]pyrene	ND	ND
Benzo[a]pyrene	ND	ND
Perylene	ND	ND
Indeno[1,2,3,-c,d]pyrene	ND	ND
Dibenzo[a,h]anthracene	ND	ND
Benzo[g,h,i]perylene	ND	ND
d8-Naphthalene	57	66
d10-Acenaphthene	62	70
d10-Phenanthrene	60	68
d12-Benzo[a]pyrene	57	53

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4104  
Data Table: PAH Results - SPMDs - Surrogate Corrected

Field ID	02-3M1-01-PHC-T-SP	02-3M2-01-PHC-T-SP	02-3M3-01-PHC-T-SP	02-NM1-01-PHC-T-SP
Sample Type	N	N	N	N
Matrix	SPMD	SPMD	SPMD	SPMD
Sample Size	1	1	1	1
Weight Basis	NA	NA	NA	NA
Associated Blank	DZ-S-49PB	DZ-S-49PB	DZ-S-49PB	DZ-S-49PB
Field Date	08/20/02	08/20/02	08/20/02	08/18/02
Extract Date	11/11/02	11/11/02	11/11/02	11/11/02
Analysis Date	11/27/02	11/27/02	11/27/02	11/27/02
Date Received	08/23/02	08/23/02	08/23/02	08/23/02
Percent Solids	NA	NA	NA	NA
Dilution Factor	1	1	1	1
Percent Lipids	NA	NA	NA	NA
Min Reporting Limit	27	31	26	36
Units	ng/2 SPMD Membranes	ng/2 SPMD Membranes	ng/2 SPMD Membranes	ng/2 SPMD Membranes

Polynuclear Aromatic Hydrocarbons				
Naphthalene	71 B	130	79 B	110
C1-Naphthalenes	96	110	110	110
C2-Naphthalenes	120	120	120	130
C3-Naphthalenes	84	87	81	94
C4-Naphthalenes	54	64	57	61
Acenaphthylene	1.1 J	1.2 J	1.1 J	1.6
Acenaphthene	3.2 J	6.4 J	3.4 J	4.6
Biphenyl	37 B	98 B	41 B	11
Fluorene	27	50	26	14
C1-Fluorenes	30	36	34	29
C2-Fluorenes	40	40	42	43
C3-Fluorenes	62	46	66	51
Anthracene	ND	ND	ND	
Phenanthrene	57 B	77	56 B	51
C1-Phenanthrenes/anthracenes	45	42	43	47
C2-Phenanthrenes/anthracenes	66	65	72	73
C3-Phenanthrenes/anthracenes	ND	ND	ND	
C4-Phenanthrenes/anthracenes	ND	ND	ND	
Dibenzothiophene	5.6 J	7 J	5.5 J	5.2
C1-Dibenzothiophenes	12 J	10 J	13 J	12
C2-Dibenzothiophenes	25 J	20 J	26	23
C3-Dibenzothiophenes	32	23 J	30	33
Fluoranthene	18 J	18 J	19 J	20
Pyrene	12 J	11 J	13 J	16
C1-Fluoranthenes/pyrenes	18 J	11 J	15 J	21
C2-Fluoranthenes/pyrenes	17 J	ND	13 J	14
C3-Fluoranthenes/pyrenes	ND	ND	ND	
Benzo[a]anthracene	ND	ND	ND	
Chrysene	4.3 J	4.9 J	4.5 J	6
C1-Chrysenes	ND	ND	ND	2.8
C2-Chrysenes	ND	ND	ND	
C3-Chrysenes	ND	ND	ND	
C4-Chrysenes	ND	ND	ND	
Benzo[b]fluoranthene	ND	ND	1.3 J	2.4
Benzo[k]fluoranthene	ND	ND	1 J	2
Benzo[e]pyrene	1.2 J	ND	1.2 J	2
Benzo[a]pyrene	ND	ND	ND	
Perylene	1.9 J	2.5 J	1.9 J	4.6
Indeno[1,2,3-c,d]pyrene	ND	ND	ND	0.93
Dibenzo[a,h]anthracene	ND	ND	ND	
Benzo[g,h,i]perylene	1.9 JB	4.1 JB	1.4 JB	11
d8-Naphthalene	72	67	72	63
d10-Acenaphthene	80	80	82	79
d10-Phenanthrene	83	85	89	87
d12-Benzo[a]pyrene	67	66	71	63

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4104  
Data Table: PAH Results - SPMDs - Surrogate Corrected

Field ID	02-NM2-01-PHC-T-SP	02-NM3-01-PHC-T-SP	02-NM3-02-PHC-FB-SP
Sample Type	N	N	N
Matrix	SPMD	SPMD	SPMD
Sample Size	1	1	1
Weight Basis	NA	NA	NA
Associated Blank	DZ-S-49PB	DZ-S-49PB	DZ-S-49PB
Field Date	08/18/02	08/18/02	08/18/02
Extract Date	11/11/02	11/11/02	11/11/02
Analysis Date	11/27/02	11/27/02	11/27/02
Date Received	08/23/02	08/23/02	08/23/02
Percent Solids	NA	NA	NA
Dilution Factor	1	1	1
Percent Lipids	NA	NA	NA
Min Reporting Limit	34	27	26
Units	ng/2 SPMD Membranes	ng/2 SPMD Membranes	ng/6 Exposures

Polynuclear Aromatic Hydro			
Naphthalene	B	100 B	56 B 510
C1-Naphthalenes		110	110 550
C2-Naphthalenes		120	120 230
C3-Naphthalenes		90	86 76
C4-Naphthalenes		68	65 44
Acenaphthylene	J	1.1 J	1.3 J 5.7 J
Acenaphthene	J	3.8 J	3.5 J 5.6 J
Biphenyl	JB	72 B	12 JB 29 B
Fluorene	J	39	16 J 13 J
C1-Fluorenes	J	36	29 18 J
C2-Fluorenes		42	43 24 J
C3-Fluorenes		54	52 ND
Anthracene	ND	ND	ND ND
Phenanthrene	B	67	54 B 28 B
C1-Phenanthrenes/anthracenes		42	45 18 J
C2-Phenanthrenes/anthracenes		70	74 ND
C3-Phenanthrenes/anthracenes	ND	ND	ND ND
C4-Phenanthrenes/anthracenes	ND	ND	ND ND
Dibenzothiophene	J	6.4 J	5.4 J 2.8 J
C1-Dibenzothiophenes	J	12 J	13 J 6 J
C2-Dibenzothiophenes	J	22 J	28 14 J
C3-Dibenzothiophenes	J	30 J	32 15 J
Fluoranthene	J	21 J	24 J 7.8 JB
Pyrene	J	13 J	18 J 4.9 JB
C1-Fluoranthenes/pyrenes	J	19 J	22 J ND
C2-Fluoranthenes/pyrenes	J	18 J	15 J ND
C3-Fluoranthenes/pyrenes	ND	ND	ND ND
Benzo[a]anthracene	ND	ND	ND ND
Chrysene	J	7.6 J	7.8 J ND
C1-Chrysenes	J	4 J	3.1 J ND
C2-Chrysenes	ND	ND	ND ND
C3-Chrysenes	ND	ND	ND ND
C4-Chrysenes	ND	ND	ND ND
Benzo[b]fluoranthene	J	2.2 J	2.6 J ND
Benzo[k]fluoranthene	J	1.9 J	1.9 J ND
Benzo[e]pyrene	J	1.9 J	2.2 J ND
Benzo[a]pyrene	ND	ND	ND ND
Perylene	J	6.1 J	4.9 J ND
Indeno[1,2,3,-c,d]pyrene	J	0.6 J	ND ND
Dibenzo[a,h]anthracene	ND	ND	ND ND
Benzo[g,h,i]perylene	J	4.4 JB	2 JB 2.3 JB
d8-Naphthalene		49	73 63
d10-Acenaphthene		62	84 77
d10-Phenanthrene		67	93 82
d12-Benzo[a]pyrene		70	73 68

Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Sediment

Field ID	00-N06-01-PHC-S	00-N18-01-PHC-S	00-N23-01-PHC-S	00-COL-02-PHC-S	00-KUP-01-PHC-S	00-KUP-02-PHC-S	00-N00-01-PHC-S	00-N13-02-PHC-S	00-N13-01-PHC-S	00-N19-01-PHC-S	00-N10-01-PHC-S	00-N03-01-PHC-S	00-N07-01-PHC-S	00-N16-01-PHC-S	00-N02-01-PHC-S
Lab ID	20A3468	20A3469	20A3473	20A3474	20A3475	20A3476	20A3482	20A3484	20A3485	20A3486	20A3488	20A3489	20A3490	20A3491	20A3492
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	PEAT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Associated Blank	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB
Field Date	08/17/00	08/17/00	08/23/00	08/24/00	08/24/00	08/24/00	08/26/00	08/19/00	08/19/00	08/17/00	08/17/00	08/17/00	08/17/00	08/17/00	08/17/00
Extract Date	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01
Analysis Date	03/02/01	03/02/01	03/02/01	03/08/01	03/02/01	03/08/01	03/09/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	63.8	55.5	56.5	68.8	75.6	66.2	66.1	51.4	53.7	61	62	51.4	54.2	59.6	62.4
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.025	0.03	0.029	0.024	0.022	0.024	0.024	0.031	0.03	0.027	0.026	0.031	0.03	0.028	0.026
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

SHC/TPH	00-N06-01-PHC-S	00-N18-01-PHC-S	00-N23-01-PHC-S	00-COL-02-PHC-S	00-KUP-01-PHC-S	00-KUP-02-PHC-S	00-N00-01-PHC-S	00-N13-02-PHC-S	00-N13-01-PHC-S	00-N19-01-PHC-S	00-N10-01-PHC-S	00-N03-01-PHC-S	00-N07-01-PHC-S	00-N16-01-PHC-S	00-N02-01-PHC-S
n-Nonane	0.0074 J	0.0098 J	0.005 J	0.0087 J	ND	ND	0.0038 J	0.0035 J	0.016 J	0.0073 J	0.0049 J	0.0033 J	0.006 J	0.005 J	0.0038 J
n-Decane	0.012 J	0.017 J	0.0094 J	0.015 J	0.00089 J	0.0013 J	0.0091 J	0.012 J	0.022 J	0.014 J	0.0083 J	0.0087 J	0.011 J	0.0095 J	0.0069 J
n-Undecane	0.015 J	0.022 J	0.011 J	0.024	0.00047 J	0.0028 J	0.01 J	0.02 J	0.029 J	0.018 J	0.012 J	0.01 J	0.014 J	0.014 J	0.0094 J
n-Dodecane	0.016 J	0.021 J	0.014 J	0.029	0.00049 J	0.0023 J	0.012 J	0.028 J	0.032	0.019 J	0.014 J	0.013 J	0.016 J	0.018 J	0.011 J
n-Tridecane	0.022 J	0.029 J	0.025 J	0.045	0.00053 J	0.0042 J	0.021 J	0.046	0.044	0.026 J	0.022 J	0.019 J	0.025 J	0.029	0.017 J
Isoprenoid RRT 1380	0.0074 J	0.0097 J	0.0079 J	0.024	ND	0.003 J	0.0069 J	0.016 J	0.014 J	0.0086 J	0.0088 J	0.0061 J	0.0078 J	0.009 J	0.0057 J
n-Tetradecane	0.027	0.035	0.029	0.064	0.00081 J	0.0074 J	0.05	0.027	0.03	0.031	0.026 J	0.03	0.03	0.034	0.02 J
Isoprenoid RRT 1470	0.018 J	0.025 J	0.022 J	0.082	ND	0.0097 J	0.019 J	0.045	0.035	0.022 J	0.026	0.018 J	0.021 J	0.022 J	0.014 J
n-Pentadecane	0.038	0.051	0.052	0.12	0.0014 J	0.032	0.047	0.092	0.074	0.043	0.053	0.043	0.048	0.052	0.031
n-Hexadecane	0.039	0.056	0.052	0.1	0.0018 J	0.021 J	0.052	0.095	0.074	0.048	0.068	0.048	0.048	0.051	0.032
Isoprenoid RRT 1650	0.02 J	0.028 J	0.023 J	0.059	ND	0.0053 J	0.025	0.045	0.035	0.023 J	0.039	0.024 J	0.023 J	0.024 J	0.017 J
n-Heptadecane	0.059	0.097	0.087	0.17	0.0059 J	0.13	0.099	0.16	0.14	0.086	0.12	0.085	0.078	0.09	0.057
Pristane	0.043	0.068	0.081	0.21	0.001 J	0.014 J	0.065	0.11	0.086	0.065	0.074	0.07	0.068	0.058	0.044
n-Octadecane	0.048	0.077	0.068	0.14	0.0032 J	0.057	0.074	0.13	0.071	0.063	0.081	0.067	0.062	0.064	0.042
Phytane	0.019 J	0.032	0.031	0.06	ND	0.0042 J	0.031	0.046	0.038	0.027	0.047	0.032	0.028 J	0.028	0.02 J
n-Nonadecane	0.07	0.13	0.12	0.23	0.0085 J	0.16	0.12	0.22	0.18	0.098	0.11	0.1	0.098	0.11	0.066
n-Eicosane	0.059	0.11	0.093	0.23	0.0054 J	0.22	0.11	0.18	0.15	0.09	0.12	0.091	0.087	0.09	0.057
n-Heneicosane	0.12	0.24	0.22	0.48	0.013 J	0.58	0.22	0.45	0.38	0.19	0.24	0.19	0.18	0.19	0.11
n-Docosane	0.089	0.16	0.15	0.34	0.011 J	0.39	0.16	0.31	0.25	0.13	0.16	0.14	0.12	0.13	0.079
n-Tricosane	0.25	0.49	0.37	1.4	0.026	1.8	0.39	0.98	0.78	0.36	0.51	0.34	0.31	0.34	0.19
n-Tetracosane	0.074	0.14	0.13	0.35	0.011 JB	0.36	0.15	0.28	0.23	0.12	0.15	0.13	0.11	0.12	0.068
n-Pentacosane	0.23	0.46	0.44	1.2	0.035	2.4	0.42	0.9	0.72	0.37	0.55	0.35	0.33	0.36	0.2
n-Hexacosane	0.071	0.12	0.12	0.28	0.017 JB	0.28	0.12	0.23	0.19	0.11	0.12	0.12	0.096	0.11	0.062
n-Heptacosane	0.32	0.64	0.68	1.7	0.052	3.2	0.63	1.3	1	0.51	0.82	0.52	0.49	0.53	0.29
n-Octacosane	0.053	0.08	0.092	0.21	0.017 JB	0.18	0.097	0.16	0.14	0.085	0.089	0.11	0.08	0.086	0.05
n-Nonacosane	0.23	0.45	0.6	1.1	0.042	1.7	0.54	0.91	0.74	0.4	0.55	0.44	0.42	0.44	0.24
n-Triacontane	0.082	0.3	0.43	0.9	0.014 JB	0.52	0.26	0.46	0.38	0.17	0.22	0.22	0.2	0.24	0.1
n-Hentriacontane	0.2	0.39	0.54	0.94	0.031	1.2	0.46	0.85	0.68	0.33	0.48	0.37	0.36	0.38	0.2
n-Dotriacontane	0.038	0.034	0.04	0.12	0.0072 JB	0.078	0.043	0.11	0.057	0.042	0.082	0.091	0.081	0.058	0.028
n-Tritriacontane	0.052	0.1	0.13	0.38	0.0082 J	0.3	0.14	0.23	0.2	0.1	0.15	0.11	0.11	0.12	0.065
n-Tetraatriacontane	0.006 J	0.0076 J	0.009 J	0.029	0.0023 JB	0.019 J	0.013 J	0.02 J	0.015 J	0.012 J	0.011 J	0.016 J	0.011 J	0.012 J	0.0073 J
n-Pentatriacontane	0.01 J	0.02 J	0.017 J	0.076	0.0028 J	0.044	0.025	0.039	0.032	0.02 J	0.026	0.022 J	0.019 J	0.019 J	0.012 J
n-Hexatriacontane	0.0035 J	0.0054 J	0.0063 J	0.013 J	0.0011 J	0.006 J	0.0075 J	0.01 J	0.0083 J	0.006 J	0.0053 J	0.0074 J	0.0052 J	0.0062 J	0.0042 J
n-Heptatriacontane	0.0028 J	0.0046 J	0.0065 J	0.012 J	0.00083 J	0.0058 J	0.0097 J	0.0075 J	0.0052 J	0.0067 J	0.006 J	0.0064 J	0.0067 J	0.0063 J	0.0033 J
n-Octatriacontane	0.0021 J	0.0037 J	0.0042 J	0.0081 J	ND	0.0041 J	0.0059 J	0.0071 J	0.0035 J	0.0035 J	0.0046 J	0.0046 J	0.0031 J	0.004 J	0.0023 J
n-Nonatriacontane	0.0017 J	0.0024 J	0.0025 J	0.0052 J	ND	0.0018 J	0.003 J	0.0045 J	0.0037 J	0.0022 J	0.002 J	0.0029 J	0.002 J	0.0025 J	0.0014 J
n-Tetracontane	0.002 J	0.0029 J	0.0028 J	0.0058 J	ND	0.0026 J	0.0032 J	0.0052 J	0.004 J	0.0026 J	0.0025 J	0.0026 J	0.0023 J	0.0025 J	0.0017 J
TPH (RES)	3.4	6	5.9	15	0.55 B	16	6.1	12	9.4	5.2	8	5.7	5.4	5.4	3.2
TPH	7.1	12	10	25	0.55 B	18	10	20	16	10	26	12	11	10	6.3
%ortho-terphenyl	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &
%5A-androstane	84	85	82	90	74	73	79	86	89	77	97	85	93	87	86
%d50-tetracosane	88	90	85	89	83	73	81	86	89	82	99	87	94	94	89

Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Sediment

Field ID	00-N01-01-PHC-S	00-N17-01-PHC-S	00-5D-01-PHC-S	00-5H-01-PHC-S	00-4C-01-PHC-S	00-C0L-01-PHC-S	00-SAG-01-PHC-S	00-N14-01-PHC-S	00-N13-03-PHC-S	00-N12-01-PHC-S	00-5F-01-PHC-S	00-N15-01-PHC-S	00-N21-01-PHC-S	00-L09-01-PHC-S	00-L07-01-PHC-S
Lab ID	20A3493	20A3494	20A3496	20A3497	20A3499	20A3500	20A3501	20A3504	20A3505	20A3506	20A3507	20A3508	20A3510	20A3511	20A3514
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Associated Blank	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-55PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB
Field Date	08/17/00	08/17/00	08/22/00	08/22/00	08/21/00	08/24/00	08/25/00	08/19/00	08/19/00	08/19/00	08/19/00	08/19/00	08/19/00	08/21/00	08/21/00
Extract Date	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01
Analysis Date	03/08/01	03/08/01	03/08/01	03/09/01	03/09/01	03/14/01	03/14/01	03/14/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/14/01	03/14/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	75.4	57.3	54.2	69.1	57.4	79.7	72.5	49.4	57.2	50.3	66.2	82.2	48.9	77.4	70.7
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.021	0.028	0.028	0.022	0.028	0.02	0.022	0.033	0.029	0.032	0.024	0.02	0.034	0.021	0.024
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

SHC/TPH

n-Nonane	0.0013 J	0.005 J	0.004 J	0.002 J	0.0016 J	0.00095 J	0.0028 J	0.012 J	0.012 J	0.012 J	0.0045 J	ND	0.02 J	0.0012 J	0.0023 J
n-Decane	0.0029 J	0.0091 J	0.0075 J	0.0034 J	0.0039 J	0.0026 J	0.007 J	0.022 J	0.02 J	0.019 J	0.0085 J	0.0009 J	0.033 J	0.0028 J	0.0046 J
n-Undecane	0.0031 J	0.012 J	0.0038 J	0.0042 J	0.0058 J	0.0044 J	0.011 J	0.033	0.029	0.012 J	0.0088 J	0.00088 J	0.048	0.0034 J	0.006 J
n-Dodecane	0.0034 J	0.015 J	0.016 J	0.0042 J	0.0077 J	0.0053 J	0.014 J	0.042	0.034	0.037	0.015 J	0.0011 J	0.06	0.0039 J	0.0075 J
n-Tridecane	0.0041 J	0.022 J	0.028 J	0.0068 J	0.012 J	0.0074 J	0.018 J	0.058	0.046	0.055	0.021 J	0.0014 J	0.086	0.0057 J	0.011 J
Isoprenoid RRT 1380	0.0013 J	0.0079 J	0.01 J	0.0024 J	0.0046 J	0.0032 J	0.0054 J	0.018 J	0.015 J	0.02 J	0.007 J	0.00054 J	0.028 J	0.002 J	0.004 J
n-Tetradecane	0.0048 J	0.036	0.036	0.0085 J	0.015 J	0.0093 J	0.021 J	0.063	0.051	0.072	0.023 J	0.0016 J	0.098	0.0063 J	0.013 J
Isoprenoid RRT 1470	0.0028 J	0.021 J	0.028 J	0.0067 J	0.011 J	0.0078 J	0.013 J	0.046	0.037	0.056	0.018 J	0.0011 J	0.072	0.0049 J	0.0093 J
n-Pentadecane	0.0066 J	0.05	0.055	0.015 J	0.027 J	0.018 J	0.027	0.091	0.072	0.11	0.034	0.002 J	0.13	0.0094 J	0.019 J
n-Hexadecane	0.0068 J	0.053	0.056	0.017 J	0.028	0.013 J	0.025	0.086	0.068	0.11	0.034	0.0023 J	0.12	0.0092 J	0.02 J
Isoprenoid RRT 1650	0.0029 J	0.024 J	0.024 J	0.008 J	0.014 J	0.0076 J	0.013 J	0.04	0.033	0.052	0.016 J	0.0013 J	0.056	0.0049 J	0.011 J
n-Heptadecane	0.01 J	0.097	0.13	0.034	0.047	0.031	0.046	0.19	0.12	0.18	0.067	0.0041 J	0.22	0.017 J	0.037
Pristane	0.0083 J	0.065	0.061	0.021 J	0.04	0.016 J	0.022 J	0.093	0.076	0.12	0.036	0.0025 J	0.14	0.012 J	0.027
n-Octadecane	0.0089 J	0.081	0.089	0.024	0.038	0.018 J	0.028	0.13	0.087	0.14	0.045	0.0034 J	0.16	0.012 J	0.026
Phytane	0.0038 J	0.031	0.026 J	0.01 J	0.019 J	0.0079 J	0.0091 J	0.04	0.033	0.052	0.016 J	0.0011 J	0.06	0.0053 J	0.011 J
n-Nonadecane	0.012 J	0.11	0.17	0.037	0.058	0.028	0.047	0.27	0.15	0.25	0.085	0.0048 J	0.29	0.018 J	0.039
n-Eicosane	0.0099 J	0.099	0.18	0.042	0.062	0.027	0.047	0.24	0.13	0.21	0.092	0.0049 J	0.25	0.022	0.039
n-Heneicosane	0.02 J	0.2	0.42	0.07	0.1	0.058	0.068	0.66	0.31	0.53	0.17	0.01 J	0.64	0.028	0.073
n-Docosane	0.016 J	0.14	0.28	0.054	0.074	0.042	0.047	0.44	0.22	0.36	0.12	0.0076 J	0.43	0.021	0.046
n-Tricosane	0.039	0.37	0.83	0.14	0.18	0.17	0.14	1.3	0.65	1.2	0.33	0.022	1.4	0.048	0.11
n-Tetracosane	0.017 J	0.14	0.27	0.072	0.077	0.046	0.056	0.4	0.21	0.35	0.11	0.013 JB	0.4	0.021	0.044
n-Pentacosane	0.04	0.38	0.95	0.17	0.23	0.13	0.18	1.3	0.61	1.1	0.34	0.033	1.3	0.053	0.13
n-Hexacosane	0.02 JB	0.12	0.21	0.074	0.068	0.037	0.05	0.31	0.18	0.27	0.087	0.03 B	0.3	0.024 B	0.039
n-Heptacosane	0.061	0.56	1.4	0.23	0.31	0.14	0.24	1.9	0.86	1.6	0.45	0.059	1.8	0.082	0.19
n-Octacosane	0.019 JB	0.097	0.16	0.065	0.059	0.031 B	0.041 B	0.23	0.14	0.2	0.065	0.035 B	0.22	0.021 B	0.032 B
n-Nonacosane	0.046	0.48	1	0.2	0.23	0.098	0.23	1.4	0.63	1.1	0.33	0.049	1.3	0.07	0.13
n-Triacontane	0.021 B	0.21	0.6	0.12	0.12	0.025 B	0.025 B	1.1	0.52	0.68	0.23	0.03	0.83	0.031	0.13
n-Hentriacontane	0.036	0.4	0.85	0.17	0.18	0.07	0.19	1.2	0.57	0.99	0.28	0.035	1.1	0.055	0.1
n-Dotriacontane	0.01 JB	0.055	0.044	0.025 J	0.01 JB	0.018 J	0.018 J	0.075	0.051	0.062	0.02 J	0.014 JB	0.07	0.012 JB	0.014 JB
n-Tritriacontane	0.013 J	0.12	0.25	0.068	0.055	0.029	0.066	0.34	0.17	0.3	0.086	0.012 J	0.33	0.017 J	0.031
n-Tetraatriacontane	0.003 JB	0.013 J	0.017 J	0.022	0.0088 J	0.0052 JB	0.0074 J	0.024 J	0.02 J	0.027 J	0.0075 J	0.0042 JB	0.023 J	0.003 JB	0.0044 JB
n-Pentatriacontane	0.0031 J	0.022 J	0.039	0.024	0.012 J	0.0086 J	0.022	0.05	0.033	0.045	0.018 J	0.0036 JB	0.049	0.0039 JB	0.0072 J
n-Hexatriacontane	0.0012 J	0.007 J	0.0074 J	0.014 J	0.0047 J	0.0028 JB	0.0036 J	0.01 J	0.01 J	0.013 J	0.0037 J	0.0017 JB	0.012 J	0.0019 JB	0.0028 JB
n-Heptatriacontane	0.00085 J	0.0067 J	0.0093 J	0.013 J	0.0044 J	0.0024 J	0.0033 J	0.012 J	0.0096 J	0.012 J	0.0035 J	0.0012 J	0.012 J	0.0017 J	0.0023 J
n-Octatriacontane	0.0018 J	0.023 J	0.0046 J	0.012 J	0.0036 J	0.0019 JB	0.0024 JB	0.0073 J	0.0066 J	0.0093 J	0.0029 JB	0.0011 JB	0.0079 J	0.0016 JB	0.0023 JB
n-Nonatriacontane	ND	0.0026 J	0.0028 J	0.008 J	0.0024 J	0.0016 J	0.0016 J	0.004 J	0.0043 J	0.005 J	0.0018 J	0.00063 J	0.0046 J	0.001 J	0.0012 J
n-Tetracontane	ND	0.0035 J	0.0033 J	0.0085 J	0.0031 J	0.0017 J	0.0016 J	0.0046 J	0.0044 J	0.0058 J	0.0024 J	0.00071 J	0.0056 J	0.0011 J	0.0011 J
TPH (RES)	0.84 B	5.7	12	2.6	3.3	1.7	2.8	16	8.4	14	4.7	0.61 B	16	1 B	2.2
TPH	1.5 B	11	17	4.1	6.1	4.3	6.5	24	14	24	7.8	1 B	27	1.9	6.9
%ortho-terphenyl	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &
%5A-androstane	74	79	77	77	77	82	86	83	84	90	86	76	89	86	93
%d50-tetracosane	77	84	84	81	81	89	91	87	89	94	92	85	92	89	94

Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I  
Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Sediment

Field ID	00-L08-01-PHC-S	00-L01-01-PHC-S	00-4A-01-PHC-S	00-4B-01-PHC-S	00-5(1)-01-PHC-S	00-5(5)-01-PHC-S	00-5(10)-01-PHC-S	00-5(0)-01-PHC-S	00-N05-01-PHC-S	00-N08-01-PHC-S	00-N09-01-PHC-S	00-5A-01-PHC-S	00-3A-01-PHC-S	00-L04-01-PHC-S	00-N11-01-PHC-S	
Lab ID	20A3515	20A3516	20A3518	20A3519	20A3520	20A3521	20A3523	20A3525	20A3526	20A3527	20A3528	20A3529	20A3530	20A3531	20A3532	
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
Associated Blank	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-58PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	
Field Date	08/21/00	08/21/00	08/21/00	08/21/00	08/22/00	08/22/00	08/22/00	08/22/00	08/18/00	08/18/00	08/18/00	08/18/00	08/20/00	08/20/00	08/18/00	
Extract Date	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	
Analysis Date	03/14/01	03/14/01	03/14/01	03/14/01	03/14/01	03/14/01	03/15/01	03/15/01	03/15/01	03/15/01	03/17/01	03/17/01	03/17/01	03/17/01	03/17/01	
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	
Percent Solids	73.5	51.9	71.5	63.3	66.3	68.3	73.4	69.1	54.1	67.3	65.9	40.9	58.6	61.2	58	
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Min Reporting Limit	0.022	0.032	0.024	0.026	0.025	0.024	0.023	0.024	0.03	0.025	0.025	0.04	0.028	0.027	0.028	
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
SHC/TPH																
n-Nonane	0.0031 J	0.0052 J	0.013 J	0.0032 J	0.0056 J	0.0045 J	0.0029 J	0.001 J	0.019 J	0.0069 J	0.0029 J	0.023 J	0.0028 J	0.0049 J	0.0068	
n-Decane	0.0086 J	0.0097 J	0.022 J	0.0075 J	0.011 J	0.0089 J	0.0079 J	0.0032 J	0.034	0.013 J	0.0055 J	0.039 J	0.0048 J	0.0093 J	0.012	
n-Undecane	0.016 J	0.014 J	0.031	0.01 J	0.012 J	0.012 J	0.0078 J	0.0061 J	0.044	0.016 J	0.0075 J	0.056	0.0081 J	0.014 J	0.016	
n-Dodecane	0.025	0.017 J	0.034	0.013 J	0.014 J	0.013 J	0.0087 J	0.008 J	0.05	0.018 J	0.0084 J	0.067	0.011 J	0.018 J	0.02	
n-Tridecane	0.044	0.03 J	0.045	0.021 J	0.018 J	0.017 J	0.012 J	0.013 J	0.065	0.024 J	0.011 J	0.089	0.021 J	0.026 J	0.03	
Isoprenoid RRT 1380	0.022	0.0098 J	0.012 J	0.0068 J	0.0059 J	0.0057 J	0.0042 J	0.0046 J	0.021 J	0.0079 J	0.0041 J	0.028 J	0.0068 J	0.0081 J	0.011	
n-Tetradecane	0.054	0.035	0.046	0.024 J	0.022 J	0.02 J	0.014 J	0.017 J	0.073	0.028	0.014 J	0.1	0.023 J	0.029	0.036	
Isoprenoid RRT 1470	0.038	0.025 J	0.026	0.017 J	0.016 J	0.014 J	0.01 J	0.012 J	0.05	0.019 J	0.0096 J	0.07	0.017 J	0.019 J	0.029	
n-Pentadecane	0.07	0.057	0.067	0.038	0.033	0.03	0.021 J	0.027	0.1	0.039	0.019 J	0.13	0.037	0.043	0.056	
n-Hexadecane	0.06	0.055	0.058	0.038	0.034	0.03	0.021 J	0.028	0.096	0.038	0.019 J	0.13	0.035	0.04	0.066	
Isoprenoid RRT 1650	0.034	0.026 J	0.028	0.019 J	0.017 J	0.015 J	0.011 J	0.013 J	0.048	0.02 J	0.0093 J	0.06	0.017 J	0.018 J	0.032	
n-Heptadecane	0.074	0.11	0.089	0.078	0.063	0.052	0.036	0.056	0.15	0.064	0.028	0.2	0.068	0.078	0.12	
Pristane	0.062	0.075	0.062	0.059	0.043	0.036	0.026	0.031	0.11	0.05	0.022 J	0.14	0.047	0.043	0.069	
n-Octadecane	0.045	0.071	0.045	0.046	0.039	0.037	0.027	0.037	0.12	0.051	0.022 J	0.16	0.045	0.054	0.077	
Phytane	0.038	0.032	0.028	0.023 J	0.018 J	0.016 J	0.011 J	0.014 J	0.05	0.021 J	0.0094 J	0.063	0.021 J	0.019 J	0.038	
n-Nonadecane	0.058	0.12	0.093	0.084	0.076	0.063	0.04	0.062	0.18	0.074	0.034	0.24	0.071	0.1	0.12	
n-Eicosane	0.053	0.11	0.09	0.07	0.063	0.054	0.035	0.056	0.15	0.063	0.03	0.21	0.064	0.092	0.12	
n-Heneicosane	0.11	0.2	0.14	0.17	0.14	0.11	0.069	0.11	0.33	0.15	0.059	0.47	0.12	0.25	0.25	
n-Docosane	0.064	0.14	0.1	0.11	0.095	0.077	0.049	0.099	0.23	0.098	0.043	0.33	0.087	0.16	0.17	
n-Tricosane	0.17	0.34	0.2	0.26	0.26	0.21	0.13	0.24	0.69	0.27	0.12	1	0.21	0.46	0.54	
n-Tetracosane	0.062	0.13	0.094	0.12	0.086	0.072	0.048	0.14	0.21	0.1	0.042	0.3	0.084	0.15	0.17	
n-Pentacosane	0.21	0.37	0.2	0.27	0.24	0.2	0.14	0.26	0.61	0.24	0.12	0.91	0.24	0.49	0.6	
n-Hexacosane	0.059	0.1	0.078	0.099	0.072	0.059	0.053	0.13	0.17	0.082	0.044 B	0.25	0.087 B	0.12 B	0.14	
n-Heptacosane	0.33	0.57	0.29	0.41	0.35	0.28	0.21	0.34	0.82	0.32	0.16 B	0.7	0.39	0.7	0.96	
n-Octacosane	0.05	0.08	0.062	0.08	0.056	0.046	0.053	0.1	0.12	0.066	0.039 B	0.18 B	0.082 B	0.095 B	0.11	
n-Nonacosane	0.25	0.5	0.31	0.34	0.26	0.21	0.17	0.27	0.59	0.23	0.13 B	0.86	0.34	0.54	0.65	
n-Triacontane	0.21	0.12	0.19	0.23	0.14	0.11	0.098	0.16	0.28	0.1	0.048 B	0.39	0.18	0.46	0.53	
n-Hentriacontane	0.2	0.42	0.26	0.27	0.22	0.18	0.13	0.22	0.49	0.2	0.1 B	0.74	0.28	0.44	0.55	
n-Dotriacontane	0.027	0.054	0.037	0.039	0.04	0.032	0.042	0.069	0.083	0.045	0.014 JB	0.052 B	0.044 B	0.039		
n-Tritriacontane	0.058	0.12	0.083	0.087	0.071	0.058	0.053	0.081	0.16	0.065	0.034 B	0.22	0.079	0.12	0.17	
n-Tetracontane	0.0072 J	0.011 J	0.01 J	0.013 J	0.0073 J	0.0058 JB	0.018 J	0.024	0.016 J	0.0095 J	0.0046 JB	0.021 JB	0.01 JB	0.011 JB	0.012	
n-Pentatriacontane	0.011 J	0.019 J	0.016 J	0.018 J	0.012 J	0.01 J	0.019 J	0.024	0.03	0.016 J	0.0071 JB	0.039 J	0.015 JB	0.018 J	0.027	
n-Hexatriacontane	0.0035 JB	0.0061 J	0.0052 J	0.0087 J	0.0039 J	0.0032 JB	0.011 J	0.012 J	0.0094 J	0.0068 J	0.0023 JB	0.011 J	0.0046 JB	0.005 JB	0.0055	
n-Heptatriacontane	0.0031 J	0.0051 J	0.0045 J	0.0068 J	0.0034 J	0.0026 J	0.0099 J	0.0087 J	0.0081 J	0.0048 J	0.0027 JB	0.0092 J	0.004 JB	0.006 J	0.0063	
n-Octatriacontane	0.0028 JB	0.0042 JB	0.0042 JB	0.0047 JB	0.0025 JB	0.0021 JB	0.0072 J	0.0069 J	0.0067 J	0.004 JB	0.0024 J	0.0072 J	0.003 J	0.0033 J	0.0031	
n-Nonatriacontane	0.0013 J	0.0024 J	0.0022 J	0.0034 J	0.0015 J	0.0013 J	0.005 J	0.0037 J	0.0039 J	0.0026 J	ND	0.004 J	0.0015 J	0.0013 J	0.0018	
n-Tetracontane	0.0013 J	0.0032 J	0.0024 J	0.0036 J	0.0019 J	0.0013 J	0.0051 J	0.0031 J	0.0044 J	0.0028 J	ND	0.0041 J	0.0016 J	0.0017 J	0.002	
TPH (RES)	3.9	5.8	4.2	4.8	3.6	3	2.3	3.6	8.9	4.2	1.9 B	12	3.9	6.2	8.1	
TPH	11	12	8.1	16	6.5	5.6	4.7	6.5	16	14	4.1	22	7.4	7.7	20	
%ortho-terphenyl	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0	
%5A-androstane	93	87	91	91	87	88	100	94	88	86	69	72	69	72	76	
%d50-tetracosane	96	88	94	91	89	92	104	98	88	88	75	76	74	76	79	



Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Sediment

Field ID	00-N04-01-PHC-S	00-3B-01-PHC-S	00-5B-01-PHC-S	00-5E-01-PHC-S	00-N20-01-PHC-S	00-L08-02-PHC-S	00-L08-03-PHC-S	00-L06-01-PHC-S
Lab ID	20A3533	20A3534	20A3535	20A3536	20A3537	20A3538	20A3539	20A3540
Sample Type	N	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Associated Blank	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB	DH-S-61PB
Field Date	08/18/00	08/20/00	08/17/00	08/17/00	08/18/00	08/21/00	08/21/00	08/21/00
Extract Date	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01
Analysis Date	03/16/01	03/16/01	03/16/01	03/17/01	03/17/01	03/17/01	03/17/01	03/17/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	41.7	63.3	76.2	74.8	62.7	64.7	75.2	56
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.039	0.025	0.022	0.026	0.026	0.026	0.022	0.029
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

SHC/TPH									
n-Nonane	J	0.024 J	0.0025 J	ND	0.0023 J	0.0089 J	0.005 J	0.0038 J	0.0032 J
n-Decane	J	0.038 J	0.0056 J	0.0014 J	0.0044 J	0.015 J	0.0098 J	0.01 J	0.0076 J
n-Undecane	J	0.052	0.007 J	0.0011 J	0.0061 J	0.021 J	0.017 J	0.019 J	0.011 J
n-Dodecane	J	0.06	0.0095 J	0.0011 J	0.0071 J	0.025 J	0.025 J	0.03	0.015 J
n-Tridecane		0.082	0.017 J	0.0015 J	0.011 J	0.037	0.044	0.053	0.025 J
Isoprenoid RRT 1380	J	0.026 J	0.0053 J	ND	0.0034 J	0.013 J	0.02 J	0.027	0.0085 J
n-Tetradecane		0.091	0.02 J	0.0017 J	0.012 J	0.043	0.051	0.064	0.028 J
Isoprenoid RRT 1470		0.064	0.014 J	ND	0.0082 J	0.032	0.037	0.043	0.019 J
n-Pentadecane		0.12	0.032	0.0028 J	0.019 J	0.059	0.067	0.08	0.039
n-Hexadecane		0.12	0.033	0.0028 J	0.019 J	0.059	0.058	0.068	0.038
Isoprenoid RRT 1650		0.056	0.015 J	ND	0.0096 J	0.028	0.034	0.04	0.018 J
n-Heptadecane		0.19	0.068	0.0066 J	0.028	0.1	0.075	0.067	0.073
Pristane		0.14	0.039	0.0061 J	0.026	0.068	0.061	0.066	0.052
n-Octadecane		0.15	0.04	0.0044 J	0.025	0.075	0.05	0.046	0.049
Phytane		0.06	0.018 J	0.0021 J	0.012 J	0.031	0.037	0.045	0.02 J
n-Nonadecane		0.25	0.061	0.006 J	0.034	0.13	0.066	0.043	0.084
n-Eicosane		0.21	0.053	0.0045 J	0.028	0.12	0.063	0.04	0.075
n-Heneicosane		0.49	0.1	0.026	0.047	0.27	0.13	0.063	0.18
n-Docosane		0.34	0.074	0.012 J	0.036	0.18	0.08	0.036	0.12
n-Tricosane		1.1	0.19	0.022 B	0.078	0.6	0.23	0.087	0.32
n-Tetracosane		0.32	0.073	0.018 JB	0.036 B	0.18	0.081	0.034 B	0.11
n-Pentacosane		0.98	0.25	0.028 B	0.087 B	0.62	0.3	0.1	0.42
n-Hexacosane	B	0.25	0.071 B	0.022 B	0.04 B	0.15 B	0.08 B	0.034 B	0.088 B
n-Heptacosane		1.3	0.39	0.036 B	0.13 B	0.92	0.46	0.16 B	0.59
n-Octacosane	B	0.18 B	0.056 B	0.022 B	0.035 B	0.11 B	0.066 B	0.03 B	0.066 B
n-Nonacosane		0.92	0.29	0.03 B	0.11 B	0.62	0.32	0.13 B	0.41
n-Triacontane		0.47	0.14	0.014 JB	0.052 B	0.45	0.33	0.079 B	0.54
n-Hentriacontane		0.78	0.22	0.025 B	0.093 B	0.53	0.25	0.11 B	0.32
n-Dotriacontane	B	0.079	0.027 B	0.009 JB	0.017 JB	0.047 B	0.031 B	0.021 JB	0.052 B
n-Tritriacontane		0.24	0.068	0.0084 JB	0.031 B	0.17	0.07	0.031 B	0.091
n-Tetracontane	JB	0.019 JB	0.0074 JB	0.0032 JB	0.0047 JB	0.012 JB	0.0075 JB	0.0044 JB	0.0084 JB
n-Pentatriacontane	J	0.038 J	0.013 JB	0.0032 JB	0.0065 JB	0.027	0.012 JB	0.0076 JB	0.015 JB
n-Hexatriacontane	JB	0.011 J	0.0041 JB	0.0021 JB	0.0026 JB	0.0064 JB	0.0037 JB	0.0028 JB	0.0051 JB
n-Heptatriacontane	J	0.0091 J	0.0034 JB	0.0014 JB	0.002 JB	0.0064 J	0.0032 JB	0.0017 JB	0.0053 JB
n-Octatriacontane	J	0.017 J	0.0024 J	ND	0.0016 J	0.0036 J	0.0016 J	0.0018 J	0.048
n-Nonatriacontane	J	0.0039 J	0.0013 J	ND	0.00092 J	0.0022 J	0.001 J	0.00072 J	0.0022 J
n-Tetracontane	J	0.0043 J	0.0011 J	ND	0.00083 J	0.0025 J	ND	0.0008 J	0.0018 J
TPH (RES)		13	3.5	0.91 B	1.6 B	7.9	4.9	3.2	5.9
TPH		23	6.4	5.9	3.5	17	14	11	11
%ortho-terphenyl	&	0 &	0 &	0 &	0 &	0 &	0 &	0 &	0 &
%5A-androstane		78	76	57	71	65	85	64	73
%d50-tetracosane		79	76	60	74	65	84	67	75

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Tissue

Field ID	00-N18-01-PHC-AN	00-N13-01-PHC-T-AN	00-N03-01-PHC-AN	00-3A-01-PHC-T-AS	00-N12-01-PHC-T-AN	00-5F-01-PHC-T-CY	00-L08-01-PHC-T-AS	00-L09-01-PHC-T-AS	00-4A-01-PHC-T-AN	00-5(0)-01-PHC-T-AN	00-5H-01-PHC-T-AS
Lab ID	20A3472	20A3483	20A3495	20A3498	20A3502	20A3509	20A3512	20A3513	20A3517	20A3522	20A3524
Sample Type	N	N	N	N	N	N	N	N	N	N	N
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	9.76 g	9.86 g	2.68 g	8.72 g	9.26 g	9.72 g	8.94 g	8.36 g	7.96 g	9.92 g	9.17 g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB
Field Date	08/25/00	08/19/00	08/17/00	08/20/00	08/19/00	08/19/00	08/21/00	08/21/00	08/21/00	08/22/00	08/22/00
Extract Date	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01
Analysis Date	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	23.6	23.3	22	13.8	24.2	20.8	14.6	15.5	20.5	22.9	15
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.051	0.051	0.19	0.057	0.054	0.051	0.056	0.06	0.063	0.05	0.054
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

**SHC/TPH - Wet**

n-Octane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Nonane	ND	ND	ND	ND	ND	0.012 J	ND	ND	ND	ND	ND	ND
n-Decane	ND	0.002 J	ND	ND	ND	ND	ND	ND	ND	0.0058 J	ND	0.0025 J
n-Undecane	ND	ND	ND	ND	ND	0.0032 J	ND	ND	ND	ND	ND	ND
n-Dodecane	ND	ND	ND	ND	ND	0.01 J	0.0034 J	0.0028 J	ND	0.0022 J	0.0024 J	ND
n-Tridecane	ND	0.0041 J	ND	ND	0.0021 J	ND	ND	ND	ND	0.0027 J	ND	ND
Isoprenoid RRT 1380	0.0097 J	0.0087 J	ND	ND	0.003 J	0.0043 J	0.0012 J	0.0016 J	ND	0.003 J	ND	ND
n-Tetradecane	0.0022 J	0.0039 J	ND	0.0018 J	0.0032 J	0.0022 J	ND	ND	0.0034 J	0.0038 J	ND	ND
Isoprenoid RRT 1470	0.0048 J	0.017 J	ND	ND	0.0091 J	0.014 J	0.0038 J	0.0044 J	0.0049 J	0.007 J	0.0033 J	0.0033 J
n-Pentadecane	0.043 J	0.023 J	0.086 J	0.0026 J	0.088	0.0063 J	0.0044 J	0.0042 J	0.085	0.095	0.0042 J	ND
n-Hexadecane	0.0036 JB	0.0046 JB	0.012 JB	0.0027 JB	0.0072 JB	0.0033 JB	0.0033 JB	0.0027 JB	0.0096 JB	0.0068 JB	0.003 JB	0.003 JB
Isoprenoid RRT 1650	0.0018 J	0.0046 J	ND	0.0026 J	0.0038 J	ND	ND	0.0023 J	0.0028 J	0.0033 J	0.0014 J	0.0014 J
n-Heptadecane	0.071	0.038 JB	0.13 J	0.0048 JB	0.13	0.0054 JB	0.0056 JB	0.0051 JB	0.15	0.15	0.0056 JB	0.0056 JB
Pristane	14 D	9	2.2	0.0048 J	14 D	0.012 J	0.0079 J	0.0079 J	22 D	23 D	0.009 J	0.009 J
n-Octadecane	0.0046 JB	0.0063 JB	0.015 JB	0.0028 JB	0.0097 JB	0.0032 JB	0.0029 JB	0.0026 JB	0.011 JB	0.0081 JB	0.0037 JB	0.0037 JB
Phytane	0.0029 J	0.0096 J	ND	ND	0.0066 J	ND	ND	ND	ND	0.0027 J	ND	ND
n-Nonadecane	0.0031 J	0.0058 J	0.014 J	ND	0.0081 J	0.003 J	ND	0.0021 J	0.0069 J	0.0052 J	0.0027 J	0.0027 J
n-Eicosane	0.0029 J	0.0051 J	ND	ND	ND	0.0052 J	ND	ND	0.0038 J	ND	ND	ND
n-Heneicosane	0.011 JB	0.046 JB	0.023 JB	0.0032 JB	0.02 JB	0.0067 JB	0.0041 JB	0.0048 JB	0.014 JB	0.012 JB	0.0048 JB	0.0048 JB
n-Docosane	0.011 JB	0.023 JB	0.035 JB	0.0047 JB	0.018 JB	0.0076 JB	0.0066 JB	0.007 JB	0.014 JB	0.0099 JB	0.0073 JB	0.0073 JB
n-Tricosane	0.036 JB	0.076 B	0.09 JB	0.014 JB	0.046 JB	0.022 JB	0.018 JB	0.017 JB	0.03 JB	0.034 JB	0.022 JB	0.022 JB
n-Tetracosane	0.025 JB	0.023 JB	0.11 JB	0.022 JB	0.026 JB	0.019 JB	0.027 JB	0.026 JB	0.028 JB	0.033 JB	0.034 JB	0.034 JB
n-Pentacosane	0.048 JB	0.044 JB	0.21 B	0.046 JB	0.052 JB	0.04 JB	0.052 JB	0.05 JB	0.056 JB	0.072 B	0.075 B	0.075 B
n-Hexacosane	0.045 JB	0.03 JB	0.26 B	0.044 JB	0.062 B	0.044 JB	0.044 JB	0.065 B	0.062 JB	0.079 B	0.099 B	0.099 B
n-Heptacosane	0.064 B	0.047 JB	0.34 B	0.086 B	0.067 B	0.075 B	0.095 B	0.091 B	0.088 B	0.11 B	0.14 B	0.14 B
n-Octacosane	0.054 B	0.034 JB	0.3 B	0.078 B	0.053 JB	0.056 B	0.08 B	0.08 B	0.077 B	0.09 B	0.12 B	0.12 B
n-Nonacosane	0.056 B	0.042 JB	0.31 B	0.078 B	0.061 B	0.066 B	0.083 B	0.087 B	0.087 B	0.092 B	0.13 B	0.13 B
n-Triacontane	0.042 JB	0.026 JB	0.22 B	0.057 B	0.042 JB	0.044 JB	0.058 B	0.057 JB	0.06 JB	0.062 B	0.1 B	0.1 B
n-Hentriacontane	0.041 JB	0.027 JB	0.21 B	0.053 JB	0.044 JB	0.046 JB	0.053 JB	0.053 JB	0.056 JB	0.057 B	0.085 B	0.085 B
n-Dotriacontane	0.024 JB	0.016 JB	0.12 JB	0.032 JB	0.027 JB	0.024 JB	0.03 JB	0.031 JB	0.034 JB	0.035 JB	0.047 JB	0.047 JB
n-Tritriacontane	0.017 JB	0.0097 JB	0.085 JB	0.02 JB	0.02 JB	0.018 JB	0.019 JB	0.019 JB	0.021 JB	0.023 JB	0.032 JB	0.032 JB
n-Tetracontane	0.0084 JB	0.006 JB	0.045 JB	0.01 JB	0.01 JB	0.0073 JB	0.01 JB	0.0096 JB	0.013 JB	0.013 JB	0.016 JB	0.016 JB
n-Pentatriacontane	0.006 JB	0.0061 JB	0.03 JB	0.0061 JB	0.0081 JB	0.005 JB	0.0061 JB	0.0062 JB	0.0086 JB	0.0084 JB	0.0087 JB	0.0087 JB
n-Hexatriacontane	0.0033 J	0.0026 J	0.016 J	0.003 J	0.003 J	0.0024 J	0.0028 J	0.0028 J	0.0046 J	0.0038 J	0.0044 J	0.0044 J
n-Heptatriacontane	0.0019 J	ND	0.0099 J	ND	0.0036 J	ND	ND	ND	ND	0.0023 J	0.0024 J	0.0024 J
n-Octatriacontane	0.0024 J	0.0089 J	0.012 J	ND	ND	ND	ND	0.0051 J	ND	ND	ND	ND

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Tissue

	00-N18-01-PHC-	00-N13-01-PHC-T-AN	00-N03-01-PHC-	00-3A-01-PHC-T-AS	00-N12-01-PHC-T-AN	00-5F-01-PHC-T-CY	00-L08-01-PHC-T-AS	00-L09-01-PHC-T-AS	00-4A-01-PHC-T-AN	00-5(0)-01-PHC-T-AN	00-5H-01-PHC-T-AS
Field ID	AN		AN								
Lab ID	20A3472	20A3483	20A3495	20A3498	20A3502	20A3509	20A3512	20A3513	20A3517	20A3522	20A3524
Sample Type	N	N	N	N	N	N	N	N	N	N	N
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	9.76 g	9.86 g	2.68 g	8.72 g	9.26 g	9.72 g	8.94 g	8.36 g	7.96 g	9.92 g	9.17 g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB	DH-S-64PB
Field Date	08/25/00	08/19/00	08/17/00	08/20/00	08/19/00	08/19/00	08/21/00	08/21/00	08/21/00	08/22/00	08/22/00
Extract Date	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01
Analysis Date	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01	04/07/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	23.6	23.3	22	13.8	24.2	20.8	14.6	15.5	20.5	22.9	15
n-Nonatriacontane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Tetracontane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TPH (RES)	13 B	10 B	6.9 B	1.3 B	20 B	1.5 B	3 B	1.6 B	32	30	1.9 B
TPH	15	14	12	1.6	26	4.4	ND	ND	ND	ND	ND
5A-androstane	66	52	59	59	50	68	45	60	39	57	53
d50-tetracosane	70	56	63	63	51	70	47	61	40	59	53

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - SHC Results - Field QC

Field ID	00-N01-01-PHC-EB	00-N13-01-PHC-FB
Lab ID	20A3487	20A3503
Sample Type	N	N
Matrix	WATER	WATER
Associated Blank	DH-S-68PB	DH-S-68PB
Field Date	08/17/00	08/19/00
Extract Date	04/06/01	04/06/01
Analysis Date	04/10/01	04/10/01
Date Received	08/30/00	08/30/00
Percent Solids	NA	NA
Percent Lipids	NA	NA
Min Reporting Limit	7.7	5.9
Units	ug/L	ug/L

SHC/TPH		
n-Nonane	ND	ND
n-Decane	0.36 JB	ND
n-Undecane	ND	ND
n-Dodecane	ND	ND
n-Tridecane	ND	ND
Isoprenoid RRT 1380	ND	ND
n-Tetradecane	ND	ND
Isoprenoid RRT 1470	ND	ND
n-Pentadecane	ND	ND
n-Hexadecane	ND	ND
Isoprenoid RRT 1650	ND	ND
n-Heptadecane	ND	ND
Pristane	ND	ND
n-Octadecane	ND	ND
Phytane	ND	ND
n-Nonadecane	ND	ND
n-Eicosane	ND	ND
n-Heneicosane	0.33 J	ND
n-Docosane	0.48 J	0.18 J
n-Tricosane	1.3 J	0.55 JB
n-Tetracosane	1.5 J	0.77 J
n-Pentacosane	3 J	1.6 J
n-Hexacosane	3.8 J	2.1 J
n-Heptacosane	5.2 J	2.7 J
n-Octacosane	5.3 J	3.4 J
n-Nonacosane	4.8 J	2.8 J
n-Triacontane	3.5 J	2.4 J
n-Hentriacontane	3.2 J	2.4 J
n-Dotriacontane	1.9 J	1.7 J
n-Tritriacontane	1.4 J	1.3 J
n-Tetratriacontane	0.98 J	0.85 J
n-Pentatriacontane	0.59 J	0.66 J
n-Hexatriacontane	0.47 J	0.38 J
n-Heptatriacontane	0.28 J	0.24 J
n-Octatriacontane	0.56 J	0.43 J
n-Nonatriacontane	ND	ND
n-Tetracontane	ND	ND
%ortho-terphenyl	60	67
%5A-androstane	60	67
%d50-tetracosane	60	67

Field ID	00-C0L-01-PHC-S	00-SAG-01-PHC-S	00-N14-01-PHC-S	00-N13-03-PHC-S	00-N12-01-PHC-S	00-SF-01-PHC-S	00-N15-01-PHC-S	00-N21-01-PHC-S	00-L07-01-PHC-S	00-L08-01-PHC-S	00-L01-01-PHC-S	00-4A-01-PHC-S	00-4B-01-PHC-S	00-5(1)-01-PHC-S	00-5(5)-01-PHC-S	00-5(10)-01-PHC-S	00-5(0)-01-PHC-S
Lab ID	20A3500 F1	20A3501 F1	20A3504 F1	20A3506 F1	20A3506 F1	20A3507 F1	20A3508 F1	20A3510 F1	20A3514 F1	20A3515 F1	20A3516 F1	20A3518 F1	20A3519 F1	20A3520 F1	20A3521 F1	20A3523 F1	20A3525 F1
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	24.52 g	22.34 g	14.97 g	17.22 g	15.4 g	20.98 g	25.19 g	14.71 g	21.18 g	22.2 g	15.66 g	21.06 g	19.42 g	20.05 g	20.44 g	22.09 g	20.72 g
Weight Basis	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Associated Blank	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA
Field Date	08/24/00	08/25/00	08/19/00	08/19/00	08/19/00	08/19/00	08/19/00	08/21/00	08/21/00	08/21/00	08/21/00	08/21/00	08/21/00	08/22/00	08/22/00	08/22/00	08/22/00
Extract Date	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01	03/07/01
Analysis Date	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/15/01	03/16/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	79.7	72.5	49.4	57.2	50.3	68.2	82.2	48.9	70.7	73.5	51.9	71.5	63.3	66.3	68.3	73.4	69.1
Percent Lipids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.51	0.56	0.84	0.72	0.81	0.6	0.5	0.85	0.59	0.56	0.8	0.59	0.64	0.62	0.61	0.56	0.6
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>Sterane-Triterpane Biomarkers</b>																	
T4-C23Diterpane	0.5 J	0.65	2	1.2	2.1	0.74	0.083 J	2.2	0.81	1.4	1.7	0.59	3.2	0.72	0.56 J	0.57	0.54 J
S4-Diacholestane	0.4 J	1	2.4	1.6	2.2	0.82	0.065 J	2.6	0.93	1.5	2.1	1.1	3.4	0.89	0.73	0.62	0.73
S5-Diacholestane	0.27 J	0.53 J	1.6	1	1.6	0.55 J	0.059 J	1.8	0.63	1.1	1.4	0.72	2.2	0.6 J	0.51 J	0.44 J	0.54 J
T9-C29Tricyclitriterpane	0.12 J	0.12 J	0.36 J	0.19 J	0.26 J	0.11 J	0.018 J	0.45 J	0.3 J	0.32 J	0.36 J	0.16 J	0.79	0.099 J	0.096 J	0.096 J	0.098 J
T10-C29Tricyclitriterpane	0.11 J	0.16 J	0.38 J	0.27 J	0.43 J	0.16 J	0.013 J	0.33 J	0.15 J	0.29 J	0.32 J	0.14 J	0.69	0.13 J	0.065 J	0.084 J	0.087 J
T11-Trisanorhopane(TS)	0.43 J	0.51 J	1.4	0.92	1.8	0.5 J	0.051 J	1.2	0.41 J	0.94	1.5	0.61	1.1	0.47 J	0.38 J	0.47 J	0.47 J
T12-Trisanorhopane(TM)	1.8	1.4	7.2	5	9	2.2	0.17 J	9.9	0.99	1.6	3.6	1.9	2.7	2.4	1.9	1.7	1.5
S24-Methylcholestane	2	1.1	5.9	4.8	9.6	1.9	0.14 J	10	0.82	2.1	3	1.2	3	2	1.6	1	1.1
S25-Ethylcholestane	0.46 J	0.48 J	1.6	1.3	1.4	0.5 J	0.059 J	2.2	0.35 J	0.64	0.98	0.7	1.3	0.4 J	0.22 J	0.43 J	0.56 J
S28-Ethylcholestane	6.7	3.6	60	31	57	16	0.7	65	5.4	10	14	6.5	12	9.5	8.2	5.8	6.2
T15-Norhopane	3.3	3.3	20	12	19	5.6	0.43 J	22	2.8	6.2	11	5.2	7.9	5.6	4.5	3.6	4
T18-Cleanane	ND	0.076 J	0.43 J	0.2 J	0.19 J	0.14 J	ND	0.38 J	0.28 J	0.4 J	0.32 J	0.25 J	0.62 J	ND	4.7	ND	0.12 J
T19-Hopane	4.2	4.4	17	12	19	6.4	0.44 J	24	2.8	5.7	8.3	6.4	8.3	5.8	4.7	3.9	4.1
T21-Homohopane	1.4	1.4	5.6	3.9	6.8	1.9	0.16 J	9.5	1	2.4	3.7	2.8	1.8	1.3	1.1	1.1	1
T22-Homohopane	4.9	11	20	12	20	10	0.48 J	25	2.4	3.1	8	4.2	4.8	5.4	5.9	3.4	4.2
SB(H)-Cholane	93	96	98	99	100	104	95	102	95	108	108	103	94	106	102	83	112

Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - ST Results - Sediment

00-N05-01-PHC-S 20A3526 F1	00-N08-01-PHC-S 20A3527 F1	00-L09-01-PHC-S 20A03511REF F1	00-N09-01-PHC-S 20A3528 F1	00-5A-01-PHC-S 20A3529 F1	00-3A-01-PHC-S 20A3530 F1	00-L04-01-PHC-S 20A3531 F1	00-N11-01-PHC-S 20A3532 F1	00-N04-01-PHC-S 20A3533 F1	00-3B-01-PHC-S 20A3534 F1	00-5B-01-PHC-S 20A3535 F1	00-5E-01-PHC-S 20A3536 F1	00-N20-01-PHC-S 20A3537 F1	00-L08-02-PHC-S 20A3538 F1	00-L08-03-PHC-S 20A3539 F1	00-L06-01-PHC-S 20A3540 F1	00-N06-01-PHC-S 20A3468 REF F1	00-N18-01-PHC-S 20A3469 REF F1	00-N23-01-PHC-S 20A3473 REF F1	00-COL-02-PHC-S 20A3474 REF F1
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
16.74 g	20.26 g	23.5 g	19.82 g	12.41 g	17.64 g	18.59 g	17.69 g	19.64 g	23.04 g	22.59 g	19.09 g	19.5 g	22.72 g	17.1 g	19.64 g	16.79 g	17.05 g	21.16 g	
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
DH-S-58PB PCA	DH-S-58PB PCA	DH-S-58PB PCA	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-61PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1
08/13/00	08/13/00	08/21/00	08/18/00	08/18/00	08/20/00	08/20/00	08/13/00	08/13/00	08/20/00	08/17/00	08/17/00	08/18/00	08/21/00	08/21/00	08/21/00	08/17/00	08/17/00	08/23/00	08/24/00
03/07/01	03/07/01	03/07/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	03/08/01	02/20/01	02/20/01	02/20/01	02/20/01
03/16/01	03/16/01	03/21/01	03/20/01	03/20/01	03/20/01	03/20/01	03/21/01	03/21/01	03/21/01	03/21/01	03/21/01	03/21/01	03/21/01	03/21/01	03/21/01	03/27/01	03/27/01	03/27/01	03/27/01
08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
54.1	67.3	77.4	65.8	40.9	58.6	61.2	58	41.7	63.3	76.2	74.8	62.7	64.7	75.2	56	63.8	55.6	56.5	68.8
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.75	0.62	0.53	0.63	1	0.71	0.67	0.71	0.99	0.64	0.54	0.55	0.65	0.64	0.55	0.73	0.64	0.74	0.73	0.59
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
1.7	2.6	0.21 J	0.28 J	1.7	0.76	0.52 J	1.2	1.6	0.58 J	0.87	0.56	1	1.6	1.1	0.65 J	0.73	1.1	1.4	1.6
2	2.4	0.34 J	0.39 J	2.1	1.1	0.87	1.4	2	0.77	0.81	0.58	1	1.8	1.5	1.1	0.97	1.4	2.1	1.8
1.4	1.6	0.22 J	0.26 J	1.4	0.64 J	0.55 J	0.87	1.4	0.48 J	0.48 J	0.39 J	0.7	1.1	0.74	0.65 J	0.49 J	0.98	1.4	1.6
0.35 J	0.58 J	0.042 J	0.17 J	0.4 J	0.21 J	0.24 J	0.3 J	0.48 J	0.15 J	0.29 J	0.23 J	0.2 J	0.39 J	0.31 J	0.26 J	0.48 J	0.24 J	0.46 J	0.38 J
0.32 J	0.56 J	0.052 J	0.21 J	0.4 J	0.24 J	0.18 J	0.19 J	0.42 J	0.16 J	0.23 J	0.14 J	0.18 J	0.39 J	0.3 J	0.19 J	0.17 J	0.23 J	0.42 J	0.38 J
1.7	0.78	0.22 J	0.38 J	2.1	0.78	0.74	1	2.1	0.64	0.28 J	0.5 J	0.98	1.3	1.2	0.83	0.91	1.1	1.3	0.83
6.4	2.8	0.6	1.1	8.4	1.5	2.1	3.8	9.1	1.6	0.34 J	1.4	4.2	2	1.3	1.9	2.3	4.5	3.6	2.1
5.9	3.2	0.56	1.1	8.4	1.8	1.4	2.8	9.6	1.4	0.54	1.2	3.8	2.1	1.8	1.6	2.4	4.5	3.4	2.3
1.7	0.74	0.15 J	0.31 J	1.6	0.73	0.67	0.73	2	0.54 J	0.3 J	0.45 J	1	0.97	1.2	0.66 J	0.54 J	1.1	1.4	2.6
26	10	2.2	4.4	10	23	31	51	7.8	0.75	4.2	28	17	5.7	24	9.7	20	20	86	86
16	6.5	1.7	3.2	20	6.2	7	12	20	4.2	0.95	3.6	11	8.8	5.3	5.7	11	10	29	29
0.15 J	0.34 J	0.11 J	ND	0.17 J	0.34 J	0.25 J	0.24 J	0.21 J	0.13 J	0.086 J	0.29 J	0.59 J	0.42 J	0.42 J	0.098 J	0.13 J	0.52 J	ND	ND
15	7.2	1.8	2.9	21	5.6	6	9.8	21	4.7	1	4.2	10	6.6	5.6	6.5	12	11	34	34
4.6	2.2	0.7	1.4	8.9	2.3	2.3	3.9	7.5	1.8	0.4 J	1.8	3.8	2.7	2.4	2.1	4.6	4.2	18	18
14	6	1.8	2.9	20	3.5	5.2	13	20	2.9	0.4 J	2.5	13	5.1	3.3	4.9	5.1	14	6.4	62
103	107	78	83	81	89	86	84	83	90	77	76	76	86	79	78	77	69	73	72

Arthur D. Little  
Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - ST Results - Sediment

00-KUP-01-PHC-S 20A3475 REF F1	00-KUP-02-PHC-S 20A3476 REF F1	00-N00-01-PHC-S 20A3482 REF F1	00-N13-02-PHC-S 20A3484 REF F1	00-N13-01-PHC-S 20A3485 REF F1	00-N19-01-PHC-S 20A3486 REF F1	00-N10-01-PHC-S 20A3488 REF F1	00-N03-01-PHC-S 20A3489 REF F1	00-N07-01-PHC-S 20A3490 REF F1	00-N16-01-PHC-S 20A3491 REF F1	00-N02-01-PHC-S 20A3492 REF F1	00-N01-01-PHC-S 20A3493 REF F1	00-N17-01-PHC-S 20A3494 REF F1	00-SD-01-PHC-S 20A3496 REF F1	00-SH-01-PHC-S 20A3497 REF F1	00-4C-01-PHC-S 20A3499 REF F1
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SEDIMENT	PEAT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
23.02 g	20.9 g	21.1 g	15.88 g	16.46 g	18.62 g	19.31 g	16.02 g	16.3 g	18.17 g	19.09 g	23.3 g	17.86 g	16.66 g	22.17 g	17.71 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1	DH-S-55PB F1
08/24/00	08/24/00	08/24/00	08/19/00	08/19/00	08/17/00	08/17/00	08/17/00	08/17/00	08/17/00	08/17/00	08/17/00	08/22/00	08/22/00	08/22/00	08/21/00
02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01	02/20/01
03/27/01	03/27/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01
08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
75.6	66.2	66.1	51.4	53.7	61	62	51.4	54.2	59.6	62.4	75.4	57.3	54.2	69.1	57.4
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.54	0.6	1.2	0.79	0.76	0.67	0.65	1.6	0.76	0.69	0.65	0.54	0.7	0.75	0.56	0.7
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
0.1 J	0.29 J	1 J	1.3	1	0.87	1.7	1.3 J	1.3	1.1	0.74	0.18 J	1.2	1.1	0.67	0.4 J
0.062 J	0.38 J	1.6	1.8	1.6	1.2	1.5	1.7	1.8	1.5	1	0.19 J	1.4	1.4	0.84	0.67 J
0.035 J	0.21 J	0.89 J	1.3	1.1	0.75	1	1 J	1	0.94	0.56 J	0.13 J	0.96	0.86	0.49 J	0.35 J
ND	0.092 J	0.3 J	0.32 J	0.28 J	0.22 J	0.3 J	0.32 J	0.34 J	0.37 J	0.19 J	0.044 J	0.3 J	0.3 J	0.17 J	0.13 J
ND	0.1 J	0.28 J	0.33 J	0.28 J	0.22 J	0.28 J	0.35 J	0.34 J	0.35 J	0.22 J	0.043 J	0.33 J	0.31 J	0.2 J	0.12 J
0.06 J	0.18 J	1.3	1.3	1	0.86	1.4	1.3 J	1.4	1.2	0.84	0.2 J	1.3	0.71 J	0.57	0.48 J
0.12 J	2.2	3.4	6.8	5.2	3.3	3.7	3.4	3.4	3.2	2.2	0.41 J	3.2	4	1.4	1.2
0.06 J	0.6	3.1	7	5.3	3	2.6	3.4	3.5	3.2	2.2	0.38 J	3.3	3.4	1.5	1.1
0.033 J	0.27 J	1.2	1.3	1.1	0.78	0.85	1.1 J	1	1	0.7	0.12 J	1	1.2	0.51 J	0.37 J
0.38 J	22	18	40	30	15	31	16	16	18	8.5	1.4	16	48	9.6	5.7
0.4 J	6	11	14	14	7.5	12	8.6	9.9	10	6.2	1.1	8.7	14	4.2	3.2
ND	0.077 J	0.48 J	0.31 J	0.28 J	0.17 J	0.2 J	0.28 J	0.41 J	0.21 J	0.16 J	0.12 J	0.17 J	0.61 J	0.14 J	0.14 J
0.45 J	5	11	16	13	9	9.4	9.9	10	9.9	6.2	1.2	9.7	10	4.2	3.6
0.14 J	1.4	4	6	4.6	3.5	3.6	4.1	4	4.2	2.4	0.53 J	4	3.4	1.7	1.4
0.35 J	12	9.4	18	14	8	14	6.6	7.5	8.2	4.7	0.8	7	15	3.3	3.9
72	64	82	79	79	86	75	83	80	83	82	80	86	84	83	82

Arthur D. Little

Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - ST Results - Tissue

Field ID	00-3A-01-PHC-T-AS	00-4A-01-PHC-T-AN	00-5H-01-PHC-T-AS	00-5F-01-PHC-T-CY	00-5(0)-01-PHC-T-AN	00-N03-01-PHC-AN	00-N12-01-PHC-T-AN	00-N13-01-PHC-T-AN	00-N18-01-PHC-AN	00-L08-01-PHC-T-AS	00-L09-01-PHC-T-AS
Lab ID	20A3498F1	20A3517F1	20A3524F1	20A3509F1	20A3522F1	20A3495F1	20A3502F1	20A3483F1	20A3472F1	20A3512F1	20A3513F1
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	8.72 g	7.96 g	9.17 g	9.72 g	9.92 g	2.68 g	9.26 g	9.86 g	9.76 g	8.94 g	8.36 g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1	DH-S-64PBF1
Field Date	08/20/00	08/21/00	08/22/00	08/19/00	08/22/00	08/17/00	08/19/00	08/19/00	08/25/00	08/21/00	08/21/00
Extract Date	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01	03/28/01
Analysis Date	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01	04/12/01
Date Received	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00	08/30/00
Percent Solids	13.8	20.5	15	20.8	22.9	22	24.2	23.3	23.6	14.6	15.5
Percent Lipids	4.54	3.24	1.56	1.24	1.96	NA	12.8	0.987	4.48	1.78	2.97
Min Reporting Limit	1.4	1.6	1.4	1.3	1.3	4.7	1.3	1.3	1.3	1.4	1.5
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>Sterane-Triterpane Biomarkers</b>											
T4-C23Diterpane	0.044 J	0.095 J	0.066 J	0.096 J	0.071 J	0.38 J	0.13 J	0.23 J	0.12 J	0.1 J	0.06 J
S4-Diacholestane	0.066 J	0.14 J	0.12 J	0.13 J	0.1 J	0.27 J	0.13 J	0.21 J	0.13 J	0.086 J	0.097 J
S5-Diacholestane	0.048 J	ND	0.087 J	0.069 J	0.083 J	0.22 J	0.092 J	0.15 J	0.082 J	0.062 J	0.078 J
T9-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	0.07 J	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	0.047 J	ND	ND	ND
T11-Trisnorhopane(TS)	0.07 J	0.11 J	0.25 J	0.1 J	0.069 J	0.5 J	0.19 J	0.22 J	0.12 J	0.096 J	0.11 J
T12-Trisnorhopane(TM)	0.078 J	0.072 J	0.15 J	0.19 J	0.073 J	0.44 J	0.13 J	0.18 J	0.099 J	0.11 J	0.088 J
S24-Methylcholestane	0.078 J	0.11 J	0.13 J	0.14 J	0.074 J	0.25 J	0.14 J	0.13 J	0.096 J	0.09 J	0.13 J
S25-Ethylcholestane	0.059 J	0.16 J	0.14 J	0.1 J	0.23 J	0.11 J	0.13 J	0.074 J	0.1 J	0.1 J	0.086 J
S28-Ethylcholestane	0.19 J	0.29 J	0.39 J	0.66 J	0.24 J	0.59 J	0.42 J	0.46 J	0.31 J	0.23 J	0.24 J
T15-Norhopane	0.24 J	0.29 J	0.64 J	0.49 J	0.22 J	0.96 J	0.48 J	0.61 J	0.36 J	0.33 J	0.24 J
T18-Oleanane	0.6 J	0.55 J	0.56 J	0.6 J	0.45 J	2 J	0.53 J	0.54 J	0.55 J	0.58 J	0.52 J
T19-Hopane	0.31 J	0.34 J	0.88 J	0.51 J	0.3 J	1.2 J	0.46 J	0.59 J	0.43 J	0.46 J	0.36 J
T21-Homohopane	0.12 J	0.11 J	0.29 J	0.2 J	0.1 J	0.5 J	0.18 J	0.26 J	0.19 J	0.23 J	0.19 J
T22-Homohopane	0.12 J	0.15 J	0.28 J	0.36 J	0.15 J	0.55 J	0.24 J	0.31 J	0.22 J	0.22 J	0.29 J
5B(H)-Cholane	76	48	74	78	70	72	66	70	83	52	71



**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - ST Results - Field QC

Field ID	00-N01-01-PHC-EB	00-N13-01-PHC-FB
Lab ID	20A3487	20A3503
Sample Type	N	N
Matrix	WATER	WATER
Sample Size	0.065 L	0.085 L
Weight Basis	WET	WET
Associated Blank	DH-S-68PB	DH-S-68PB
Field Date	08/17/00	08/19/00
Extract Date	04/06/01	04/06/01
Analysis Date	04/12/01	04/12/01
Date Received	08/30/00	08/30/00
Percent Solids	NA	NA
Percent Lipids	NA	NA
Min Reporting Limit	190	150
Units	ng/L	ng/L

**Sterane-Triterpane Biomarkers**

T4-C23Diterpane	ND	ND
S4-Diacholestane	ND	ND
S5-Diacholestane	ND	ND
T9-C29Tricyclitriterpane	ND	ND
T10-C29Tricyclitriterpane	ND	ND
T11-Trisnorhopane(TS)	ND	ND
T12-Trisnorhopane(TM)	ND	ND
S24-Methylcholestane	ND	ND
S25-Ethylcholestane	ND	ND
S28-Ethylcholestane	ND	ND
T15-Norhopane	23 J	ND
T18-Oleanane	ND	ND
T19-Hopane	24 J	ND
T21-Homohopane	ND	ND
T22-Homohopane	ND	ND

5B(H)-Cholane

72

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Field ID	02-3A-01-PHC-S	02-3B-01-PHC-S	02-4A-01-PHC-S	02-4B-01-PHC-S	02-4C-01-PHC-S	02-5A-01-PHC-S	02-5B-01-PHC-S
Sample Type	N	N	N	N	N	N	N
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	19.17 g	18.04 g	20.89 g	22.18 g	24.91 g	17.51 g	24.26 g
Weight Basis	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Associated Blank	DY-S-69PB	DY-S-69PB	DY-S-66PB	DY-S-66PB	DY-S-66PB	DY-S-63PB	DY-S-63PB
Field Date	07/29/02	07/29/02	07/31/02	07/31/02	07/31/02	08/03/02	08/03/02
Extract Date	10/17/02	10/17/02	10/16/02	10/16/02	10/16/02	10/15/02	10/15/02
Analysis Date	10/31/02	10/31/02	10/29/02	10/29/02	10/29/02	10/25/02	10/26/02
Date Received	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
Percent Solids	63.1	59.6	68.9	73	81.9	57.6	79.7
Dilution Factor	1	1	1	1	1	1	1
Percent Lipids	NA	NA	NA	NA	NA	NA	NA
Min Reporting Limit	0.65	0.69	0.6	0.56	0.5	0.71	0.52
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	0.79	0.83	0.37 J	0.14 J	0.034 J	1.1	0.14 J
S4-Diacholestane	1.2	1.2	0.77	0.23 J	0.037 J	1.6	0.18 J
S5-Diacholestane	1.1	1.1	0.52 J	0.16 J	0.04 J	0.68 J	0.11 J
T9-C29Tricyclitriterpane	0.25 J	0.25 J	0.099 J	0.036 J	ND	0.28 J	0.038 J
T10-C29Tricyclitriterpane	0.22 J	0.23 J	0.093 J	0.032 J	ND	0.3 J	0.036 J
T11-Trisnorhopane(TS)	1.2	1.1	0.7	0.19 J	0.079 J	1.9	0.19 J
T12-Trisnorhopane(TM)	2.5	2.6	1.9	0.5 J	0.12 J	5.1	0.39 J
S24-Methylcholestane	2.4	2.3	1.2	0.39 J	0.067 J	4.4	0.35 J
S25-Ethylcholestane	0.79	0.81	0.76	0.16 J	0.042 J	1.1	0.17 J
S28-Ethylcholestane	3.8	5.8	6.6	2	0.24 J	24	1.3
T15-Norhopane	6.6	6.3	4.4	1	0.24 J	10	0.97
T18-Oleanane	0.23 J	0.36 J	ND	ND	ND	ND	ND
T19-Hopane	6.7	6.8	5.4	1.2	0.29 J	12	1.2
T21-Homohopane	2.9	3.1	2.5	0.5 J	0.16 J	4.6	0.54
T22-Homohopane	4	4.1	3.2	1.1	0.17 J	10	0.75
5B(H)-Cholane	78	82	89	85	82	80	76

02-5D-01-PHC-S	02-5D-02-PHC-S	02-5D-03-PHC-S	02-5E-01-PHC-S	02-5F-01-PHC-S	02-5H-01-PHC-S	02-5(0)-01-PHC-S	02-5(1)-01-PHC-S
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
21.49 g	21.12 g	20.24 g	23.44 g	21.38 g	23.29 g	22.38 g	24.8 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-63PB	DY-S-63PB	DY-S-63PB	DY-S-63PB	DY-S-63PB	DY-S-66PB	DY-S-66PB	DY-S-66PB
08/07/02	08/07/02	08/07/02	08/04/02	08/07/02	08/01/02	08/01/02	08/01/02
10/15/02	10/15/02	10/15/02	10/15/02	10/15/02	10/16/02	10/16/02	10/16/02
10/25/02	10/25/02	10/25/02	10/25/02	10/25/02	10/29/02	10/29/02	10/29/02
08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
71.1	69.9	66.9	77.5	71.2	77.4	73.2	82.2
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.58	0.59	0.62	0.53	0.58	0.54	0.56	0.5
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.37 J	0.45 J	0.46 J	0.11 J	0.5 J	0.24 J	0.21 J	0.044 J
0.62	0.81	0.74	0.14 J	0.98	0.38 J	0.37 J	0.051 J
0.33 J	0.34 J	0.36 J	0.093 J	0.25 J	0.28 J	0.22 J	0.058 J
0.12 J	0.16 J	0.17 J	0.036 J	0.17 J	0.067 J	0.071 J	0.017 J
0.11 J	0.15 J	0.13 J	0.037 J	0.15 J	0.074 J	0.08 J	0.0091 J
0.69	0.85	0.89	0.16 J	2	0.32 J	0.27 J	0.063 J
1.7	2.4	2.2	0.36 J	2.2	0.98	0.92	0.17 J
1.4	1.9	1.6	0.26 J	2.2	0.77	0.6	0.1 J
0.44 J	0.62	0.64	0.16 J	0.67	0.29 J	0.18 J	0.048 J
8.7	12	12	1	15	4.6	4.6	0.61
3.6	5	5.1	0.81	6	2.1	1.9	0.34 J
ND	ND	ND	ND	ND	0.12 J	ND	ND
4.2	5.8	5.3	0.96	6.5	2.4	2.2	0.38 J
1.5	2.1	1.9	0.42 J	2.5	0.97	0.88	0.18 J
7.2	11	9.5	0.57	10	2.9	2.6	0.51
78	77	81	67	80	88	93	84

02-5(5) -01-PHC-S	02-5(10)-01-PHC-S	02-L01-01-PHC-S	02-L04-01-PHC-S	02-L06-01-PHC-S	02-L07-01-PHC-S	02-L08-02-PHC-S	02-L09-01-PHC-S
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
20.94 g	22.82 g	23.37 g	20.67 g	20.85 g	21.24 g	21.97 g	23.74 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-66PB	DY-S-66PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-69PB
08/01/02	08/01/02	07/31/02	07/30/02	07/30/02	07/30/02	07/30/02	07/30/02
10/16/02	10/16/02	10/17/02	10/17/02	10/17/02	10/17/02	10/17/02	10/17/02
10/29/02	10/29/02	10/31/02	10/31/02	10/31/02	10/31/02	10/31/02	10/31/02
08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
69.4	75.9	76.8	67.4	68.1	69.2	73	78.7
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.6	0.55	0.53	0.6	0.6	0.59	0.57	0.53
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.43 J	0.18 J	0.18 J	0.46 J	0.6	0.49 J	1.4	0.15 J
0.67	0.28 J	0.36 J	0.93	1.1	0.88	2.2	0.27 J
0.44 J	0.21 J	0.33 J	0.72	1	0.94	1.8	0.3 J
0.13 J	0.046 J	ND	0.19 J	0.22 J	0.17 J	0.49 J	0.055 J
0.097 J	0.046 J	ND	0.17 J	0.15 J	0.13 J	0.36 J	0.059 J
0.58 J	0.25 J	0.39 J	1	1	0.87	1.9	0.35 J
1.9	0.72	0.79	2.3	2.2	1.9	3.2	0.73
1.4	0.6	0.63	1.5	1.9	1.6	3.8	0.59
0.39 J	0.24 J	0.34 J	0.73	0.89	0.65	1.9	0.19 J
8.8	3	4.9	7.5	4.2	4.5	7	2.4
3.9	1.5	2	5.5	5.5	4.9	8.7	1.5
ND	ND	ND	ND	0.26 J	0.21 J	0.53 J	0.092 J
4.6	1.8	2.2	5.7	6	4.9	9	1.8
1.8	0.72	0.85	2	2.4	1.9	3.5	0.66
4.6	1.9	2.2	5.8	4.9	4.3	6	2.1
80	80	77	81	78	78	77	81

02-N01-01-PHC-S	02-N02-01-PHC-S	02-N03-01-PHC-S	02-N03-02-PHC-S	02-N03-03-PHC-S	02-N04-01-PHC-S	02-N05-01-PHC-S	02-N06-01-PHC-S
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
23.62 g	19.17 g	16.42 g	15.1 g	14.49 g	19.49 g	16.67 g	18.92 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-66PB	DY-S-63PB	DY-S-66PB	DY-S-66PB	DY-S-66PB	DY-S-63PB	DY-S-63PB	DY-S-69PB
08/03/02	08/03/02	08/05/02	08/05/02	08/05/02	08/03/02	08/03/02	08/02/02
10/16/02	10/15/02	10/16/02	10/16/02	10/16/02	10/15/02	10/15/02	10/17/02
10/28/02	10/25/02	10/29/02	10/29/02	10/29/02	10/25/02	10/26/02	10/31/02
08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
77.8	62.9	54.3	50	48.2	64.1	55.4	62.9
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.53	0.65	0.76	0.83	0.86	0.64	1.5	0.66
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.11 J	1	0.82	1	0.97	0.79	1.2 J	0.73
0.14 J	1.3	1.1	1.4	1.6	1.1	1.7	1.1
0.099 J	0.79	0.7 J	0.86	0.98	0.57 J	0.96 J	1
0.046 J	0.31 J	0.23 J	0.29 J	0.28 J	0.21 J	0.36 J	0.29 J
0.031 J	0.24 J	0.18 J	0.28 J	0.21 J	0.22 J	0.28 J	0.24 J
0.18 J	1.1	1.2	1.6	1.4	1.5	1.9	1.3
0.39 J	3.2	3.3	4.4	4	4	6	3.2
0.38 J	2.9	2.9	3.7	3.3	3.7	5.3	2.9
0.16 J	0.71	0.81	1.1	0.74 J	0.86	1.2 J	0.71
1.5	13	16	18	18	20	28	14
0.87	7.3	7.1	8.8	8.8	8.4	12	6.8
0.28 J	ND	ND	ND	10	ND	ND	ND
1	8.2	8.3	10	9.7	9.3	14	7.8
0.52 J	3.3	3.4	4.7	4	3.8	5.4	3.2
0.74	6	6.5	8	7.4	9	12	7.1
84	76	79	82	88	74	81	78

02-N07-01-PHC-S	02-N08-01-PHC-S	02-N09-01-PHC-S	02-N10-01-PHC-S	02-N11-01-PHC-S	02-N12-01-PHC-S	02-N13-01-PHC-S	02-N14-01-PHC-S
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
20.37 g	16.74 g	18.97 g	17.49 g	22.58 g	18.68 g	14.31 g	16.8 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-66PB	DY-S-66PB	DY-S-66PB	DY-S-66PB	DY-S-69PB	DY-S-69PB	DY-S-66PB	DY-S-63PB
08/05/02	08/05/02	08/05/02	08/02/02	08/02/02	08/02/02	08/04/02	08/07/02
10/16/02	10/16/02	10/16/02	10/16/02	10/17/02	10/17/02	10/16/02	10/15/02
10/29/02	10/28/02	10/28/02	10/30/02	10/31/02	10/31/02	10/29/02	10/25/02
08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
67.8	54.8	62.6	57.2	74.2	61.5	47.3	55.9
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.61	0.75	0.66	0.71	0.55	0.67	0.87	0.74
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.37 J	0.76	0.52 J	0.77	0.61	0.61 J	1.1	0.9
0.59 J	1.2	0.69	1.1	0.76	1.2	1.5	1.4
0.35 J	0.53 J	0.46 J	0.67 J	0.2 J	0.88	0.56 J	0.53 J
0.088 J	ND	0.15 J	0.17 J	ND	0.2 J	0.27 J	0.29 J
0.09 J	ND	0.12 J	0.16 J	ND	0.22 J	0.29 J	0.24 J
0.53 J	2.3	0.75	1.1	1.5	1.5	1.8	1.6
1.6	2.8	2.1	3.5	1.8	3.6	5.9	4.9
1.4	3	1.8	3	1.4	2.4	4.8	4.3
0.33 J	0.77	0.54 J	0.62 J	0.67	1.2	1.1	1.1
6.9	15	8.8	18	5.2	7.4	45	40
3.4	7	4.3	7.3	5.7	8.9	13	13
ND	ND	ND	ND	ND	ND	ND	ND
4.1	8.4	5.2	8	5.3	8.8	13	13
1.7	3.8	2.2	3	2	3.5	4.8	4.9
4.1	8.2	3.9	8	6.9	11	19	19
82	84	78	92	81	73	83	71

02-N15-01-PHC-S	02-N16-01-PHC-S	02-N17-01-PHC-S	02-N18-01-PHC-S	02-N19-01-PHC-S	02-N20-01-PHC-S	02-N21-01-PHC-S	02-N23-01-PHC-S
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
24.41 g	15.18 g	16.92 g	19.81 g	15.45 g	25.03 g	17.81 g	20.88 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-63PB	DY-S-66PB	DY-S-66PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-63PB
08/07/02	08/05/02	08/05/02	08/02/02	08/02/02	08/02/02	08/02/02	08/05/02
10/15/02	10/16/02	10/16/02	10/17/02	10/17/02	10/17/02	10/17/02	10/15/02
10/25/02	10/28/02	10/29/02	10/31/02	10/31/02	10/31/02	10/31/02	10/26/02
08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
79.7	50.2	56.2	65.6	50.4	83.4	58.6	68.5
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.51	0.82	0.74	0.63	0.81	0.5	0.7	0.6
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.22 J	1.1	0.99	0.66	0.67 J	0.1 J	0.87	0.89
0.31 J	1.6	1.4	0.95	0.98	0.16 J	1.4	1.4
0.16 J	0.8 J	0.8	0.92	0.94	0.11 J	1	0.67
0.051 J	0.3 J	0.24 J	0.17 J	0.22 J	ND	0.28 J	0.26 J
0.062 J	0.34 J	0.21 J	0.19 J	0.13 J	ND	0.2 J	0.25 J
0.31 J	2.1	1.7	1.2	1.2	0.15 J	2.1	1.2
1.3	5.4	4.4	3	3	0.41 J	4.3	3.3
1.2	4.4	3.6	2.5	2.7	0.29 J	3.6	2.7
0.27 J	1	1	0.65	0.69 J	0.1 J	1.1	0.93
8.3	22	22	13	15	0.8	12	13
2.6	10	9.7	6.6	8.7	0.94	10	7.9
ND	12	ND	ND	ND	ND	ND	ND
2.9	12	11	7.4	7	1.1	10	8.3
1.1	5.1	4.3	3	2.9	0.35 J	3.6	3.3
3.4	9.9	9.1	11	8	1.2	14	6.8
81	82	90	80	78	77	74	75

02-COL-01-PHC-S	02-COL-01-PHC-P	02-SAG-01-PHC-S	02-SAG-01-PHC-P	02-CAN-01-PHC-S	02-CAN-02-PHC-S	02-KUP-01-PHC-S	02-KUP-01-PHC-P
N	N	N	N	N	N	N	N
SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
19.12 g	7.18 g	15.41 g	12.27 g	19.5 g	16.36 g	22.57 g	12.81 g
DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-69PB	DY-S-63PB	DY-S-63PB	DY-S-63PB	DY-S-63PB
08/13/02	08/13/02	08/14/02	08/14/02	08/09/02	08/09/02	08/06/02	08/06/02
10/17/02	10/17/02	10/17/02	10/17/02	10/15/02	10/15/02	10/15/02	10/15/02
10/31/02	10/31/02	10/31/02	11/01/02	10/25/02	10/25/02	10/25/02	10/25/02
08/23/02	08/23/02	08/23/02	08/23/02	08/15/02	08/15/02	08/15/02	08/15/02
63.6	23.6	50.4	40.8	64	54.3	74.9	42.3
1	1	1	1	1	1	1	1
NA	NA	NA	NA	NA	NA	NA	NA
0.65	1.7	0.81	1	0.64	0.76	0.55	0.98
ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

0.71	0.54 J	0.68 J	0.29 J	0.3 J	0.18 J	2	0.5 J
0.92	0.84 J	1.5	0.45 J	0.72	0.54 J	4.1	0.65 J
0.48 J	0.24 J	1.1	ND	0.26 J	0.21 J	1.4	0.11 J
0.22 J	ND	0.33 J	0.15 J	0.11 J	0.12 J	0.74	0.14 J
0.18 J	ND	0.26 J	0.12 J	0.12 J	0.089 J	0.64	0.37 J
2.4	ND	1.4	ND	0.98	0.55 J	3.1	0.66 J
5.2	2.6	3.4	5.2	1.5	1.8	3.4	5.6
5.4	2	2.4	0.53 J	0.53 J	0.28 J	2.6	7.1
1.1	ND	0.98	0.25 J	0.5 J	0.22 J	2.5	0.24 J
19	ND	13	4.7	4.2	2.7	17	20
9.9	90	6	5.7	4.1	4	12	12
ND	ND	ND	0.95 J	0.39 J	0.81	ND	1.7
11	5.2	8.9	5.8	4.8	3.5	11	15
4.6	2.1	2.8	1.7	2.2	1.2	4.5	3.2
12	4.9	22	12	2.6	2.3	24	25
76	71	69	79	78	74	70	60



<b>02-KUP-02-PHC-S</b>	<b>02-KUP-02-PHC-P</b>
<b>N</b>	<b>N</b>
<b>SEDIMENT</b>	<b>SEDIMENT</b>
<b>18.18 g</b>	<b>12.83 g</b>
<b>DRY</b>	<b>DRY</b>
<b>DY-S-63PB</b>	<b>DY-S-63PB</b>
<b>08/07/02</b>	<b>08/07/02</b>
<b>10/15/02</b>	<b>10/15/02</b>
<b>10/25/02</b>	<b>10/25/02</b>
<b>08/15/02</b>	<b>08/15/02</b>
<b>59.9</b>	<b>42.4</b>
<b>1</b>	<b>1</b>
<b>NA</b>	<b>NA</b>
<b>0.69</b>	<b>0.97</b>
<b>ug/Kg</b>	<b>ug/Kg</b>

1.2	6.2
2	13
0.82	5
0.48 J	2.2
0.35 J	1.9
2.3	5.1
5.5	15
1.8	6.2
1.6	9
52	77
25	98
ND	ND
11	37
4	14
36	100
74	77

Field ID	Northstar Oil	KUPARIC WELL 3H-5
Sample Type	N	N
Matrix	OIL	CRUDE OIL
Sample Size	5.18 mg	5.2 mg
Weight Basis	OIL	OIL
Associated Blank	DY-S-77PB	EB-S-61PB
Field Date	07/18/02	08/12/01
Extract Date	10/17/02	02/20/03
Analysis Date	10/18/02	02/25/03
Date Received	07/19/02	08/31/01
Percent Solids	NA	NA
Dilution Factor	1	1
Percent Lipids	NA	NA
Min Reporting Limit	4.8	4.8
Units	mg/Kg	mg/Kg

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	41	84
S4-Diacholestane	42	33
S5-Diacholestane	23	21
T9-C29Tricyclitriterpane	18	22
T10-C29Tricyclitriterpane	16	20
T11-Trisnorhopane(TS)	14	22
T12-Trisnorhopane(TM)	6.6	34
S24-Methylcholestane	11	13
S25-Ethylcholestane	21	36
S28-Ethylcholestane	16	31
T15-Norhopane	26	99
T18-Oleanane	ND	ND
T19-Hopane	49	100
T21-Homohopane	19	47
T22-Homohopane	13	38
5B(H)-Cholane	107	100

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004084  
Data Table: ST Results - Tissues - Surrogate Corrected

Field ID	02-3A-01-PHC-T-AS	02-4A-01-PHC-T-AN	02-4A-02-PHC-T-AN	02-5H-01-PHC-T-AS	02-5F-01-PHC-T-CY	02-5(0)-01-PHC-T-AN	02-L08-01-PHC-T-AS	02-L09-01-PHC-T-AS	02-N03-01-PHC-T-AN	02-N04-01-PHC-T-AN	02-N12-01-PHC-T-AN
Sample Type	N	N	N	N	N	N	N	N	N	N	N
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	10.21 g	5.7 g	10.06 g	10.14 g	10.03 g	10.02 g	10.01 g	10.07 g	10.13 g	10.09 g	10.17 g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-76PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB
Field Date	07/29/02	07/31/02	08/20/02	08/01/02	08/07/02	08/01/02	07/30/02	07/30/02	08/10/02	08/11/02	08/03/02
Extract Date	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02
Analysis Date	11/03/02	11/03/02	11/04/02	11/03/02	11/02/02	11/03/02	11/03/02	11/03/02	11/02/02	11/02/02	11/03/02
Date Received	08/15/02	08/15/02	08/23/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02	08/15/02
Percent Solids	11.9	21.8	26.9	13.5	45.3	22.3	12.8	9.56	24.7	25.1	21.7
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Lipids	0.644	3.07	0.209	0.373	0.14	0.128	0.178	0.183	2.36	0.17	0.256
Min Reporting Limit	1.2	2.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

**Sterane-Triterpane Biomarkers**

T4-C23Diterpane	0.051 J	0.092 J	0.066 J	0.062 J	0.07 J	0.068 J	0.081 J	0.055 J	0.11 J	0.09 J	0.069 J
S4-Diacholestane	0.06 J	0.098 J	0.12 J	0.072 J	0.092 J	0.11 J	0.068 J	0.048 J	0.22 J	0.1 J	0.074 J
S5-Diacholestane	0.086 J	0.2 J	0.14 J	0.11 J	0.14 J	0.12 J	0.13 J	0.085 J	0.22 J	0.13 J	0.075 J
T9-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
T11-Trisnorhopane(TS)	0.052 J	0.098 J	0.072 J	0.095 J	0.12 J	0.096 J	ND	0.069 J	0.2 J	0.11 J	0.07 J
T12-Trisnorhopane(TM)	0.058 J	0.12 J	0.16 J	0.1 J	0.2 J	0.14 J	0.089 J	0.068 J	0.16 J	0.16 J	0.09 J
S24-Methylcholestane	0.074 J	0.1 J	0.1 J	0.46 J	0.12 J	0.073 J	ND	ND	0.14 J	0.13 J	0.045 J
S25-Ethylcholestane	ND	0.048 J	ND	ND	ND	ND	ND	ND	0.098 J	ND	ND
S28-Ethylcholestane	0.15 J	0.3 J	0.34 J	0.34 J	0.82 J	0.28 J	0.15 J	0.12 J	0.44 J	0.35 J	0.3 J
T15-Norhopane	0.16 J	0.37 J	0.33 J	0.23 J	0.43 J	0.29 J	0.24 J	0.16 J	0.52 J	0.39 J	0.23 J
T18-Oleanane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
T19-Hopane	0.2 J	0.55 J	0.39 J	0.28 J	0.51 J	0.35 J	0.27 J	0.24 J	0.58 J	0.4 J	0.24 J
T21-Homohopane	0.092 J	0.16 J	0.15 J	0.12 J	0.2 J	0.16 J	0.091 J	0.11 J	0.27 J	0.18 J	0.12 J
T22-Homohopane	0.085 J	0.17 J	0.2 J	0.15 J	0.43 J	0.28 J	0.12 J	0.1 J	0.24 J	0.21 J	0.17 J

5B(H)-Cholane	64	68	65	62	62	60	54	60	48	66	70
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Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: ST Results - Tissues - Surrogate Corrected

	02-N13-01-PHC-T-	02-N18-01-PHC-T-	02-PM1-01-PHC-T-	02-NM1-01-PHC-T-	02-NM2-01-PHC-T-	02-NM3-01-PHC-T-	02-3M1-01-PHC-T-	02-3M2-01-PHC-T-	02-3M3-01-PHC-T-
Field ID	AN	AN	MU	MU	MU	MU	MU	MU	MU
Sample Type	N	N	N	N	N	N	N	N	N
Matrix	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sample Size	10.06g	10.06g	10.08g	10.09g	10.07g	10.14g	10.06g	10.15g	10.12g
Weight Basis	WET	WET	WET	WET	WET	WET	WET	WET	WET
Associated Blank	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB	DY-S-72PB
Field Date	08/04/02	08/02/02	07/29/02	08/18/02	08/18/02	08/18/02	08/20/02	08/20/02	08/20/02
Extract Date	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02	10/16/02
Analysis Date	11/03/02	11/03/02	11/03/02	11/03/02	11/03/02	11/03/02	11/03/02	11/03/02	11/03/02
Date Received	08/15/02	08/15/02	08/15/02	08/23/02	08/23/02	08/23/02	08/23/02	08/23/02	08/23/02
Percent Solids	25.3	23.3	8.35	10	10.5	9.16	9.22	8.59	10.1
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Lipids	0.28	0.274	0.637	0.918	0.535	0.676	1.91	0.284	0.361
Min Reporting Limit	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

**Sterane-Triterpane Bior**

T4-C23Diterpane	0.066J	0.081J	0.06J	0.049J	0.054J	0.051J	0.059J	0.061J	0.068J
S4-Diacholestane	0.13J	0.073J	0.056J	0.061J	0.059J	0.045J	0.073J	0.055J	0.11J
S5-Diacholestane	0.12J	0.1J	0.1J	0.092J	0.078J	0.082J	0.084J	0.099J	0.13J
T9-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND	ND	ND	ND	ND	ND	ND
T11-Trisnorhopane(TS)	0.12J	0.08J	0.061J	0.081J	0.078J	0.05J	0.065J	0.063J	0.11J
T12-Trisnorhopane(TM)	0.16J	0.099J	0.054J	0.12J	0.073J	0.093J	0.095J	0.092J	0.12J
S24-Methylcholestane	0.097J	ND	0.096J	0.12J	0.15J	0.1J	0.095J	0.057J	0.08J
S25-Ethylcholestane	ND	ND	ND	ND	ND	ND	ND	ND	ND
S28-Ethylcholestane	0.58J	0.26J	0.1J	0.26J	0.33J	0.22J	0.19J	0.22J	0.25J
T15-Norhopane	0.36J	0.28J	0.17J	0.21J	0.27J	0.2J	0.2J	0.2J	0.24J
T18-Oleanane	ND	ND	ND	ND	ND	ND	ND	ND	ND
T19-Hopane	0.36J	0.35J	0.2J	0.26J	0.28J	0.25J	0.24J	0.25J	0.32J
T21-Homohopane	0.14J	0.13J	0.072J	0.11J	0.15J	0.1J	0.12J	0.091J	0.1J
T22-Homohopane	0.28J	0.16J	0.064J	0.17J	0.18J	0.14J	0.13J	0.15J	0.15J

5B(H)-Cholane	64	68	66	65	64	67	67	64	57
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Field ID	02-CAN-03-PHC-S	02-5F-01-PHC-EB	02-5(5) -01-PHC-FB	02-L08-01-PHC-EB
Sample Type	N	N	N	N
Matrix	WATER/SEDIMENT	WATER	BOTTLE BLANK	WATER
Sample Size	0.09 L	0.085 L	1	0.065 L
Weight Basis	WET	WET	As Received	WET
Associated Blank	DY-S-75PB	DY-S-75PB	DY-S-75PB	DY-S-75PB
Field Date	08/09/02	08/07/02	08/01/02	07/30/02
Extract Date	10/16/02	10/16/02	10/16/02	10/16/02
Analysis Date	10/18/02	10/18/02	10/18/02	10/18/02
Date Received	08/15/02	08/15/02	08/15/02	08/15/02
Percent Solids	NA	NA	NA	NA
Dilution Factor	1	1	1	1
Percent Lipids	NA	NA	NA	NA
Min Reporting Limit	140	150	12	190
Units	ng/L	ng/L	ng	ng/L

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	ND	ND	ND	ND
S4-Diacholestane	ND	ND	ND	ND
S5-Diacholestane	ND	ND	ND	ND
T9-C29Tricyclitriterpane	ND	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND	ND
T11-Trisnorhopane(TS)	ND	ND	ND	ND
T12-Trisnorhopane(TM)	ND	ND	ND	ND
S24-Methylcholestane	ND	ND	ND	ND
S25-Ethylcholestane	ND	ND	ND	ND
S28-Ethylcholestane	ND	ND	ND	ND
T15-Norhopane	ND	ND	ND	ND
T18-Oleanane	ND	ND	ND	ND
T19-Hopane	ND	ND	ND	ND
T21-Homohopane	ND	ND	ND	ND
T22-Homohopane	ND	ND	ND	ND

5B(H)-Cholane

95

94

96

96

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4069

Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank
Sample Type	PB
Matrix	WATER
Sample Size	0.15 L
Weight Basis	WET
Associated Blank	NA
Field Date	10/16/02
Extract Date	10/16/02
Analysis Date	10/18/02
Date Received	10/16/02
Percent Solids	NA
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	83
Units	ng/L

### Polynuclear Aromatic Hydrocarbons

Naphthalene	6.7 J
C1-Naphthalenes	2.9 J
C2-Naphthalenes	6.1 J
C3-Naphthalenes	ND
C4-Naphthalenes	ND
Acenaphthylene	ND
Acenaphthene	ND
Biphenyl	ND
Fluorene	ND
C1-Fluorenes	ND
C2-Fluorenes	ND
C3-Fluorenes	ND
Anthracene	1.2 J
Phenanthrene	6.2 J
C1-Phenanthrenes/anthracenes	ND
C2-Phenanthrenes/anthracenes	ND
C3-Phenanthrenes/anthracenes	ND
C4-Phenanthrenes/anthracenes	ND
Dibenzothiophene	ND
C1-Dibenzothiophenes	ND
C2-Dibenzothiophenes	ND
C3-Dibenzothiophenes	ND
Fluoranthene	2.7 J
Pyrene	2.7 J
C1-Fluoranthenes/pyrenes	ND
C2-Fluoranthenes/pyrenes	ND
C3-Fluoranthenes/pyrenes	ND
Benzo[a]anthracene	ND
Chrysene	ND
C1-Chrysenes	ND
C2-Chrysenes	ND
C3-Chrysenes	ND
C4-Chrysenes	ND
Benzo[b]fluoranthene	ND
Benzo[k]fluoranthene	ND
Benzo[e]pyrene	ND
Benzo[a]pyrene	ND
Perylene	ND
Indeno[1,2,3,-c,d]pyrene	ND
Dibenzo[a,h]anthracene	ND
Benzo[g,h,i]perylene	ND
d8-Naphthalene	71
d10-Acenaphthene	80
d10-Phenanthrene	84
d12-Benzo[a]pyrene	79

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4069

Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank
Sample Type	PB
Matrix	WATER
Sample Size	0.15 L
Weight Basis	WET
Associated Blank	NA
Field Date	10/16/02
Extract Date	10/16/02
Analysis Date	10/18/02
Date Received	10/16/02
Percent Solids	NA
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	83
Units	ng/L

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	ND
S4-Diacholestane	ND
S5-Diacholestane	ND
T9-C29Tricyclitriterpane	ND
T10-C29Tricyclitriterpane	ND
T11-Trisnorhopane(TS)	ND
T12-Trisnorhopane(TM)	ND
S24-Methylcholestane	ND
S25-Ethylcholestane	ND
S28-Ethylcholestane	ND
T15-Norhopane	ND
T18-Oleanane	ND
T19-Hopane	ND
T21-Homohopane	ND
T22-Homohopane	ND

5B(H)-Cholane	89
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Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4069

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference			
Sample Type	Standard			
Matrix	ORS			
Sample Size	OIL			
Weight Basis	5.1 mg			
Associated Blank	OIL			
Field Date	NA			
Extract Date	04/23/02			
Analysis Date	04/23/02			
Date Received	10/18/02			
Percent Solids	04/23/02			
Dilution Factor	NA			
Percent Lipids	1			
Min Reporting Limit	NA			
Units	4.9			
	mg/Kg	T	%D	Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	774	710	9.01
C1-Naphthalenes	1440	1600	-10
C2-Naphthalenes	2060	2300	-10.4
C3-Naphthalenes	1720	1960	-12.2
C4-Naphthalenes	968	1180	-18
Acenaphthylene	ND		
Acenaphthene	ND		
Biphenyl	222	214	3.74
Fluorene	105	95.2	10.3
C1-Fluorenes	247	239	3.35
C2-Fluorenes	359	356	0.843
C3-Fluorenes	348	396	-12.1
Anthracene	ND		
Phenanthrene	283	260	8.85
C1-Phenanthrenes/anthracenes	628	612	2.61
C2-Phenanthrenes/anthracenes	702	752	-6.65
C3-Phenanthrenes/anthracenes	517	534	-3.18
C4-Phenanthrenes/anthracenes	313	308	1.62
Dibenzothiophene	252	222	13.5
C1-Dibenzothiophenes	508	484	4.96
C2-Dibenzothiophenes	636	658	-3.34
C3-Dibenzothiophenes	583	574	1.57
Fluoranthene	ND		
Pyrene	14.3	13.4	6.72
C1-Fluoranthenes/pyrenes	90.3	83.9	7.63
C2-Fluoranthenes/pyrenes	159	142	12
C3-Fluoranthenes/pyrenes	172	158	8.86
Benzo[a]anthracene	ND		
Chrysene	56.1	49.2	14
C1-Chrysenes	93.7	81.5	15
C2-Chrysenes	105	102	2.94
C3-Chrysenes	95	79.6	19.3
C4-Chrysenes	66.8	64	4.37
Benzo[b]fluoranthene	7.21	7.62	-5.38
Benzo[k]fluoranthene	ND		
Benzo[e]pyrene	12.1	12.4	-2.42
Benzo[a]pyrene	ND		
Perylene	ND		
Indeno[1,2,3,-c,d]pyrene	ND		
Dibenzo[a,h]anthracene	1.46 J		
Benzo[g,h,i]perylene	3.44 J	3.18	8.18
d8-Naphthalene	90		
d10-Acenaphthene	97		
d10-Phenanthrene	98		
d12-Benzo[a]pyrene	108		



Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4069

Data Table: IRM - Surrogate Corrected

Field ID	Instrument	Reference Standard	T	%D	Q
Sample Type	IRM				
Matrix	IRM				
Sample Size	0.1 mL				
Weight Basis	WET				
Associated Blank	NA				
Field Date	10/15/02				
Extract Date	10/15/02				
Analysis Date	10/18/02				
Date Received	10/15/02				
Percent Solids	NA				
Dilution Factor	1				
Percent Lipids	NA				
Min Reporting Limit	250				
Units	ug/L				

### Polynuclear Aromatic Hydrocarbons

Naphthalene	6640	###	-3.63
C1-Naphthalenes	ND		
C2-Naphthalenes	ND		
C3-Naphthalenes	ND		
C4-Naphthalenes	ND		
Acenaphthylene	6640	###	-4.6
Acenaphthene	6490	###	-10.8
Biphenyl	6960	###	-0.571
Fluorene	6200	###	-14.7
C1-Fluorenes	ND		
C2-Fluorenes	ND		
C3-Fluorenes	ND		
Anthracene	7060	###	-9.72
Phenanthrene	6850	###	-2.28
C1-Phenanthrenes/anthracenes	ND		
C2-Phenanthrenes/anthracenes	ND		
C3-Phenanthrenes/anthracenes	ND		
C4-Phenanthrenes/anthracenes	ND		
Dibenzothiophene	ND		
C1-Dibenzothiophenes	ND		
C2-Dibenzothiophenes	ND		
C3-Dibenzothiophenes	ND		
Fluoranthene	6110	###	3.38
Pyrene	5840	###	-0.849
C1-Fluoranthenes/pyrenes	ND		
C2-Fluoranthenes/pyrenes	ND		
C3-Fluoranthenes/pyrenes	ND		
Benzo[a]anthracene	3420	###	-4.74
Chrysene	7040	###	0.142
C1-Chrysenes	ND		
C2-Chrysenes	ND		
C3-Chrysenes	ND		
C4-Chrysenes	ND		
Benzo[b]fluoranthene	5420	###	3.24
Benzo[k]fluoranthene	5720	###	2.69
Benzo[e]pyrene	5730	###	1.96
Benzo[a]pyrene	6670	###	-1.77
Perylene	6950	###	-2.39
Indeno[1,2,3,-c,d]pyrene	6110	###	-2.86
Dibenzo[a,h]anthracene	5490	###	5.98
Benzo[g,h,i]perylene	5200	###	-1.7
d8-Naphthalene	98		
d10-Acenaphthene	97		
d10-Phenanthrene	97		
d12-Benzo[a]pyrene	94		

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4069

Data Table: ORS - Surrogate Corrected

	Oil Reference			
Field ID	Standard			
Sample Type	ORS			
Matrix	OIL			
Sample Size	5.1 mg			
Weight Basis	OIL			
Associated Blank	NA			
Field Date	04/23/02			
Extract Date	04/23/02			
Analysis Date	10/18/02			
Date Received	04/23/02			
Percent Solids	NA			
Dilution Factor	1			
Percent Lipids	NA			
Min Reporting Limit	4.9			
Units	mg/Kg	T	%D	Q

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	56.9	58.9	-3.4
S4-Diacholestane	39.6	46.8	-15.4
S5-Diacholestane	23.8	26.1	-8.81
T9-C29Tricyclitriterpane	13.7	15.7	-12.7
T10-C29Tricyclitriterpane	13.7	15	-8.67
T11-Trisnorhopane(TS)	22.5	24.8	-9.27
T12-Trisnorhopane(TM)	25	31	-19.4
S24-Methylcholestane	30.6	26.2	16.8
S25-Ethylcholestane	48	39.8	20.6
S28-Ethylcholestane	36.2	33.9	6.78
T15-Norhopane	82.9	83.8	-1.07
T18-Oleanane		ND	
T19-Hopane	119	113	5.31
T21-Homohopane	53.6	46.1	16.3
T22-Homohopane	42	35.2	19.3
5B(H)-Cholane	110		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4070  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Procedural Blank	Blank Spike	T	%R	Q
Sample Type	PB	PB	BS			
Matrix	OIL	Oil	Oil			
Sample Size	5 mg	5 mg	5 mg			
Weight Basis	OIL	OIL	OIL			
Associated Blank	NA	NA	EB-S-61PB			
Field Date	10/17/02	02/20/03	02/20/03			
Extract Date	10/17/02	02/20/03	02/20/03			
Analysis Date	10/18/02	02/25/03	02/25/03			
Date Received	10/17/02	02/20/03	02/20/03			
Percent Solids	NA	NA	NA			
Dilution Factor	1	1	1			
Percent Lipids	NA	NA	NA			
Min Reporting Limit	5	5	5			
Units	mg/Kg	mg/Kg	mg/Kg			

### Polynuclear Aromatic Hydrocarbons

Naphthalene	0.16 J	ND	210	200	105	
C1-Naphthalenes	0.17 J	ND	0.29 J			
C2-Naphthalenes	0.25 J	ND	ND			
C3-Naphthalenes	0.14 J	ND	ND			
C4-Naphthalenes	ND	ND	ND			
Acenaphthylene	ND	ND	220	200	110	
Acenaphthene	ND	0.13 J	220	200	110	
Biphenyl	ND	ND	ND			
Fluorene	ND	ND	210	200	105	
C1-Fluorenes	ND	ND	ND			
C2-Fluorenes	ND	ND	ND			
C3-Fluorenes	ND	ND	ND			
Anthracene	ND	0.13 J	210	200	105	
Phenanthrene	ND	0.15 J	210	200	105	
C1-Phenanthrenes/anthracenes	ND	ND	ND			
C2-Phenanthrenes/anthracenes	ND	ND	0.38 J			
C3-Phenanthrenes/anthracenes	ND	ND	0.28 J			
C4-Phenanthrenes/anthracenes	ND	ND	ND			
Dibenzothiophene	ND	ND	ND			
C1-Dibenzothiophenes	ND	ND	ND			
C2-Dibenzothiophenes	ND	ND	ND			
C3-Dibenzothiophenes	ND	ND	ND			
Fluoranthene	ND	0.19 J	220	200	110	
Pyrene	ND	0.29 J	210	200	105	
C1-Fluoranthenes/pyrenes	ND	ND	0.43 J			
C2-Fluoranthenes/pyrenes	ND	ND	ND			
C3-Fluoranthenes/pyrenes	ND	ND	ND			
Benzo[a]anthracene	ND	ND	210	200	105	
Chrysene	ND	ND	210	200	105	
C1-Chrysenes	ND	ND	0.22 J			
C2-Chrysenes	ND	ND	ND			
C3-Chrysenes	ND	ND	ND			
C4-Chrysenes	ND	ND	ND			
Benzo[b]fluoranthene	ND	ND	220	200	110	
Benzo[k]fluoranthene	ND	ND	180	200	90	
Benzo[e]pyrene	ND	ND	ND			
Benzo[a]pyrene	ND	ND	230	200	115	
Perylene	ND	ND	ND			
Indeno[1,2,3,-c,d]pyrene	ND	ND	230	200	115	
Dibenzo[a,h]anthracene	ND	ND	240	200	120	
Benzo[g,h,i]perylene	0.066 J	0.36 J	210	200	105	
d8-Naphthalene	104	93	95			
d10-Acenaphthene	109	95	97			
d10-Phenanthrene	111	94	95			
d12-Benzo[a]pyrene	112	102	102			

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control IRM

Field ID	Instrument Reference			Instrument Reference		
	Standard			Standard		
Lab ID	BX30IRM			BY42IRM		
Sample Type	IRM			IRM		
Matrix	IRM			IRM		
Sample Size	0.1 mL			0.1 mL		
Weight Basis	WET			WET		
Associated Blank	NA			NA		
Field Date	01/04/01			03/28/01		
Extract Date	01/04/01			03/28/01		
Analysis Date	03/21/01			04/05/01		
Date Received	01/04/01			03/28/01		
Percent Solids	NA			NA		
Percent Lipids	NA			NA		
Min Reporting Limit	250			250		
Units	ug/L	T	%D Q	ug/L	T	%D
<b>Polynuclear Aromatic Hydrocarbons</b>						
Naphthalene	6400	6890	-7.11	6580	6890	-4.5
C1-Naphthalenes	ND			ND		
C2-Naphthalenes	ND			ND		
C3-Naphthalenes	ND			ND		
C4-Naphthalenes	ND			ND		
Acenaphthylene	6210	6960	-10.8	6280	6960	-9.77
Acenaphthene	6440	7280	-11.5	6440	7280	-11.5
Biphenyl	6650	7000	-5	6970	7000	-0.428
Fluorene	6340	7270	-12.8	6350	7270	-12.6
C1-Fluorenes	ND			ND		
C2-Fluorenes	ND			ND		
C3-Fluorenes	ND			ND		
Anthracene	7010	7820	-10.4	7030	7820	-10.1
Phenanthrene	6720	7010	-4.14	7070	7010	0.856
C1-Phenanthrenes/anthracenes	ND			ND		
C2-Phenanthrenes/anthracenes	ND			ND		
C3-Phenanthrenes/anthracenes	ND			ND		
C4-Phenanthrenes/anthracenes	ND			ND		
Dibenzothiophene	ND			ND		
C1-Dibenzothiophenes	ND			ND		
C2-Dibenzothiophenes	ND			ND		
C3-Dibenzothiophenes	ND			ND		
Fluoranthene	5510	5910	-6.77	5880	5910	-0.508
Pyrene	5550	5890	-5.77	5870	5890	-0.34
C1-Fluoranthenes/pyrenes	ND			ND		
C2-Fluoranthenes/pyrenes	ND			ND		
C3-Fluoranthenes/pyrenes	ND			ND		
Benzo[a]anthracene	3120	3590	-13.1	3460	3590	-3.62
Chrysene	6740	7030	-4.12	7040	7030	0.142
C1-Chrysenes	ND			ND		
C2-Chrysenes	ND			ND		
C3-Chrysenes	ND			ND		
C4-Chrysenes	ND			ND		
Benzo[b]fluoranthene	4920	5250	-6.28	4980	5250	-5.14
Benzo[k]fluoranthene	5470	5570	-1.8	6080	5570	9.16
Benzo[e]pyrene	5540	5620	-1.42	5910	5620	5.16
Benzo[a]pyrene	6370	6790	-6.18	6510	6790	-4.12
Perylene	7270	7120	2.11	7500	7120	5.34
Indeno[1,2,3,-c,d]pyrene	5560	6290	-11.6	6110	6290	-2.86
Dibenzo[a,h]anthracene	5030	5180	-2.9	5310	5180	2.51
Benzo[g,h,i]perylene	4670	5290	-11.7	5240	5290	-0.945
d8-Naphthalene	106			93		
d10-Acenaphthene	105			100		
d10-Phenanthrene	104			99		
d12-Benzo[a]pyrene	99			95		

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control IRM

Field ID Lab ID Sample Type Matrix Sample Size Weight Basis Associated Blank Field Date Extract Date Analysis Date Date Received Percent Solids Percent Lipids Min Reporting Limit Units	Instrument Reference Standard BX30IRM-1			Instrument Reference Standard BX30IRM-2		
	Q	ug/L	T %D Q	ug/L	T %D	%D
<b>Polynuclear Aromatic Hydrocarbons</b>						
Naphthalene	6400	6890	-7.11	6400	6890	-7.11
C1-Naphthalenes	ND			ND		
C2-Naphthalenes	ND			ND		
C3-Naphthalenes	ND			ND		
C4-Naphthalenes	ND			ND		
Acenaphthylene	6170	6960	-11.4	6210	6960	-10.8
Acenaphthene	6440	7280	-11.5	6440	7280	-11.5
Biphenyl	6690	7000	-4.43	6650	7000	-5
Fluorene	6350	7270	-12.6	6340	7270	-12.8
C1-Fluorenes	ND			ND		
C2-Fluorenes	ND			ND		
C3-Fluorenes	ND			ND		
Anthracene	6930	7820	-11.4	7010	7820	-10.4
Phenanthrene	6680	7010	-4.71	6720	7010	-4.14
C1-Phenanthrenes/anthracenes	ND			ND		
C2-Phenanthrenes/anthracenes	ND			ND		
C3-Phenanthrenes/anthracenes	ND			ND		
C4-Phenanthrenes/anthracenes	ND			ND		
Dibenzothiophene	ND			ND		
C1-Dibenzothiophenes	ND			ND		
C2-Dibenzothiophenes	ND			ND		
C3-Dibenzothiophenes	ND			ND		
Fluoranthene	5480	5910	-7.28	5510	5910	-6.77
Pyrene	5450	5890	-7.47	5550	5890	-5.77
C1-Fluoranthenes/pyrenes	ND			ND		
C2-Fluoranthenes/pyrenes	ND			ND		
C3-Fluoranthenes/pyrenes	ND			ND		
Benzo[a]anthracene	3080	3590	-14.2	3120	3590	-13.1
Chrysene	6740	7030	-4.12	6740	7030	-4.12
C1-Chrysenes	ND			ND		
C2-Chrysenes	ND			ND		
C3-Chrysenes	ND			ND		
C4-Chrysenes	ND			ND		
Benzo[b]fluoranthene	4760	5250	-9.33	4920	5250	-6.28
Benzo[k]fluoranthene	5830	5570	4.67	5470	5570	-1.8
Benzo[e]pyrene	5770	5620	2.67	5540	5620	-1.42
Benzo[a]pyrene	6380	6790	-6.04	6370	6790	-6.18
Perylene	7520	7120	5.62	7270	7120	2.11
Indeno[1,2,3,-c,d]pyrene	5500	6290	-12.6	5560	6290	-11.6
Dibenzo[a,h]anthracene	4950	5180	-4.44	5030	5180	-2.9
Benzo[g,h,i]perylene	4880	5290	-7.75	4670	5290	-11.7
d8-Naphthalene	106			106		
d10-Acenaphthene	104			105		
d10-Phenanthrene	105			104		
d12-Benzo[a]pyrene	96			99		

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control IRM

Field ID	Instrument Reference				Instrument Reference			
	Standard				Standard			
Lab ID	BY42IRM				BX30IRM-1			
Sample Type	IRM				IRM			
Matrix	IRM				IRM			
Sample Size	0.1 mL				0.1 mL			
Weight Basis	WET				WET			
Associated Blank	NA				NA			
Field Date	03/28/01				01/04/01			
Extract Date	03/28/01				01/04/01			
Analysis Date	03/28/01				03/05/01			
Date Received	03/28/01				01/04/01			
Percent Solids	NA				NA			
Percent Lipids	NA				NA			
Min Reporting Limit	250				250			
Units	Q	ug/L	T	%D	Q	ug/L	T	%D
<b>Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	6800	6890	-1.31		6320	6890	-8.27	
C1-Naphthalenes	ND				ND			
C2-Naphthalenes	ND				ND			
C3-Naphthalenes	ND				ND			
C4-Naphthalenes	ND				ND			
Acenaphthylene	6620	6960	-4.88		6170	6960	-11.4	
Acenaphthene	6760	7280	-7.14		6440	7280	-11.5	
Biphenyl	7270	7000	3.86		6770	7000	-3.28	
Fluorene	6570	7270	-9.63		6350	7270	-12.6	
C1-Fluorenes	ND				ND			
C2-Fluorenes	ND				ND			
C3-Fluorenes	ND				ND			
Anthracene	7140	7820	-8.7		7030	7820	-10.1	
Phenanthrene	7210	7010	2.85		6670	7010	-4.85	
C1-Phenanthrenes/anthracenes	ND				ND			
C2-Phenanthrenes/anthracenes	ND				ND			
C3-Phenanthrenes/anthracenes	ND				ND			
C4-Phenanthrenes/anthracenes	ND				ND			
Dibenzothiophene	ND				ND			
C1-Dibenzothiophenes	ND				ND			
C2-Dibenzothiophenes	ND				ND			
C3-Dibenzothiophenes	ND				ND			
Fluoranthene	5910	5910	0		5550	5910	-6.09	
Pyrene	5930	5890	0.679		5540	5890	-5.94	
C1-Fluoranthenes/pyrenes	ND				ND			
C2-Fluoranthenes/pyrenes	ND				ND			
C3-Fluoranthenes/pyrenes	ND				ND			
Benzo[a]anthracene	3330	3590	-7.24		3110	3590	-13.4	
Chrysene	7400	7030	5.26		6820	7030	-2.99	
C1-Chrysenes	ND				ND			
C2-Chrysenes	ND				ND			
C3-Chrysenes	ND				ND			
C4-Chrysenes	ND				ND			
Benzo[b]fluoranthene	4950	5250	-5.71		4590	5250	-12.6	
Benzo[k]fluoranthene	6380	5570	14.5		6110	5570	9.69	
Benzo[e]pyrene	5930	5620	5.52		5800	5620	3.2	
Benzo[a]pyrene	6670	6790	-1.77		6420	6790	-5.45	
Perylene	7780	7120	9.27		7590	7120	6.6	
Indeno[1,2,3-c,d]pyrene	5580	6290	-11.3		5350	6290	-14.9	
Dibenzo[a,h]anthracene	5360	5180	3.47		4980	5180	-3.86	
Benzo[g,h,i]perylene	5100	5290	-3.59		4920	5290	-6.99	
d8-Naphthalene	101				107			
d10-Acenaphthene	98				104			
d10-Phenanthrene	98				103			
d12-Benzo[a]pyrene	92				95			

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**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control IRM

	<b>Instrument Reference</b>			
Field ID		<b>Standard</b>		
Lab ID		<b>BX30IRM-2</b>		
Sample Type		<b>IRM</b>		
Matrix		<b>IRM</b>		
Sample Size		<b>0.1 mL</b>		
Weight Basis		<b>WET</b>		
Associated Blank		<b>NA</b>		
Field Date		<b>01/04/01</b>		
Extract Date		<b>01/04/01</b>		
Analysis Date		<b>03/14/01</b>		
Date Received		<b>01/04/01</b>		
Percent Solids		<b>NA</b>		
Percent Lipids		<b>NA</b>		
Min Reporting Limit		<b>250</b>		
Units	<b>Q</b>	<b>ug/L</b>	<b>T</b>	<b>%D Q</b>

Polynuclear Aromatic Hydrocarbons				
Naphthalene	6400	6890	-7.11	
C1-Naphthalenes		ND		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
Acenaphthylene	6170	6960	-11.4	
Acenaphthene	6440	7280	-11.5	
Biphenyl	6690	7000	-4.43	
Fluorene	6350	7270	-12.6	
C1-Fluorenes		ND		
C2-Fluorenes		ND		
C3-Fluorenes		ND		
Anthracene	6930	7820	-11.4	
Phenanthrene	6680	7010	-4.71	
C1-Phenanthrenes/anthracenes		ND		
C2-Phenanthrenes/anthracenes		ND		
C3-Phenanthrenes/anthracenes		ND		
C4-Phenanthrenes/anthracenes		ND		
Dibenzothiophene		ND		
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		ND		
Fluoranthene	5480	5910	-7.28	
Pyrene	5450	5890	-7.47	
C1-Fluoranthenes/pyrenes		ND		
C2-Fluoranthenes/pyrenes		ND		
C3-Fluoranthenes/pyrenes		ND		
Benzo[a]anthracene	3080	3590	-14.2	
Chrysene	6740	7030	-4.12	
C1-Chrysenes		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo[b]fluoranthene	4760	5250	-9.33	
Benzo[k]fluoranthene	5830	5570	4.67	
Benzo[e]pyrene	5770	5620	2.67	
Benzo[a]pyrene	6380	6790	-6.04	
Perylene	7520	7120	5.62	
Indeno[1,2,3,-c,d]pyrene	5500	6290	-12.6	
Dibenzo[a,h]anthracene	4950	5180	-4.44	
Benzo[g,h,i]perylene	4880	5290	-7.75	
d8-Naphthalene	106			
d10-Acenaphthene	104			
d10-Phenanthrene	105			
d12-Benzo[a]pyrene	96			

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control SRM

	Standard Reference			Standard Reference		
Field ID	Material 1944			Material-1944		
Lab ID	DH-S-63SRM F2			DH-S-60SRM		
Sample Type	SRM			SRM		
Matrix	SEDIMENT			SEDIMENT		
Sample Size	1.03 g			1.04 g		
Weight Basis	DRY			DRY		
Associated Blank	DH-S-61PB F2			DH-S-58PB PCA F2		
Field Date	03/08/01			03/07/01		
Extract Date	03/08/01			03/07/01		
Analysis Date	03/23/01			03/15/01		
Date Received	03/08/01			03/07/01		
Percent Solids	98.8			98.8		
Percent Lipids	NA			NA		
Min Reporting Limit	97.1			12		
Units	ug/Kg	T	%D Q	ug/Kg	T	%D Q

Polynuclear Aromatic Hydrocarbons						
Naphthalene	866	1650	-47.5	&	834	1650 -49.4 &
C1-Naphthalenes	513				478	
C2-Naphthalenes	1540				1470	
C3-Naphthalenes	1970				2210	
C4-Naphthalenes	2330				2310	
Acenaphthylene	832				916	
Acenaphthene	438				434	
Biphenyl	141				142	
Fluorene	670				700	
C1-Fluorenes	825				885	
C2-Fluorenes	1260				1270	
C3-Fluorenes	1590				1650	
Anthracene	1390	1770	-21.5		1340	1770 -24.3
Phenanthrene	5090	5270	-3.42		4210 D	5270 -20.1
C1-Phenanthrenes/anthracenes	5670				5220	
C2-Phenanthrenes/anthracenes	6370				5800	
C3-Phenanthrenes/anthracenes	4180				3810	
C4-Phenanthrenes/anthracenes	3600				3200	
Dibenzothiophene	732				699	
C1-Dibenzothiophenes	1770				1740	
C2-Dibenzothiophenes	2610				2580	
C3-Dibenzothiophenes	2460				2060	
Fluoranthene	8870	8920	-0.56		7500 D	8920 -15.9
Pyrene	9480	9700	-2.27		8080 D	9700 -16.7
C1-Fluoranthenes/pyrenes	7270				6730	
C2-Fluoranthenes/pyrenes	3380				2960	
C3-Fluoranthenes/pyrenes	1580				1400	
Benzo[a]anthracene	4490	4720	-4.87		3980 D	4720 -15.7
Chrysene	5560	5900	-5.76		4280 D	5900 -27.4
C1-Chrysenes	3500				3780	
C2-Chrysenes	2170				2270	
C3-Chrysenes	1120				1170	
C4-Chrysenes	673				710	
Benzo[b]fluoranthene	6830	5960	14.6		5040 D	5960 -15.4
Benzo[k]fluoranthene	1730	2300	-24.8		1340	2300 -41.7 &
Benzo[e]pyrene	3580	3280	9.15		2910 D	3280 -11.3
Benzo[a]pyrene	4140	4300	-3.72		3320 D	4300 -22.8
Perylene	1110	1170	-5.13		1100	1170 -5.98
Indeno[1,2,3,-c,d]pyrene	2800	2780	0.719		2270 D	2780 -18.3
Dibenzo[a,h]anthracene	754	759	-0.659		912	759 20.2
Benzo[g,h,i]perylene	2350	2840	-17.2		2860	2840 0.704
d8-Naphthalene	57				55	
d10-Acenaphthene	80				77	
d10-Phenanthrene	99				104	
d12-Benzo[a]pyrene	95				98	



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Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control SRM

	<b>Standard Reference</b>		
Field ID	Material- 1944		
Lab ID	DH-S-57SRM F2		
Sample Type	SRM		
Matrix	SEDIMENT		
Sample Size	1.03 g		
Weight Basis	DRY		
Associated Blank	DH-S-55PB PCA		
Field Date	02/20/01		
Extract Date	02/20/01		
Analysis Date	03/06/01		
Date Received	02/20/01		
Percent Solids	98.8		
Percent Lipids	NA		
Min Reporting Limit	97.1		
Units	ug/Kg	T	%D Q

<b>Polynuclear Aromatic Hydrocarbons</b>			
Naphthalene	1360	1650	-17.6
C1-Naphthalenes	489		
C2-Naphthalenes	1480		
C3-Naphthalenes	2400		
C4-Naphthalenes	2610		
Acenaphthylene	938		
Acenaphthene	452		
Biphenyl	167		
Fluorene	809		
C1-Fluorenes	948		
C2-Fluorenes	1390		
C3-Fluorenes	1750		
Anthracene	1610	1770	-9.04
Phenanthrene	5350	5270	1.52
C1-Phenanthrenes/anthracenes	5780		
C2-Phenanthrenes/anthracenes	6400		
C3-Phenanthrenes/anthracenes	4000		
C4-Phenanthrenes/anthracenes	3490		
Dibenzothiophene	771		
C1-Dibenzothiophenes	1780		
C2-Dibenzothiophenes	2920		
C3-Dibenzothiophenes	2380		
Fluoranthene	9020	8920	1.12
Pyrene	9450	9700	-2.58
C1-Fluoranthenes/pyrenes	6960		
C2-Fluoranthenes/pyrenes	3440		
C3-Fluoranthenes/pyrenes	1490		
Benzo[a]anthracene	5100	4720	8.05
Chrysene	5350	5900	-9.32
C1-Chrysenes	3570		
C2-Chrysenes	2040		
C3-Chrysenes	1110		
C4-Chrysenes	576		
Benzo[b]fluoranthene	6220	5960	4.36
Benzo[k]fluoranthene	1900	2300	-17.4
Benzo[e]pyrene	3550	3280	8.23
Benzo[a]pyrene	4220	4300	-1.86
Perylene	1160	1170	-0.855
Indeno[1,2,3,-c,d]pyrene	3460	2780	24.5
Dibenzo[a,h]anthracene	677	759	-10.8
Benzo[g,h,i]perylene	2900	2840	2.11
d8-Naphthalene	37		
d10-Acenaphthene	84		
d10-Phenanthrene	121		
d12-Benzo[a]pyrene	117		

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**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

	00-N09-01-PHC-S	00-N09-01-PHC-S		00-C0L-01-PHC-S
Field ID	00-N09-01-PHC-S	DUP		00-C0L-01-PHC-S
Lab ID	20A3528 F2 PCA	20A3528DUP F2 PCA		20A3500 F2
Sample Type	N	DUP		N
Matrix	SEDIMENT	SEDIMENT		SEDIMENT
Sample Size	19.82 g	19.96 g		24.52 g
Weight Basis	DRY	DRY		DRY
Associated Blank	NA	NA		DH-S-58PB PCA F2
Field Date	08/18/00	08/18/00		08/24/00
Extract Date	04/02/01	04/02/01		03/07/01
Analysis Date	04/05/01	04/05/01		03/15/01
Date Received	08/30/00	08/30/00		08/30/00
Percent Solids	65.8	65.8		79.7
Percent Lipids	NA	NA		NA
Min Reporting Limit	0.63	0.63		0.51
Units	ug/Kg	ug/Kg	RPD Q	ug/Kg

Polynuclear Aromatic Hydrocarbons				
Naphthalene	6.9	7.3	5.6	2.4
C1-Naphthalenes	18	19	5.4	5
C2-Naphthalenes	25	26	3.9	8.9
C3-Naphthalenes	18	20	10	6.3
C4-Naphthalenes	14	19	30	5.1
Acenaphthylene	0.085 J	0.072 J	16	0.064 J
Acenaphthene	0.48 J	0.55 J	14	0.17 JB
Biphenyl	3.1	3.3	6.2	1.1
Fluorene	2.4	2.6	8	0.7
C1-Fluorenes	4.8	5.2	8	1.4
C2-Fluorenes	6.4	6.6	3.1	2.3
C3-Fluorenes	7.2	7.2	0	2.8
Anthracene	0.39 J	0.31 J	23	0.14 JB
Phenanthrene	13	13	0	6
C1-Phenanthrenes/anthracenes	21	22	4.6	9.8
C2-Phenanthrenes/anthracenes	17	16	6.1	9.8
C3-Phenanthrenes/anthracenes	13	13	0	5.1
C4-Phenanthrenes/anthracenes	5.8	6.1	5	3.6
Dibenzothiophene	1.9	2.1	10	0.76
C1-Dibenzothiophenes	3.6	3.9	8	2
C2-Dibenzothiophenes	6.2	6.2	0	3
C3-Dibenzothiophenes	4.2	4	4.9	2.4
Fluoranthene	3	2.6	14	3
Pyrene	4	3.7	7.8	2.9
C1-Fluoranthenes/pyrenes	9.6	9.2	4.2	6.9
C2-Fluoranthenes/pyrenes	8.6	8.8	2.3	4.7
C3-Fluoranthenes/pyrenes	5.8	5.8	0	3
Benzo[a]anthracene	ND	ND		0.98
Chrysene	5.5	5.6	1.8	4.2
C1-Chrysenes	6.2	6.3	1.6	4.1
C2-Chrysenes	5.2	5.1	1.9	3.7
C3-Chrysenes	3.9	3.7	5.3	2.2
C4-Chrysenes	2.3	2.3	0	1.6
Benzo[b]fluoranthene	3.3	3.3	0	3.3
Benzo[k]fluoranthene	0.4 J	0.35 J	13	0.38 J
Benzo[e]pyrene	3.8	3.9	2.6	2.6
Benzo[a]pyrene	1.1	0.96	14	1.1
Perylene	20	22	9.5	18
Indeno[1,2,3,-c,d]pyrene	0.85	0.79	7.3	0.69
Dibenzo[a,h]anthracene	0.42 J	0.37 J	13	0.19 J
Benzo[g,h,i]perylene	2.5	2.6	3.9	1.1
d8-Naphthalene	52	52		62
d10-Acenaphthene	78	74		75
d10-Phenanthrene	88	83		94
d12-Benzo[a]pyrene	90	83		98

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**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

**00-C0L-01-PHC-S**

Field ID DUP  
 Lab ID 20A3500DUP F2  
 Sample Type DUP  
 Matrix SEDIMENT  
 Sample Size 24.52 g  
 Weight Basis DRY  
 Associated Blank DH-S-58PB PCA F2  
 Field Date 08/24/00  
 Extract Date 03/07/01  
 Analysis Date 03/15/01  
 Date Received 08/30/00  
 Percent Solids 79.7  
 Percent Lipids NA  
 Min Reporting Limit 0.51  
 Units ug/Kg RPD

Polynuclear Aromatic Hydrocarboi		
Naphthalene	2.5	4.1
C1-Naphthalenes	4.9	2
C2-Naphthalenes	9.2	3.3
C3-Naphthalenes	7.5	17
C4-Naphthalenes	5.7	11
Acenaphthylene	0.069 J	7.5
Acenaphthene	0.19 JB	11
Biphenyl	1.1	0
Fluorene	0.78	11
C1-Fluorenes	1.6	13
C2-Fluorenes	2.7	16
C3-Fluorenes	2.9	3.5
Anthracene	0.14 JB	0
Phenanthrene	6.2	3.3
C1-Phenanthrenes/anthracenes	9.8	0
C2-Phenanthrenes/anthracenes	9.8	0
C3-Phenanthrenes/anthracenes	5.1	0
C4-Phenanthrenes/anthracenes	4.2	15
Dibenzothiophene	0.78	2.6
C1-Dibenzothiophenes	2.1	4.9
C2-Dibenzothiophenes	3.1	3.3
C3-Dibenzothiophenes	2.4	0
Fluoranthene	3.1	3.3
Pyrene	3	3.4
C1-Fluoranthenes/pyrenes	7.4	7
C2-Fluoranthenes/pyrenes	5.2	10
C3-Fluoranthenes/pyrenes	3.1	3.3
Benzo[a]anthracene	1	2
Chrysene	4.5	6.9
C1-Chrysenes	4.1	0
C2-Chrysenes	3.5	5.6
C3-Chrysenes	2	9.5
C4-Chrysenes	1.4	13
Benzo[b]fluoranthene	3.5	5.9
Benzo[k]fluoranthene	0.37 J	2.7
Benzo[e]pyrene	2.6	0
Benzo[a]pyrene	1.2	8.7
Perylene	19	5.4
Indeno[1,2,3,-c,d]pyrene	0.66	4.4
Dibenzo[a,h]anthracene	0.24 J	23
Benzo[g,h,i]perylene	1.1	0
d8-Naphthalene	52	
d10-Acenaphthene	68	
d10-Phenanthrene	94	
d12-Benzo[a]pyrene	87	

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**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

	00-N06-01-PHC-S	00-N06-01-PHC-S	
Field ID	00-N06-01-PHC-S	DUP	
Lab ID	20A3468 F2	20A3468DUP F2	
Sample Type	N	DUP	
Matrix	SEDIMENT	SEDIMENT	
Sample Size	19.64 g	19.2 g	
Weight Basis	DRY	DRY	
Associated Blank	DH-S-55PB PCA	DH-S-55PB PCA	
Field Date	08/17/00	08/17/00	
Extract Date	02/20/01	02/20/01	
Analysis Date	03/06/01	03/06/01	
Date Received	08/30/00	08/30/00	
Percent Solids	63.8	63.8	
Percent Lipids	NA	NA	
Min Reporting Limit	0.64	0.65	
Units	Q ug/Kg	ug/Kg	RPD Q

Polynuclear Aromatic Hydrocarbons				
Naphthalene	12	12	0	
C1-Naphthalenes	25	25	0	
C2-Naphthalenes	42	42	0	
C3-Naphthalenes	39	43	9.8	
C4-Naphthalenes	20	23	14	
Acenaphthylene	ND	ND		
Acenaphthene	0.88	0.9	2.2	
Biphenyl	5.5	5.4	1.8	
Fluorene	4.9	5.3	7.8	
C1-Fluorenes	8.9	11	21	
C2-Fluorenes	12	14	15	
C3-Fluorenes	11	14	24	
Anthracene	ND	ND		
Phenanthrene	21	22	4.6	
C1-Phenanthrenes/anthracenes	33	35	5.9	
C2-Phenanthrenes/anthracenes	28	32	13	
C3-Phenanthrenes/anthracenes	14	15	6.9	
C4-Phenanthrenes/anthracenes	20	20	0	
Dibenzothiophene	3.3	3.3	0	
C1-Dibenzothiophenes	9.6	10	4.1	
C2-Dibenzothiophenes	9.4	9.5	1	
C3-Dibenzothiophenes	7.9	6.7	16	
Fluoranthene	4	4.5	12	
Pyrene	6.1	6.1	0	
C1-Fluoranthenes/pyrenes	17	16	6.1	
C2-Fluoranthenes/pyrenes	15	15	0	
C3-Fluoranthenes/pyrenes	9.1	9.8	7.4	
Benzo[a]anthracene	1.5	1.6	6.4	
Chrysene	9.2	8.9	3.3	
C1-Chrysenes	9.6	9.1	5.3	
C2-Chrysenes	7.8	7.8	0	
C3-Chrysenes	7.4	7	5.6	
C4-Chrysenes	3.6	3.3	8.7	
Benzo[b]fluoranthene	6	6.1	1.6	
Benzo[k]fluoranthene	0.86	0.71	19	
Benzo[e]pyrene	6.7	6.7	0	
Benzo[a]pyrene	1.9	1.8	5.4	
Perylene	40	40	0	
Indeno[1,2,3,-c,d]pyrene	1.2	1.5	22	
Dibenzo[a,h]anthracene	0.56 J	0.49 J	13	
Benzo[g,h,i]perylene	4.4	4.4	0	
d8-Naphthalene	53	38		
d10-Acenaphthene	76	54		
d10-Phenanthrene	102	90		
d12-Benzo[a]pyrene	103	87		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Blank Spike	Procedural Blank
Lab ID	DH-S-61PB F2	DH-S-62BS F2	DH-S-58PB PCA F2
Sample Type	PB	BS	PB
Matrix	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	20 g	20 g	20 g
Weight Basis	DRY	DRY	DRY
Associated Blank	NA	DH-S-61PB F2	NA
Field Date	03/08/01	03/08/01	03/07/01
Extract Date	03/08/01	03/08/01	03/07/01
Analysis Date	03/23/01	03/23/01	03/15/01
Date Received	03/08/01	03/08/01	03/07/01
Percent Solids	100	100	100
Percent Lipids	NA	NA	NA
Min Reporting Limit	0.62	0.62	0.62
Units	ug/Kg	ug/Kg	T %R Q ug/Kg

Polynuclear Aromatic Hydrocarbons					
Naphthalene	0.37 J	40	50	79	0.37 J
C1-Naphthalenes	0.28 J	2.7			0.35 J
C2-Naphthalenes	0.35 J	4			0.56 J
C3-Naphthalenes	ND	ND			0.45 J
C4-Naphthalenes	ND	ND			ND
Acenaphthylene	ND	38	50	76	ND
Acenaphthene	ND	40	50	80	0.045 J
Biphenyl	0.056 J	0.63			0.045 J
Fluorene	0.06 J	40	50	80	0.077 J
C1-Fluorenes	ND	ND			0.1 J
C2-Fluorenes	ND	ND			0.17 J
C3-Fluorenes	ND	ND			ND
Anthracene	ND	40	50	80	0.034 J
Phenanthrene	0.26 J	45	50	89	0.35 J
C1-Phenanthrenes/anthracenes	0.15 J	4.6			0.2 J
C2-Phenanthrenes/anthracenes	0.18 J	6.8			0.12 J
C3-Phenanthrenes/anthracenes	0.11 J	5			0.1 J
C4-Phenanthrenes/anthracenes	ND	ND			ND
Dibenzothiophene	ND	0.85			0.04 J
C1-Dibenzothiophenes	ND	1.8			0.074 J
C2-Dibenzothiophenes	ND	2.8			0.14 J
C3-Dibenzothiophenes	ND	3			ND
Fluoranthene	0.086 J	48	50	96	0.085 J
Pyrene	0.068 J	49	50	98	0.077 J
C1-Fluoranthenes/pyrenes	ND	3			0.082 J
C2-Fluoranthenes/pyrenes	ND	ND			ND
C3-Fluoranthenes/pyrenes	ND	ND			ND
Benzo[a]anthracene	ND	51	50	102	ND
Chrysene	ND	51	50	102	ND
C1-Chrysenes	ND	1.5			ND
C2-Chrysenes	ND	1.6			ND
C3-Chrysenes	ND	ND			ND
C4-Chrysenes	ND	ND			ND
Benzo[b]fluoranthene	ND	52	50	104	ND
Benzo[k]fluoranthene	ND	48	50	96	ND
Benzo[e]pyrene	ND	ND			ND
Benzo[a]pyrene	ND	49	50	98	ND
Perylene	ND	ND			ND
Indeno[1,2,3-c,d]pyrene	ND	47	50	94	ND
Dibenzo[a,h]anthracene	ND	47	50	94	ND
Benzo[g,h,i]perylene	ND	41	50	82	ND
d8-Naphthalene	68	3 &			81
d10-Acenaphthene	73	3 &			84
d10-Phenanthrene	80	3 &			91
d12-Benzo[a]pyrene	81	3 &			80

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Blank Spike	
Lab ID	DH-S-59BS PCA F2	
Sample Type	BS	
Matrix	SEDIMENT	
Sample Size	20 g	
Weight Basis	DRY	
Associated Blank	DH-S-58PB PCA F2	
Field Date	03/07/01	
Extract Date	03/07/01	
Analysis Date	03/15/01	
Date Received	03/07/01	
Percent Solids	100	
Percent Lipids	NA	
Min Reporting Limit	0.62	
Units	ug/Kg	T %R

Polynuclear Aromatic Hydrocarbons			
Naphthalene	48	50	95
C1-Naphthalenes	2.3		
C2-Naphthalenes	2.8		
C3-Naphthalenes	1.2 B		
C4-Naphthalenes	ND		
Acenaphthylene	46	50	92
Acenaphthene	48	50	96
Biphenyl	ND		
Fluorene	49	50	98
C1-Fluorenes	ND		
C2-Fluorenes	ND		
C3-Fluorenes	ND		
Anthracene	33	50	66
Phenanthrene	47	50	93
C1-Phenanthrenes/anthracenes	0.29 JB		
C2-Phenanthrenes/anthracenes	ND		
C3-Phenanthrenes/anthracenes	ND		
C4-Phenanthrenes/anthracenes	ND		
Dibenzothiophene	ND		
C1-Dibenzothiophenes	ND		
C2-Dibenzothiophenes	ND		
C3-Dibenzothiophenes	ND		
Fluoranthene	51	50	102
Pyrene	52	50	104
C1-Fluoranthenes/pyrenes	ND		
C2-Fluoranthenes/pyrenes	ND		
C3-Fluoranthenes/pyrenes	ND		
Benzo[a]anthracene	48	50	96
Chrysene	48	50	96
C1-Chrysenes	ND		
C2-Chrysenes	ND		
C3-Chrysenes	ND		
C4-Chrysenes	ND		
Benzo[b]fluoranthene	65	50	130
Benzo[k]fluoranthene	52	50	104
Benzo[e]pyrene	ND		
Benzo[a]pyrene	51	50	102
Perylene	ND		
Indeno[1,2,3,-c,d]pyrene	57	50	114
Dibenzo[a,h]anthracene	54	50	108
Benzo[g,h,i]perylene	43	50	86
d8-Naphthalene	82		
d10-Acenaphthene	83		
d10-Phenanthrene	90		
d12-Benzo[a]pyrene	76		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

	Procedural	Blank Spike		
Field ID	Blank	DH-S-56BS PCA		
Lab ID	DH-S-55PB PCA	DH-S-56BS PCA		
Sample Type	PB	BS		
Matrix	SEDIMENT	SEDIMENT		
Sample Size	20 g	20 g		
Weight Basis	DRY	DRY		
Associated Blank	NA	DH-S-55PB PCA		
Field Date	02/20/01	02/20/01		
Extract Date	02/20/01	02/20/01		
Analysis Date	03/14/01	03/14/01		
Date Received	02/20/01	02/20/01		
Percent Solids	100	100		
Percent Lipids	NA	NA		
Min Reporting Limit	0.62	1.2		
Units	Q ug/Kg	ug/Kg	T %R	Q

Polynuclear Aromatic Hydrocarbons				
Naphthalene	0.44 J	47	50	93
C1-Naphthalenes	1	0.47 JB		
C2-Naphthalenes	1.8	0.45 JB		
C3-Naphthalenes	0.83	ND		
C4-Naphthalenes	ND	ND		
Acenaphthylene	0.043 J	43	50	86
Acenaphthene	0.04 J	45	50	90
Biphenyl	ND	ND		
Fluorene	0.087 J	45	50	90
C1-Fluorenes	0.13 J	0.18 JB		
C2-Fluorenes	0.15 J	ND		
C3-Fluorenes	ND	ND		
Anthracene	0.03 J	35	50	70
Phenanthrene	0.26 J	44	50	87
C1-Phenanthrenes/anthracenes	0.32 J	0.22 JB		
C2-Phenanthrenes/anthracenes	0.2 J	0.18 JB		
C3-Phenanthrenes/anthracenes	0.17 J	0.082 JB		
C4-Phenanthrenes/anthracenes	ND	ND		
Dibenzothiophene	0.08 J	0.28 JB		
C1-Dibenzothiophenes	0.13 J	ND		
C2-Dibenzothiophenes	0.19 J	ND		
C3-Dibenzothiophenes	0.13 J	ND		
Fluoranthene	0.038 J	48	50	96
Pyrene	0.057 J	48	50	96
C1-Fluoranthenes/pyrenes	0.096 J	0.078 JB		
C2-Fluoranthenes/pyrenes	ND	ND		
C3-Fluoranthenes/pyrenes	ND	ND		
Benzo[a]anthracene	ND	46	50	92
Chrysene	ND	47	50	94
C1-Chrysenes	ND	ND		
C2-Chrysenes	ND	ND		
C3-Chrysenes	ND	ND		
C4-Chrysenes	ND	ND		
Benzo[b]fluoranthene	&	52	50	104
Benzo[k]fluoranthene		44	50	88
Benzo[e]pyrene	ND	ND		
Benzo[a]pyrene	ND	47	50	94
Perylene	ND	ND		
Indeno[1,2,3,-c,d]pyrene	ND	55	50	110
Dibenzo[a,h]anthracene	ND	52	50	104
Benzo[g,h,i]perylene	ND	50	50	100
d8-Naphthalene	83	93		
d10-Acenaphthene	87	95		
d10-Phenanthrene	96	98		
d12-Benzo[a]pyrene	97	97		

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4068

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference	T	%D	Q
Sample Type	Standard			
Matrix	ORS			
Sample Size	OIL			
Weight Basis	5.02 mg			
Associated Blank	OIL			
Field Date	NA			
Extract Date	05/16/02			
Analysis Date	05/16/02			
Date Received	10/17/02			
Percent Solids	05/16/02			
Dilution Factor	NA			
Percent Lipids	1			
Min Reporting Limit	NA			
Units	0.199			
	ug/mg			
<b>SHC/TPH</b>				
n-Nonane	5.1	4.8	6.25	
n-Decane	4.25	4.2	1.19	
n-Undecane	4.17	4.3	-3.02	
n-Dodecane	4.07	4	1.75	
n-Tridecane	3.71	4	-7.25	
Isoprenoid RRT 1380	1.29	1	29	
n-Tetradecane	4.48	4.2	6.67	
Isoprenoid RRT 1470	1.44	1.4	2.86	
n-Pentadecane	3.42	3.7	-7.57	
n-Hexadecane	3.38	3.2	5.62	
Isoprenoid RRT 1650	1.72	1.5	14.7	
n-Heptadecane	2.79	3.2	-12.8	
Pristane	2.02	2.2	-8.18	
n-Octadecane	2.64	2.9	-8.96	
Phytane	1.45	1.6	-9.38	
n-Nonadecane	2.52	2.6	-3.08	
n-Eicosane	2.68	2.7	-0.741	
n-Heneicosane	2.26	2.4	-5.83	
n-Docosane	2.22	2.2	0.909	
n-Tricosane	2.04	2	2	
n-Tetracosane	1.86	2	-7	
n-Pentacosane	1.67	1.7	-1.76	
n-Hexacosane	1.46	1.5	-2.67	
n-Heptacosane	1.09	1.2	-9.17	
n-Octacosane	0.929	0.88	5.57	
n-Nonacosane	0.768	0.81	-5.18	
n-Triacontane	0.67	0.65	3.08	
n-Hentriacontane	0.748	0.58	29	
n-Dotriacontane	0.406	0.44	-7.73	
n-Tritriacontane	0.352	0.4	-12	
n-Tetratriacontane	0.336	0.35	-4	
n-Pentatriacontane	0.419	0.35	19.7	
n-Hexatriacontane	0.273	0.23	18.7	
n-Heptatriacontane	0.229	0.23	-0.435	
n-Octatriacontane	0.222	0.22	0.909	
n-Tetracontane	0.189 J	0.19	-0.526	
TPH (RES)	171	220	-22.3	
TPH	550	660	-16.7	
%ortho-terphenyl	100			
%5A-androstane	103			
%d50-tetracosane	103			



Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4068

Data Table: DUP - Surrogate Corrected

Field ID	02-NOR-01-PHC-0	02-NOR-01-PHC-0DUP		
Sample Type	N	DUP		
Matrix	OIL	OIL		
Sample Size	5.18 mg	5.08 mg		
Weight Basis	OIL	OIL		
Associated Blank	DY-S-77PB	DY-S-77PB		
Field Date	07/18/02	07/18/02		
Extract Date	10/17/02	10/17/02		
Analysis Date	10/18/02	10/18/02		
Date Received	07/19/02	07/19/02		
Percent Solids	NA	NA		
Dilution Factor	1	1		
Percent Lipids	NA	NA		
Min Reporting Limit	0.19	0.2		
Units	ug/mg	ug/mg	RPD	Q

SHC/TPH				
n-Nonane	12	12	0	
n-Decane	10	10	0	
n-Undecane	9.2	9.5	3.2	
n-Dodecane	8.5	8.8	3.5	
n-Tridecane	7.6	8	5.1	
Isoprenoid RRT 1380	2.3	2.4	4.2	
n-Tetradecane	8.4	8.7	3.5	
Isoprenoid RRT 1470	2.8	2.9	3.5	
n-Pentadecane	6.8	7.1	4.3	
n-Hexadecane	6.2	6.4	3.2	
Isoprenoid RRT 1650	3	3.1	3.3	
n-Heptadecane	5.2	5.6	7.4	
Pristane	3.5	3.8	8.2	
n-Octadecane	4.3	4.5	4.5	
Phytane	2.2	2.2	0	
n-Nonadecane	4.2	4.2	0	
n-Eicosane	3.9	4.1	5	
n-Heneicosane	3.2	3.3	3.1	
n-Docosane	3	3.1	3.3	
n-Tricosane	2.8	3	6.9	
n-Tetracosane	2.4	2.5	4.1	
n-Pentacosane	2.2	2.3	4.4	
n-Hexacosane	1.8	1.8	0	
n-Heptacosane	1.5	1.6	6.4	
n-Octacosane	1.2	1.3	8	
n-Nonacosane	1.1	1.1	0	
n-Triacontane	0.95	0.99	4.1	
n-Hentriacontane	0.94	0.99	5.2	
n-Dotriacontane	0.58	0.58	0	
n-Tritriacontane	0.51	0.52	1.9	
n-Tetratriacontane	0.38	0.38	0	
n-Pentatriacontane	0.4	0.41	2.5	
n-Hexatriacontane	0.24	0.24	0	
n-Heptatriacontane	0.2	0.22	9.5	
n-Octatriacontane	0.19	0.21	10	
n-Tetracontane	0.14 J	0.14 J	0	
TPH (RES)	230	240	4.2	
TPH	500	530	5.8	
%ortho-terphenyl	85	85		
%5A-androstane	82	82		
%d50-tetracosane	85	85		

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4068

Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank
Sample Type	PB
Matrix	WATER
Sample Size	0.15 L
Weight Basis	WET
Associated Blank	NA
Field Date	10/16/02
Extract Date	10/16/02
Analysis Date	10/17/02
Date Received	10/16/02
Percent Solids	NA
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	3.3
Units	ug/L

### SHC/TPH

n-Nonane	ND
n-Decane	ND
n-Undecane	ND
n-Dodecane	ND
n-Tridecane	ND
Isoprenoid RRT 1380	ND
n-Tetradecane	ND
Isoprenoid RRT 1470	ND
n-Pentadecane	ND
n-Hexadecane	ND
Isoprenoid RRT 1650	ND
n-Heptadecane	ND
Pristane	ND
n-Octadecane	ND
Phytane	ND
n-Nonadecane	ND
n-Eicosane	ND
n-Heneicosane	ND
n-Docosane	0.18 J
n-Tricosane	0.68 J
n-Tetracosane	1.2 J
n-Pentacosane	1.6 J
n-Hexacosane	2 J
n-Heptacosane	2.4 J
n-Octacosane	2.5 J
n-Nonacosane	2.2 J
n-Triacontane	1.7 J
n-Hentriacontane	1.5 J
n-Dotriacontane	0.89 J
n-Tritriacontane	0.5 J
n-Tetratriacontane	0.27 J
n-Pentatriacontane	0.14 J
n-Hexatriacontane	ND
n-Heptatriacontane	ND
n-Octatriacontane	ND
n-Tetracontane	ND
TPH (RES)	92
TPH	92
%ortho-terphenyl	70
%5A-androstane	63
%d50-tetracosane	66

Project Title : MMS - AMINIDA - PHASE II - TASK 2

Data Package: 4068

Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank
Sample Type	PB
Matrix	OIL
Sample Size	5 mg
Weight Basis	OIL
Associated Blank	NA
Field Date	10/17/02
Extract Date	10/17/02
Analysis Date	10/18/02
Date Received	10/17/02
Percent Solids	NA
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	0.2
Units	ug/mg

### SHC/TPH

n-Nonane	ND
n-Decane	ND
n-Undecane	ND
n-Dodecane	ND
n-Tridecane	ND
Isoprenoid RRT 1380	ND
n-Tetradecane	ND
Isoprenoid RRT 1470	ND
n-Pentadecane	ND
n-Hexadecane	ND
Isoprenoid RRT 1650	ND
n-Heptadecane	ND
Pristane	ND
n-Octadecane	ND
Phytane	ND
n-Nonadecane	ND
n-Eicosane	ND
n-Heneicosane	ND
n-Docosane	ND
n-Tricosane	ND
n-Tetracosane	ND
n-Pentacosane	ND
n-Hexacosane	ND
n-Heptacosane	ND
n-Octacosane	ND
n-Nonacosane	0.0069 J
n-Triacontane	ND
n-Hentriacontane	ND
n-Dotriacontane	ND
n-Tritriacontane	ND
n-Tetratriacontane	ND
n-Pentatriacontane	ND
n-Hexatriacontane	ND
n-Heptatriacontane	ND
n-Octatriacontane	ND
n-Tetracontane	ND
TPH (RES)	0.88
TPH	0.88
%ortho-terphenyl	85
%5A-androstane	78
%d50-tetracosane	80

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4070

Data Table: ORS - Surrogate Corrected

	Oil Reference			Oil Reference		
Field ID	Standard			Standard		
Sample Type	ORS			ORS		
Matrix	OIL			OIL		
Sample Size	5.1 mg			5.34 mg		
Weight Basis	OIL			OIL		
Associated Blank	NA			NA		
Field Date	04/23/02			12/31/02		
Extract Date	04/23/02			12/31/02		
Analysis Date	10/18/02			02/25/03		
Date Received	04/23/02			12/31/02		
Percent Solids	NA			NA		
Dilution Factor	1			1		
Percent Lipids	NA			NA		
Min Reporting Limit	4.9			4.68		
Units	mg/Kg	T	%D	Q	mg/Kg	T %D Q

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	56.9	58.9	-3.4		48.1	58.9	-18.3
S4-Diacholestane	39.6	46.8	-15.4		44.8	46.8	-4.27
S5-Diacholestane	23.8	26.1	-8.81		28	26.1	7.28
T9-C29Tricyclitriterpane	13.7	15.7	-12.7		15.8	15.7	0.637
T10-C29Tricyclitriterpane	13.7	15	-8.67		12.5	15	-16.7
T11-Trisnorhopane(TS)	22.5	24.8	-9.27		21.9	24.8	-11.7
T12-Trisnorhopane(TM)	25	31	-19.4		25.2	31	-18.7
S24-Methylcholestane	30.6	26.2	16.8		28.4	26.2	8.4
S25-Ethylcholestane	48	39.8	20.6		41.4	39.8	4.02
S28-Ethylcholestane	36.2	33.9	6.78		36.7	33.9	8.26
T15-Norhopane	82.9	83.8	-1.07		80.6	83.8	-3.82
T18-Oleanane		ND				ND	
T19-Hopane	119	113	5.31		118	113	4.42
T21-Homohopane	53.6	46.1	16.3		49.7	46.1	7.81
T22-Homohopane	42	35.2	19.3		36.5	35.2	3.69
5B(H)-Cholane	110				99		



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4070  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Procedural Blank
Sample Type	PB	PB
Matrix	OIL	Oil
Sample Size	5 mg	5 mg
Weight Basis	OIL	OIL
Associated Blank	NA	NA
Field Date	10/17/02	02/20/03
Extract Date	10/17/02	02/20/03
Analysis Date	10/18/02	02/25/03
Date Received	10/17/02	02/20/03
Percent Solids	NA	NA
Dilution Factor	1	1
Percent Lipids	NA	NA
Min Reporting Limit	5	5
Units	mg/Kg	mg/Kg

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	ND	ND
S4-Diacholestane	ND	ND
S5-Diacholestane	ND	ND
T9-C29Tricyclictriterpane	ND	ND
T10-C29Tricyclictriterpane	ND	ND
T11-Trisnorhopane(TS)	ND	ND
T12-Trisnorhopane(TM)	ND	ND
S24-Methylcholestane	ND	ND
S25-Ethylcholestane	ND	ND
S28-Ethylcholestane	ND	ND
T15-Norhopane	ND	ND
T18-Oleanane	ND	ND
T19-Hopane	ND	ND
T21-Homohopane	ND	ND
T22-Homohopane	ND	ND

5B(H)-Cholane

109

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Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4070  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS				ORS				ORS			
Sample Type	OIL				OIL				OIL			
Matrix	OIL				OIL				OIL			
Sample Size	5.1 mg				5.1 mg				5.34 mg			
Weight Basis	OIL				OIL				OIL			
Associated Blank	NA				NA				NA			
Field Date	04/23/02				04/23/02				12/31/02			
Extract Date	04/23/02				04/23/02				12/31/02			
Analysis Date	10/18/02				10/23/02				02/25/03			
Date Received	04/23/02				04/23/02				12/31/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	4.9				4.9				4.68			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q
<b>Polynuclear Aromatic Hydrocarbons</b>												
Naphthalene	774	710	9.01		832	710	17.2		752	710	5.92	
C1-Naphthalenes	1440	1600	-10		1510	1600	-5.62		1600	1600	0	
C2-Naphthalenes	2060	2300	-10.4		2100	2300	-8.7		2210	2300	-3.91	
C3-Naphthalenes	1720	1960	-12.2		1600	1960	-18.4		1830	1960	-6.63	
C4-Naphthalenes	968	1180	-18		927	1180	-21.4		1060	1180	-10.2	
Acenaphthylene	ND				ND				ND			
Acenaphthene	ND				ND				ND			
Biphenyl	222	214	3.74		233	214	8.88		226	214	5.61	
Fluorene	105	95.2	10.3		103	95.2	8.19		100	95.2	5.04	
C1-Fluorenes	247	239	3.35		253	239	5.86		246	239	2.93	
C2-Fluorenes	359	356	0.843		344	356	-3.37		353	356	-0.843	
C3-Fluorenes	348	396	-12.1		340	396	-14.1		348	396	-12.1	
Anthracene	ND				ND				ND			
Phenanthrene	283	260	8.85		290	260	11.5		278	260	6.92	
C1-Phenanthrenes/anthracenes	628	612	2.61		584	612	-4.58		615	612	0.49	
C2-Phenanthrenes/anthracenes	702	752	-6.65		628	752	-16.5		758	752	0.798	
C3-Phenanthrenes/anthracenes	517	534	-3.18		483	534	-9.55		507	534	-5.06	
C4-Phenanthrenes/anthracenes	313	308	1.62		258	308	-16.2		290	308	-5.84	
Dibenzothiophene	252	222	13.5		258	222	16.2		235	222	5.86	
C1-Dibenzothiophenes	508	484	4.96		477	484	-1.45		478	484	-1.24	
C2-Dibenzothiophenes	636	658	-3.34		618	658	-6.08		630	658	-4.26	
C3-Dibenzothiophenes	583	574	1.57		525	574	-8.54		543	574	-5.4	
Fluoranthene	ND				ND				ND			
Pyrene	14.3	13.4	6.72		16.3	13.4	21.6		13.9	13.4	3.73	
C1-Fluoranthenes/pyrenes	90.3	83.9	7.63		83.8	83.9	-0.119		79	83.9	-5.84	
C2-Fluoranthenes/pyrenes	159	142	12		142	142	0		138	142	-2.82	
C3-Fluoranthenes/pyrenes	172	158	8.86		147	158	-6.96		155	158	-1.9	
Benzo[a]anthracene	ND				ND				ND			
Chrysene	56.1	49.2	14		51.6	49.2	4.88		53	49.2	7.72	
C1-Chrysenes	93.7	81.5	15		80.6	81.5	-1.1		92.3	81.5	13.2	
C2-Chrysenes	105	102	2.94		93.8	102	-8.04		106	102	3.92	
C3-Chrysenes	95	79.6	19.3		80.8	79.6	1.51		88.3	79.6	10.9	
C4-Chrysenes	66.8	64	4.37		57.7	64	-9.84		62.7	64	-2.03	
Benzo[b]fluoranthene	7.21	7.62	-5.38		7.32	7.62	-3.94		6.67	7.62	-12.5	
Benzo[k]fluoranthene	ND				ND				ND			
Benzo[e]pyrene	12.1	12.4	-2.42		12.2	12.4	-1.61		12.1	12.4	-2.42	
Benzo[a]pyrene	ND				ND				ND			
Perylene	ND				ND				ND			
Indeno[1,2,3,-c,d]pyrene	ND				ND				ND			
Dibenzo[a,h]anthracene	1.46 J				1.16 J				1.41 J			
Benzo[g,h,i]perylene	3.44 J	3.18	8.18		3.17 J	3.18	-0.314		3.48 J	3.18	9.43	
d8-Naphthalene	90				93				93			
d10-Acenaphthene	97				98				93			
d10-Phenanthrene	98				96				95			
d12-Benzo[a]pyrene	108				106				107			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4070  
Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference				Instrument Reference				Instrument Reference			
	Standard				Standard				Standard			
Sample Type	IRM				IRM				IRM			
Matrix	IRM				IRM				IRM			
Sample Size	0.1 mL				0.1 mL				0.1 mL			
Weight Basis	WET				WET				WET			
Associated Blank	NA				NA				NA			
Field Date	10/15/02				10/15/02				10/15/02			
Extract Date	10/15/02				10/15/02				10/15/02			
Analysis Date	10/18/02				10/23/02				02/25/03			
Date Received	10/15/02				10/15/02				10/15/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	250				250				250			
Units	ug/L	T	%D	Q	ug/L	T	%D	Q	ug/L	T	%D	Q

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	6640	6890	-3.63		6850	6890	-0.58		6750	6890	-2.03	
C1-Naphthalenes	ND				ND				ND			
C2-Naphthalenes	ND				ND				ND			
C3-Naphthalenes	ND				ND				ND			
C4-Naphthalenes	ND				ND				ND			
Acenaphthylene	6640	6960	-4.6		6690	6960	-3.88		6540	6960	-6.03	
Acenaphthene	6490	7280	-10.8		6590	7280	-9.48		6430	7280	-11.7	
Biphenyl	6960	7000	-0.571		7130	7000	1.86		7070	7000	1	
Fluorene	6200	7270	-14.7		6390	7270	-12.1		6230	7270	-14.3	
C1-Fluorenes	ND				ND				ND			
C2-Fluorenes	ND				ND				ND			
C3-Fluorenes	ND				ND				ND			
Anthracene	7060	7820	-9.72		7160	7820	-8.44		7260	7820	-7.16	
Phenanthrene	6850	7010	-2.28		7030	7010	0.285		6940	7010	-0.998	
C1-Phenanthrenes/anthracenes	ND				ND				ND			
C2-Phenanthrenes/anthracenes	ND				ND				ND			
C3-Phenanthrenes/anthracenes	ND				ND				ND			
C4-Phenanthrenes/anthracenes	ND				ND				ND			
Dibenzothiophene	ND				ND				ND			
C1-Dibenzothiophenes	ND				ND				ND			
C2-Dibenzothiophenes	ND				ND				ND			
C3-Dibenzothiophenes	ND				ND				ND			
Fluoranthene	6110	5910	3.38		6110	5910	3.38		6010	5910	1.69	
Pyrene	5840	5890	-0.849		6000	5890	1.87		5850	5890	-0.679	
C1-Fluoranthenes/pyrenes	ND				ND				ND			
C2-Fluoranthenes/pyrenes	ND				ND				ND			
C3-Fluoranthenes/pyrenes	ND				ND				ND			
Benzo[a]anthracene	3420	3590	-4.74		3360	3590	-6.41		3540	3590	-1.39	
Chrysene	7040	7030	0.142		7040	7030	0.142		7140	7030	1.56	
C1-Chrysenes	ND				ND				ND			
C2-Chrysenes	ND				ND				ND			
C3-Chrysenes	ND				ND				ND			
C4-Chrysenes	ND				ND				ND			
Benzo[b]fluoranthene	5420	5250	3.24		5690	5250	8.38		5360	5250	2.1	
Benzo[k]fluoranthene	5720	5570	2.69		5610	5570	0.718		5740	5570	3.05	
Benzo[e]pyrene	5730	5620	1.96		5930	5620	5.52		5790	5620	3.02	
Benzo[a]pyrene	6670	6790	-1.77		6860	6790	1.03		6750	6790	-0.589	
Perylene	6950	7120	-2.39		7120	7120	0		7080	7120	-0.562	
Indeno[1,2,3-c,d]pyrene	6110	6290	-2.86		6540	6290	3.97		6010	6290	-4.45	
Dibenzo[a,h]anthracene	5490	5180	5.98		5680	5180	9.65		5440	5180	5.02	
Benzo[g,h,i]perylene	5200	5290	-1.7		5340	5290	0.945		5100	5290	-3.59	

d8-Naphthalene	98				96				99			
d10-Acenaphthene	97				94				97			
d10-Phenanthrene	97				94				96			
d12-Benzo[a]pyrene	94				91				96			



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4070  
Data Table: DUP - Surrogate Corrected

Field ID	Northstar Oil		Northstar Oil DUP		KUPARIC WELL 3H-5		KUPARIC WELL 3H-5		
	N	DUP	DUP	RPD	Q	N	DUP	RPD	Q
Sample Type	N	DUP	DUP			N	DUP		
Matrix	OIL	OIL	OIL			CRUDE OIL	CRUDE OIL		
Sample Size	5.18 mg	5.08 mg	5.08 mg			5.2 mg	4.92 mg		
Weight Basis	OIL	OIL	OIL			OIL	OIL		
Associated Blank	DY-S-77PB	DY-S-77PB	DY-S-77PB			EB-S-61PB	EB-S-61PB		
Field Date	07/18/02	07/18/02	07/18/02			08/12/01	08/12/01		
Extract Date	10/17/02	10/17/02	10/17/02			02/20/03	02/20/03		
Analysis Date	10/18/02	10/18/02	10/18/02			02/25/03	02/25/03		
Date Received	07/19/02	07/19/02	07/19/02			08/31/01	08/31/01		
Percent Solids	NA	NA	NA			NA	NA		
Dilution Factor	2	2	2			1	1		
Percent Lipids	NA	NA	NA			NA	NA		
Min Reporting Limit	4.8	4.9	4.9			4.8	5.1		
Units	mg/Kg	mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg	RPD	Q

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	1000 D	1100 D	9.5			590	650	9.7	
C1-Naphthalenes	1800	1800	0			1200	1300	8	
C2-Naphthalenes	2600	2700	3.8			1900	2000	5.1	
C3-Naphthalenes	1900	1900	0			1700	1800	5.7	
C4-Naphthalenes	900	900	0			1000	1100	9.5	
Acenaphthylene	ND	ND				ND	ND		
Acenaphthene	ND	ND				ND	ND		
Biphenyl	330	340	3			130	140	7.4	
Fluorene	180	190	5.4			56	60	6.9	
C1-Fluorenes	280	300	6.9			180	190	5.4	
C2-Fluorenes	340	350	2.9			310	330	6.2	
C3-Fluorenes	300	300	0			360	380	5.4	
Anthracene	ND	ND				ND	ND		
Phenanthrene	310	320	3.2			210	240	13	
C1-Phenanthrenes/anthracenes	690	680	1.4			500	550	9.5	
C2-Phenanthrenes/anthracenes	750	710	5.5			660	710	7.3	
C3-Phenanthrenes/anthracenes	500	490	2			530	570	7.3	
C4-Phenanthrenes/anthracenes	240	250	4.1			300	340	12	
Dibenzothiophene	94	95	1			190	200	5.1	
C1-Dibenzothiophenes	210	200	4.9			490	520	5.9	
C2-Dibenzothiophenes	210	220	4.6			780	860	9.8	
C3-Dibenzothiophenes	150	150	0			880	940	6.6	
Fluoranthene	ND	ND				ND	ND		
Pyrene	25	25	0			8.7	8.8	1.1	
C1-Fluoranthenes/pyrenes	100	98	2			54	57	5.4	
C2-Fluoranthenes/pyrenes	160	160	0			100	120	18	
C3-Fluoranthenes/pyrenes	160	160	0			140	150	6.9	
Benzo[a]anthracene	ND	ND				ND	ND		
Chrysene	51	48	6.1			37	41	10	
C1-Chrysenes	90	82	9.3			80	84	4.9	
C2-Chrysenes	120	120	0			96	100	4.1	
C3-Chrysenes	94	86	8.9			91	100	9.4	
C4-Chrysenes	60	67	11			63	69	9.1	
Benzo[b]fluoranthene	7	6.5	7.4			4.1 J	4.9 J	18	
Benzo[k]fluoranthene	ND	ND				1 J	1 J	0	
Benzo[e]pyrene	13	14	7.4			6.5	7.1	8.8	
Benzo[a]pyrene	ND	ND				ND	ND		
Perylene	ND	ND				ND	ND		
Indeno[1,2,3,-c,d]pyrene	ND	ND				ND	ND		
Dibenzo[a,h]anthracene	1.2 J	1.4 J	15			1.5 J	1.6 J	6.4	
Benzo[g,h,i]perylene	1.6 J	1.8 J	12			1.8 J	1.9 J	5.4	

d8-Naphthalene	105	103				91	92		
d10-Acenaphthene	110	109				91	93		
d10-Phenanthrene	110	111				90	91		
d12-Benzo[a]pyrene	115	112				101	101		

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	Oil Reference			Oil Reference		
Field ID	Standard			Standard		
Lab ID	BX28ORS			BY32ORS		
Sample Type	ORS			ORS		
Matrix	OIL			OIL		
Sample Size	5.04 mg			5.12 mg		
Weight Basis	OIL			OIL		
Associated Blank	NA			NA		
Field Date	12/19/00			03/21/01		
Extract Date	12/19/00			03/21/01		
Analysis Date	03/22/01			04/05/01		
Date Received	12/19/00			03/21/01		
Percent Solids	NA			NA		
Percent Lipids	NA			NA		
Min Reporting Limit	4.96			4.88		
Units	mg/Kg	T	%D	mg/Kg	T	%D

Polynuclear Aromatic Hydrocarbons						
Naphthalene	745	710	4.93	764	710	7.6
C1-Naphthalenes	1470	1600	-8.12	1830	1600	14.4
C2-Naphthalenes	2070	2300	-10	2160	2300	-6.09
C3-Naphthalenes	1560	1960	-20.4	1830	1960	-6.63
C4-Naphthalenes	912	1180	-22.7	1110	1180	-5.93
Acenaphthylene	ND			ND		
Acenaphthene	ND			ND		
Biphenyl	219	214	2.34	228	214	6.54
Fluorene	97.3	95.2	2.2	104	95.2	9.24
C1-Fluorenes	234	239	-2.09	259	239	8.37
C2-Fluorenes	309	356	-13.2	383	356	7.58
C3-Fluorenes	318	396	-19.7	411	396	3.79
Anthracene	ND			ND		
Phenanthrene	277	260	6.54	286	260	10
C1-Phenanthrenes/anthracenes	581	612	-5.06	646	612	5.56
C2-Phenanthrenes/anthracenes	720	752	-4.26	712	752	-5.32
C3-Phenanthrenes/anthracenes	472	534	-11.6	571	534	6.93
C4-Phenanthrenes/anthracenes	242	308	-21.4	311	308	0.974
Dibenzothiophene	229	222	3.15	238	222	7.21
C1-Dibenzothiophenes	476	484	-1.65	453	484	-6.4
C2-Dibenzothiophenes	579	658	-12	706	658	7.29
C3-Dibenzothiophenes	497	574	-13.4	557	574	-2.96
Fluoranthene	ND			ND		
Pyrene	12.9	13.4	-3.73	15	13.4	11.9
C1-Fluoranthenes/pyrenes	76.8	83.9	-8.46	78.5	83.9	-6.44
C2-Fluoranthenes/pyrenes	133	142	-6.34	138	142	-2.82
C3-Fluoranthenes/pyrenes	134	158	-15.2	150	158	-5.06
Benzo[a]anthracene	ND			ND		
Chrysene	53.7	49.2	9.15	51.3	49.2	4.27
C1-Chrysenes	83.9	81.5	2.94	88.2	81.5	8.22
C2-Chrysenes	105	102	2.94	106	102	3.92
C3-Chrysenes	83.4	79.6	4.77	92.9	79.6	16.7
C4-Chrysenes	62.2	64	-2.81	74.6	64	16.6
Benzo[b]fluoranthene	8.51	7.62	11.7	7.28	7.62	-4.46
Benzo[k]fluoranthene	ND			ND		
Benzo[e]pyrene	14.7	12.4	18.5	13.3	12.4	7.26
Benzo[a]pyrene	ND			ND		
Perylene	ND			ND		
Indeno[1,2,3,-c,d]pyrene	ND			ND		
Dibenzo[a,h]anthracene	1.68 J			1.55 J		
Benzo[g,h,i]perylene	3.97 J	3.18	24.8	3.63 J	3.18	14.2
d8-Naphthalene	93			89		
d10-Acenaphthene	95			99		
d10-Phenanthrene	94			98		
d12-Benzo[a]pyrene	79			100		

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	Oil Reference			Oil Reference				
Field ID	Standard			Standard				
Lab ID	BX28ORS-1			BX28ORS-2				
Sample Type	ORS			ORS				
Matrix	OIL			OIL				
Sample Size	5.04 mg			5.04 mg				
Weight Basis	OIL			OIL				
Associated Blank	NA			NA				
Field Date	12/19/00			12/19/00				
Extract Date	12/19/00			12/19/00				
Analysis Date	03/14/01			03/22/01				
Date Received	12/19/00			12/19/00				
Percent Solids	NA			NA				
Percent Lipids	NA			NA				
Min Reporting Limit	4.96			4.96				
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydrocarbons							
Naphthalene	723	710	1.83		745	710	4.93
C1-Naphthalenes	1490	1600	-6.88		1470	1600	-8.12
C2-Naphthalenes	2080	2300	-9.56		2070	2300	-10
C3-Naphthalenes	1540	1960	-21.4		1560	1960	-20.4
C4-Naphthalenes	906	1180	-23.2		912	1180	-22.7
Acenaphthylene	ND				ND		
Acenaphthene	ND				ND		
Biphenyl	224	214	4.67		219	214	2.34
Fluorene	95.9	95.2	0.735		97.3	95.2	2.2
C1-Fluorenes	232	239	-2.93		234	239	-2.09
C2-Fluorenes	300	356	-15.7		309	356	-13.2
C3-Fluorenes	313	396	-21		318	396	-19.7
Anthracene	ND				ND		
Phenanthrene	274	260	5.38		277	260	6.54
C1-Phenanthrenes/anthracenes	566	612	-7.52		581	612	-5.06
C2-Phenanthrenes/anthracenes	647	752	-14		720	752	-4.26
C3-Phenanthrenes/anthracenes	446	534	-16.5		472	534	-11.6
C4-Phenanthrenes/anthracenes	206	308	-33.1		242	308	-21.4
Dibenzothiophene	228	222	2.7		229	222	3.15
C1-Dibenzothiophenes	471	484	-2.68		476	484	-1.65
C2-Dibenzothiophenes	552	658	-16.1		579	658	-12
C3-Dibenzothiophenes	473	574	-17.6		497	574	-13.4
Fluoranthene	ND				ND		
Pyrene	14	13.4	4.48		12.9	13.4	-3.73
C1-Fluoranthenes/pyrenes	71.5	83.9	-14.8		76.8	83.9	-8.46
C2-Fluoranthenes/pyrenes	129	142	-9.15		133	142	-6.34
C3-Fluoranthenes/pyrenes	143	158	-9.49		134	158	-15.2
Benzo[a]anthracene	ND				ND		
Chrysene	48.8	49.2	-0.813		53.7	49.2	9.15
C1-Chrysenes	78.5	81.5	-3.68		83.9	81.5	2.94
C2-Chrysenes	94.5	102	-7.35		105	102	2.94
C3-Chrysenes	84.6	79.6	6.28		83.4	79.6	4.77
C4-Chrysenes	66.2	64	3.44		62.2	64	-2.81
Benzo[b]fluoranthene	9.08	7.62	19.2		8.51	7.62	11.7
Benzo[k]fluoranthene	ND				ND		
Benzo[e]pyrene	14.9	12.4	20.2		14.7	12.4	18.5
Benzo[a]pyrene	ND				ND		
Perylene	ND				ND		
Indeno[1,2,3,-c,d]pyrene	ND				ND		
Dibenzo[a,h]anthracene	ND				1.68 J		
Benzo[g,h,i]perylene	3.58 J	3.18	12.6		3.97 J	3.18	24.8
d8-Naphthalene	100				93		
d10-Acenaphthene	97				95		
d10-Phenanthrene	99				94		
d12-Benzo[a]pyrene	80				79		

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	Oil Reference			Oil Reference				
Field ID	Standard			Standard				
Lab ID	BY32ORS			BX28ORS-1				
Sample Type	ORS			ORS				
Matrix	OIL			OIL				
Sample Size	5.12 mg			5.04 mg				
Weight Basis	OIL			OIL				
Associated Blank	NA			NA				
Field Date	03/21/01			12/19/00				
Extract Date	03/21/01			12/19/00				
Analysis Date	03/29/01			03/05/01				
Date Received	03/21/01			12/19/00				
Percent Solids	NA			NA				
Percent Lipids	NA			NA				
Min Reporting Limit	4.88			4.96				
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydrocarbons							
Naphthalene	785	710	10.6		732	710	3.1
C1-Naphthalenes	1610	1600	0.625		1430	1600	-10.6
C2-Naphthalenes	2260	2300	-1.74		2030	2300	-11.7
C3-Naphthalenes	1700	1960	-13.3		1500	1960	-23.5
C4-Naphthalenes	980	1180	-16.9		843	1180	-28.6
Acenaphthylene	ND				ND		
Acenaphthene	ND				ND		
Biphenyl	238	214	11.2		225	214	5.14
Fluorene	106	95.2	11.3		97.3	95.2	2.2
C1-Fluorenes	260	239	8.79		230	239	-3.76
C2-Fluorenes	340	356	-4.49		297	356	-16.6
C3-Fluorenes	353	396	-10.8		325	396	-17.9
Anthracene	ND				ND		
Phenanthrene	292	260	12.3		279	260	7.31
C1-Phenanthrenes/anthracenes	593	612	-3.1		561	612	-8.33
C2-Phenanthrenes/anthracenes	706	752	-6.12		676	752	-10.1
C3-Phenanthrenes/anthracenes	498	534	-6.74		444	534	-16.8
C4-Phenanthrenes/anthracenes	285	308	-7.47		227	308	-26.3
Dibenzothiophene	239	222	7.66		228	222	2.7
C1-Dibenzothiophenes	476	484	-1.65		461	484	-4.75
C2-Dibenzothiophenes	598	658	-9.12		621	658	-5.62
C3-Dibenzothiophenes	546	574	-4.88		483	574	-15.8
Fluoranthene	ND				ND		
Pyrene	14.1	13.4	5.22		12.4	13.4	-7.46
C1-Fluoranthenes/pyrenes	85.8	83.9	2.26		71.4	83.9	-14.9
C2-Fluoranthenes/pyrenes	140	142	-1.41		127	142	-10.6
C3-Fluoranthenes/pyrenes	146	158	-7.59		125	158	-20.9
Benzo[a]anthracene	ND				ND		
Chrysene	56.4	49.2	14.6		50.2	49.2	2.03
C1-Chrysenes	84.1	81.5	3.19		77	81.5	-5.52
C2-Chrysenes	105	102	2.94		94.2	102	-7.65
C3-Chrysenes	85	79.6	6.78		77.1	79.6	-3.14
C4-Chrysenes	63.2	64	-1.25		56.8	64	-11.2
Benzo[b]fluoranthene	7.01	7.62	-8		7.91	7.62	3.8
Benzo[k]fluoranthene	ND				ND		
Benzo[e]pyrene	12.6	12.4	1.61		15.6	12.4	25.8
Benzo[a]pyrene	ND				ND		
Perylene	ND				ND		
Indeno[1,2,3,-c,d]pyrene	ND				ND		
Dibenzo[a,h]anthracene	1.37 J				ND		
Benzo[g,h,i]perylene	3.26 J	3.18	2.52		3.56 J	3.18	11.9
d8-Naphthalene	97				98		
d10-Acenaphthene	96				97		
d10-Phenanthrene	97				97		
d12-Benzo[a]pyrene	101				79		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	<b>Oil Reference</b>		
Field ID	<b>Standard</b>		
Lab ID	<b>BX28ORS-2</b>		
Sample Type	<b>ORS</b>		
Matrix	<b>OIL</b>		
Sample Size	<b>5.04 mg</b>		
Weight Basis	<b>OIL</b>		
Associated Blank	<b>NA</b>		
Field Date	<b>12/19/00</b>		
Extract Date	<b>12/19/00</b>		
Analysis Date	<b>03/14/01</b>		
Date Received	<b>12/19/00</b>		
Percent Solids	<b>NA</b>		
Percent Lipids	<b>NA</b>		
Min Reporting Limit	<b>4.96</b>		
Units	<b>mg/Kg</b>	<b>T</b>	<b>%D Q</b>

Polynuclear Aromatic Hydrocarbons			
Naphthalene	723	710	1.83
C1-Naphthalenes	1490	1600	-6.88
C2-Naphthalenes	2080	2300	-9.56
C3-Naphthalenes	1540	1960	-21.4
C4-Naphthalenes	906	1180	-23.2
Acenaphthylene	ND		
Acenaphthene	ND		
Biphenyl	224	214	4.67
Fluorene	95.9	95.2	0.735
C1-Fluorenes	232	239	-2.93
C2-Fluorenes	300	356	-15.7
C3-Fluorenes	313	396	-21
Anthracene	ND		
Phenanthrene	274	260	5.38
C1-Phenanthrenes/anthracenes	566	612	-7.52
C2-Phenanthrenes/anthracenes	647	752	-14
C3-Phenanthrenes/anthracenes	446	534	-16.5
C4-Phenanthrenes/anthracenes	206	308	-33.1
Dibenzothiophene	228	222	2.7
C1-Dibenzothiophenes	471	484	-2.68
C2-Dibenzothiophenes	552	658	-16.1
C3-Dibenzothiophenes	473	574	-17.6
Fluoranthene	ND		
Pyrene	14	13.4	4.48
C1-Fluoranthenes/pyrenes	71.5	83.9	-14.8
C2-Fluoranthenes/pyrenes	129	142	-9.15
C3-Fluoranthenes/pyrenes	143	158	-9.49
Benzo[a]anthracene	ND		
Chrysene	48.8	49.2	-0.813
C1-Chrysenes	78.5	81.5	-3.68
C2-Chrysenes	94.5	102	-7.35
C3-Chrysenes	84.6	79.6	6.28
C4-Chrysenes	66.2	64	3.44
Benzo[b]fluoranthene	9.08	7.62	19.2
Benzo[k]fluoranthene	ND		
Benzo[e]pyrene	14.9	12.4	20.2
Benzo[a]pyrene	ND		
Perylene	ND		
Indeno[1,2,3,-c,d]pyrene	ND		
Dibenzo[a,h]anthracene	ND		
Benzo[g,h,i]perylene	3.58 J	3.18	12.6
d8-Naphthalene	100		
d10-Acenaphthene	97		
d10-Phenanthrene	99		
d12-Benzo[a]pyrene	80		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike				Procedural Blank
Sample Type	PB	BS				PB
Matrix	SEDIMENT	SEDIMENT				SEDIMENT
Sample Size	20 g	20 g				20 g
Weight Basis	DRY	DRY				DRY
Associated Blank	NA	DY-S-66PB				NA
Field Date	10/16/02	10/16/02				10/28/02
Extract Date	10/16/02	10/16/02				10/28/02
Analysis Date	10/27/02	10/27/02				11/05/02
Date Received	10/16/02	10/16/02				10/28/02
Percent Solids	100	100				100
Dilution Factor	1	1				1
Percent Lipids	NA	NA				NA
Min Reporting Limit	0.62	0.62				0.62
Units	ug/Kg	ug/Kg	T	%R	Q	ug/Kg
<b>Polynuclear Aromatic Hydrocarbons</b>						
Naphthalene	0.25 J	57	50	114		0.44 J
C1-Naphthalenes	0.088 J	0.2 JB				0.21 J
C2-Naphthalenes	0.088 J	0.18 JB				0.17 J
C3-Naphthalenes	ND	0.13 J				ND
C4-Naphthalenes	ND	ND				ND
Acenaphthylene	ND	58	50	116		0.022 J
Acenaphthene	0.025 J	56	50	112		0.055 J
Biphenyl	0.068 J	0.1 JB				0.21 J
Fluorene	0.062 J	60	50	120		0.18 J
C1-Fluorenes	ND	ND				ND
C2-Fluorenes	ND	ND				ND
C3-Fluorenes	ND	ND				ND
Anthracene	ND	43	50	86		0.057 J
Phenanthrene	0.37 J	58	50	115		1.4
C1-Phenanthrenes/anthracenes	0.073 J	0.34 JB				0.26 J
C2-Phenanthrenes/anthracenes	ND	0.22 J				0.14 J
C3-Phenanthrenes/anthracenes	ND	0.072 J				ND
C4-Phenanthrenes/anthracenes	ND	ND				ND
Dibenzothiophene	0.019 J	0.21 J				0.058 J
C1-Dibenzothiophenes	ND	ND				ND
C2-Dibenzothiophenes	ND	ND				ND
C3-Dibenzothiophenes	ND	ND				ND
Fluoranthene	0.094 J	68	50	136	&	0.53 J
Pyrene	0.055 J	65	50	130	&	0.19 J
C1-Fluoranthenes/pyrenes	ND	0.15 J				ND
C2-Fluoranthenes/pyrenes	ND	ND				ND
C3-Fluoranthenes/pyrenes	ND	ND				ND
Benzo[a]anthracene	ND	58	50	116		ND
Chrysene	ND	60	50	120		ND
C1-Chrysenes	ND	ND				ND
C2-Chrysenes	ND	ND				ND
C3-Chrysenes	ND	ND				ND
C4-Chrysenes	ND	ND				ND
Benzo[b]fluoranthene	ND	69	50	138	&	ND
Benzo[k]fluoranthene	ND	68	50	136	&	ND
Benzo[e]pyrene	ND	ND				ND
Benzo[a]pyrene	ND	63	50	126	&	ND
Perylene	ND	ND				ND
Indeno[1,2,3,-c,d]pyrene	ND	73	50	146	&	ND
Dibenzo[a,h]anthracene	ND	72	50	144	&	ND
Benzo[g,h,i]perylene	ND	67	50	134	&	ND
d8-Naphthalene	63	67				65
d10-Acenaphthene	70	74				66
d10-Phenanthrene	80	85				74
d12-Benzo[a]pyrene	79	79				74

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Blank Spike			Procedural Blank		Blank Spike			
Sample Type	BS			PB		BS			
Matrix	SEDIMENT			SEDIMENT		SEDIMENT			
Sample Size	20 g			20 g		20 g			
Weight Basis	DRY			DRY		DRY			
Associated Blank	DZ-S-03PB			NA		DY-S-69PB			
Field Date	10/28/02			10/17/02		10/17/02			
Extract Date	10/28/02			10/17/02		10/17/02			
Analysis Date	11/05/02			10/29/02		10/29/02			
Date Received	10/28/02			10/17/02		10/17/02			
Percent Solids	100			100		100			
Dilution Factor	1			1		1			
Percent Lipids	NA			NA		NA			
Min Reporting Limit	0.62			0.62		0.62			
Units	ug/Kg	T	%R	Q	ug/Kg	ug/Kg	T	%R	Q
<b>Polynuclear Aromatic Hydro</b>									
Naphthalene	57	50	113		0.33 J	53	50	105	
C1-Naphthalenes	0.28 JB				0.11 J	0.26 JB			
C2-Naphthalenes	0.21 JB				0.13 J	0.19 JB			
C3-Naphthalenes	ND				ND	ND			
C4-Naphthalenes	ND				ND	ND			
Acenaphthylene	54	50	108		ND	51	50	102	
Acenaphthene	54	50	108		0.029 J	52	50	104	
Biphenyl	0.26 JB				0.084 J	0.13 JB			
Fluorene	54	50	108		0.076 J	53	50	106	
C1-Fluorenes	ND				ND	ND			
C2-Fluorenes	ND				ND	ND			
C3-Fluorenes	ND				ND	ND			
Anthracene	37	50	74		0.021 J	38	50	76	
Phenanthrene	52	50	101		0.49 J	50	50	99	
C1-Phenanthrenes/anthracenes	0.14 JB				0.13 J	0.13 JB			
C2-Phenanthrenes/anthracenes	0.11 JB				ND	0.068 J			
C3-Phenanthrenes/anthracenes	0.054 J				ND	ND			
C4-Phenanthrenes/anthracenes	ND				ND	ND			
Dibenzothiophene	0.16 JB				ND	ND			
C1-Dibenzothiophenes	ND				ND	ND			
C2-Dibenzothiophenes	ND				ND	ND			
C3-Dibenzothiophenes	ND				ND	ND			
Fluoranthene	65	50	129 &		0.15 J	59	50	118	
Pyrene	61	50	122		0.072 J	56	50	112	
C1-Fluoranthenes/pyrenes	ND				ND	ND			
C2-Fluoranthenes/pyrenes	ND				ND	ND			
C3-Fluoranthenes/pyrenes	ND				ND	ND			
Benzo[a]anthracene	60	50	120		ND	54	50	108	
Chrysene	62	50	124		ND	56	50	112	
C1-Chrysenes	ND				ND	ND			
C2-Chrysenes	ND				ND	ND			
C3-Chrysenes	ND				ND	ND			
C4-Chrysenes	ND				ND	ND			
Benzo[b]fluoranthene	75	50	150 &		ND	62	50	124	
Benzo[k]fluoranthene	72	50	144 &		ND	62	50	124	
Benzo[e]pyrene	ND				ND	ND			
Benzo[a]pyrene	60	50	120		ND	56	50	112	
Perylene	ND				ND	ND			
Indeno[1,2,3-c,d]pyrene	72	50	144 &		ND	62	50	124	
Dibenzo[a,h]anthracene	72	50	144 &		ND	62	50	124	
Benzo[g,h,i]perylene	71	50	142 &		ND	60	50	120	
d8-Naphthalene	61				67	64			
d10-Acenaphthene	65				75	72			
d10-Phenanthrene	74				82	80			
d12-Benzo[a]pyrene	64				77	74			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: DUP - Surrogate Corrected

Field ID	02-N10-01-PHC-S	02-N10-01-PHC-S DUP			02-N23-01-PHC-S	02-N23-01-PHC-S DUP
Sample Type	N	DUP			N	DUP
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT
Sample Size	17.49 g	17.46 g			20.6 g	20.65 g
Weight Basis	DRY	DRY			DRY	DRY
Associated Blank	DY-S-66PB	DY-S-66PB			DZ-S-03PB	DZ-S-03PB
Field Date	08/02/02	08/02/02			08/05/02	08/05/02
Extract Date	10/16/02	10/16/02			10/28/02	10/28/02
Analysis Date	10/28/02	10/28/02			11/06/02	11/06/02
Date Received	08/15/02	08/15/02			08/15/02	08/15/02
Percent Solids	57.2	57.2			68.5	68.5
Dilution Factor	1	1			1	1
Percent Lipids	NA	NA			NA	NA
Min Reporting Limit	0.71	0.72			0.61	0.6
Units	ug/Kg	ug/Kg	RPD	Q	ug/Kg	ug/Kg

### Polynuclear Aromatic Hydrocarbons

Naphthalene	12	11	8.7		7.4	7.2
C1-Naphthalenes	25	24	4.1		16	17
C2-Naphthalenes	41	40	2.5		29	30
C3-Naphthalenes	28	29	3.5		22	22
C4-Naphthalenes	14	15	6.9		15	15
Acenaphthylene	0.039 J	0.085 J	74	&	0.048 JB	0.046 JB
Acenaphthene	1	1	0		0.89	0.89
Biphenyl	6.4	6.2	3.2		5.2	5.2
Fluorene	5.4	5.5	1.8		4	3.9
C1-Fluorenes	9.4	9.6	2.1		7.1	6.7
C2-Fluorenes	13	13	0		9.6	9.5
C3-Fluorenes	11	12	8.7		8.6	9.2
Anthracene	0.66 J	0.6 J	9.5		0.61	0.58 J
Phenanthrene	27	26	3.8		19	19
C1-Phenanthrenes/anthracenes	39	39	0		30	30
C2-Phenanthrenes/anthracenes	32	33	3.1		26	26
C3-Phenanthrenes/anthracenes	22	22	0		17	18
C4-Phenanthrenes/anthracenes	10	9.6	4.1		8.8	8.8
Dibenzothiophene	4.1	4	2.5		2.9	3
C1-Dibenzothiophenes	8.8	8.7	1.1		6.3	6.4
C2-Dibenzothiophenes	11	11	0		8.4	7.9
C3-Dibenzothiophenes	8.4	8.6	2.4		6.5	6.1
Fluoranthene	6.2	5.7	8.4		4.2	4.3
Pyrene	7.8	7.7	1.3		6.1	6.2
C1-Fluoranthenes/pyrenes	20	20	0		15	15
C2-Fluoranthenes/pyrenes	20	19	5.1		14	14
C3-Fluoranthenes/pyrenes	12	12	0		9.3	9
Benzo[a]anthracene	1.7	1.8	5.7		1.6	1.6
Chrysene	12	12	0		10	10
C1-Chrysenes	13	12	8		11	12
C2-Chrysenes	12	12	0		9.9	10
C3-Chrysenes	6	6.1	1.6		4.4	4.5
C4-Chrysenes	3.2	3	6.4		3.6	3.1
Benzo[b]fluoranthene	7.2	7.1	1.4		6.5	6.3
Benzo[k]fluoranthene	0.6 J	0.85	34	&	0.47 J	0.48 J
Benzo[e]pyrene	8.7	8.8	1.1		8.2	8
Benzo[a]pyrene	2.2	2.2	0		1.6	1.7
Perylene	59	57	3.4		56	56
Indeno[1,2,3-c,d]pyrene	1.7	1.7	0		1.3	1.4
Dibenzo[a,h]anthracene	0.89	0.85	4.6		0.75	0.83
Benzo[g,h,i]perylene	6.1	6	1.6		5.4	5.8
d8-Naphthalene	54	46			50	56
d10-Acenaphthene	77	73			75	76
d10-Phenanthrene	95	95			92	93
d12-Benzo[a]pyrene	97	95			83	90



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: DUP - Surrogate Corrected

Field ID	02-SAG-01-PHC-S		02-SAG-01-PHC-S		DUP	
Sample Type	N		N		DUP	
Matrix	SEDIMENT		SEDIMENT		DUP	
Sample Size	15.41 g		15.2 g		DUP	
Weight Basis	DRY		DRY		DUP	
Associated Blank	DY-S-69PB		DY-S-69PB		DUP	
Field Date	08/14/02		08/14/02		DUP	
Extract Date	10/17/02		10/17/02		DUP	
Analysis Date	10/30/02		10/30/02		DUP	
Date Received	08/23/02		08/23/02		DUP	
Percent Solids	50.4		50.4		DUP	
Dilution Factor	1		1		DUP	
Percent Lipids	NA		NA		DUP	
Min Reporting Limit	0.81		0.82		DUP	
Units	RPD	Q	ug/Kg	ug/Kg	RPD	Q

Polynuclear Aromatic Hydro						
Naphthalene	2.7		6.9		7.4	7
C1-Naphthalenes	6.1		17		15	12
C2-Naphthalenes	3.4		35		34	2.9
C3-Naphthalenes	0		41		38	7.6
C4-Naphthalenes	0		25		24	4.1
Acenaphthylene	4.2		0.084 J		0.097 J	14
Acenaphthene	0		0.81		0.78 J	3.8
Biphenyl	0		6.1		5.8	5
Fluorene	2.5		5.5		5.3	3.7
C1-Fluorenes	5.8		7.3		7.2	1.4
C2-Fluorenes	1		12		11	8.7
C3-Fluorenes	6.7		12		12	0
Anthracene	5		0.83		0.81 J	2.4
Phenanthrene	0		26		25	3.9
C1-Phenanthrenes/anthracenes	0		47		45	4.3
C2-Phenanthrenes/anthracenes	0		44		44	0
C3-Phenanthrenes/anthracenes	5.7		29		29	0
C4-Phenanthrenes/anthracenes	0		14		13	7.4
Dibenzothiophene	3.4		4.1		4.1	0
C1-Dibenzothiophenes	1.6		21		19	10
C2-Dibenzothiophenes	6.1		25		25	0
C3-Dibenzothiophenes	6.3		16		18	12
Fluoranthene	2.4		6.9		6.8	1.4
Pyrene	1.6		8.6		8.6	0
C1-Fluoranthenes/pyrenes	0		23		23	0
C2-Fluoranthenes/pyrenes	0		20		20	0
C3-Fluoranthenes/pyrenes	3.3		15		14	6.9
Benzo[a]anthracene	0		2.3		2.6	12
Chrysene	0		13		13	0
C1-Chrysenes	8.7		16		17	6.1
C2-Chrysenes	1		20		15	28
C3-Chrysenes	2.2		9.5		10	5.1
C4-Chrysenes	15		6		7	15
Benzo[b]fluoranthene	3.1		9.5		9.4	1
Benzo[k]fluoranthene	2.1		0.96		0.93	3.2
Benzo[e]pyrene	2.5		8.8		9.1	3.4
Benzo[a]pyrene	6.1		4.4		3.9	12
Perylene	0		100		97	3
Indeno[1,2,3,-c,d]pyrene	7.4		2.5		2.4	4.1
Dibenzo[a,h]anthracene	10		1.1		1	9.5
Benzo[g,h,i]perylene	7.1		6		5.9	1.7
d8-Naphthalene			44		51	
d10-Acenaphthene			66		81	
d10-Phenanthrene			78		93	
d12-Benzo[a]pyrene			74		90	

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: SRM - Surrogate Corrected

Field ID	Standard Reference			Standard Reference			Standard Reference		
	Material - 1944			Material - 1944			Material - 1944		
Sample Type	SRM			SRM			SRM		
Matrix	SEDIMENT			SEDIMENT			SEDIMENT		
Sample Size	1.01 g			1.01 g			1.02 g		
Weight Basis	DRY			DRY			DRY		
Associated Blank	DY-S-66PB			DZ-S-03PB			DY-S-69PB		
Field Date	10/16/02			10/28/02			10/17/02		
Extract Date	10/16/02			10/28/02			10/17/02		
Analysis Date	10/27/02			11/05/02			10/29/02		
Date Received	10/16/02			10/28/02			10/17/02		
Percent Solids	98.8			98.8			98.8		
Dilution Factor	2			1			1		
Percent Lipids	NA			NA			NA		
Min Reporting Limit	49.5			99			49		
Units	ug/Kg	T	%D	Q	ug/Kg	T	%D	Q	ug/Kg

Polynuclear Aromatic Hydrocarbons									
Naphthalene	935	1650	-43.3	&	762	1650	-53.8	&	694
C1-Naphthalenes	459				374				379
C2-Naphthalenes	1380				1170				1230
C3-Naphthalenes	1790				1620				1820
C4-Naphthalenes	1980				2270				2140
Acenaphthylene	1060				903				894
Acenaphthene	452				358	570	-37.2	&	391
Biphenyl	157				123	320	-61.6	&	116
Fluorene	699				592	850	-30.4		625
C1-Fluorenes	837				716				718
C2-Fluorenes	1290				1150				1040
C3-Fluorenes	1520				1420				1300
Anthracene	1680	1770	-5.08		1380	1770	-22		1370
Phenanthrene	5780	5270	9.68		4670	5270	-11.4		4430
C1-Phenanthrenes/anthracenes	6140				4950				5200
C2-Phenanthrenes/anthracenes	6480				5100				5740
C3-Phenanthrenes/anthracenes	4310				3610				3700
C4-Phenanthrenes/anthracenes	3710				2870				3100
Dibenzothiophene	862				685	620	10.5		731
C1-Dibenzothiophenes	2040				1580				1660
C2-Dibenzothiophenes	3120				2560				2950
C3-Dibenzothiophenes	2850				2270				2380
Fluoranthene	10200 D	8920	14.3		8990	8920	0.785		7940
Pyrene	10400 D	9700	7.22		9290	9700	-4.23		8120
C1-Fluoranthenes/pyrenes	8950				6550				6860
C2-Fluoranthenes/pyrenes	4450				3060				2940
C3-Fluoranthenes/pyrenes	1760				1340				1570
Benzo[a]anthracene	5880	4720	24.6		4590	4720	-2.75		4320
Chrysene	7050	4860	45.1	&	5190	5900	-12		5010
C1-Chrysenes	4560				3420				3730
C2-Chrysenes	2740				2050				2120
C3-Chrysenes	1290				910				1140
C4-Chrysenes	474				406				752
Benzo[b]fluoranthene	7760	5960	30.2		5840	5960	-2.01		5220
Benzo[k]fluoranthene	2200	2300	-4.35		1980	2300	-13.9		1680
Benzo[e]pyrene	4400	3280	34.1		3420	3280	4.27		3140
Benzo[a]pyrene	5400	4300	25.6		3890	4300	-9.53		3750
Perylene	1330	1170	13.7		1020	1170	-12.8		1050
Indeno[1,2,3-c,d]pyrene	3860	2780	38.8	&	2810	2780	1.08		2690
Dibenzo[a,h]anthracene	1000	759	31.8		657	759	-13.4		786
Benzo[g,h,i]perylene	3610	2840	27.1		2680	2840	-5.63		2580
d8-Naphthalene	52				44				45
d10-Acenaphthene	76				72				75
d10-Phenanthrene	98				98				97
d12-Benzo[a]pyrene	98				92				95

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: SRM - Surrogate Corrected

Field ID  
Sample Type  
Matrix  
Sample Size  
Weight Basis  
Associated Blank  
Field Date  
Extract Date  
Analysis Date  
Date Received  
Percent Solids  
Dilution Factor  
Percent Lipids  
Min Reporting Limit  
Units

T %D Q

**Polynuclear Aromatic Hydro**

Naphthalene	1650	-57.9	&
C1-Naphthalenes			
C2-Naphthalenes			
C3-Naphthalenes			
C4-Naphthalenes			
Acenaphthylene			
Acenaphthene			
Biphenyl			
Fluorene			
C1-Fluorenes			
C2-Fluorenes			
C3-Fluorenes			
Anthracene	1770	-22.6	
Phenanthrene	5270	-15.9	
C1-Phenanthrenes/anthracenes			
C2-Phenanthrenes/anthracenes			
C3-Phenanthrenes/anthracenes			
C4-Phenanthrenes/anthracenes			
Dibenzothiophene			
C1-Dibenzothiophenes			
C2-Dibenzothiophenes			
C3-Dibenzothiophenes			
Fluoranthene	8920	-11	
Pyrene	9700	-16.3	
C1-Fluoranthenes/pyrenes			
C2-Fluoranthenes/pyrenes			
C3-Fluoranthenes/pyrenes			
Benzo[a]anthracene	4720	-8.47	
Chrysene	5900	-15.1	
C1-Chrysenes			
C2-Chrysenes			
C3-Chrysenes			
C4-Chrysenes			
Benzo[b]fluoranthene	5960	-12.4	
Benzo[k]fluoranthene	2300	-27	
Benzo[e]pyrene	3280	-4.27	
Benzo[a]pyrene	4300	-12.8	
Perylene	1170	-10.2	
Indeno[1,2,3,-c,d]pyrene	2780	-3.24	
Dibenzo[a,h]anthracene	759	3.56	
Benzo[g,h,i]perylene	2840	-9.15	

d8-Naphthalene  
d10-Acenaphthene  
d10-Phenanthrene  
d12-Benzo[a]pyrene

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference			Instrument Reference		
	Standard			Standard		
Sample Type	IRM			IRM		
Matrix	IRM			IRM		
Sample Size	0.1 mL			0.1 mL		
Weight Basis	WET			WET		
Associated Blank	NA			NA		
Field Date	10/15/02			10/15/02		
Extract Date	10/15/02			10/15/02		
Analysis Date	10/27/02			11/01/02		
Date Received	10/15/02			10/15/02		
Percent Solids	NA			NA		
Dilution Factor	1			1		
Percent Lipids	NA			NA		
Min Reporting Limit	250			250		
Units	ug/L	T	%D	Q	ug/L	T %D Q

Polynuclear Aromatic Hydrocarbons						
Naphthalene	6940	6890	0.726		6990	6890 1.45
C1-Naphthalenes	ND				ND	
C2-Naphthalenes	ND				ND	
C3-Naphthalenes	ND				ND	
C4-Naphthalenes	ND				ND	
Acenaphthylene	6770	6960	-2.73		6550	6960 -5.89
Acenaphthene	6550	7280	-10		6560	7280 -9.89
Biphenyl	7180	7000	2.57		7170	7000 2.43
Fluorene	6320	7270	-13.1		6210	7270 -14.6
C1-Fluorenes	ND				ND	
C2-Fluorenes	ND				ND	
C3-Fluorenes	ND				ND	
Anthracene	7300	7820	-6.65		7160	7820 -8.44
Phenanthrene	7040	7010	0.428		6830	7010 -2.57
C1-Phenanthrenes/anthracenes	ND				ND	
C2-Phenanthrenes/anthracenes	ND				ND	
C3-Phenanthrenes/anthracenes	ND				ND	
C4-Phenanthrenes/anthracenes	ND				ND	
Dibenzothiophene	ND				ND	
C1-Dibenzothiophenes	ND				ND	
C2-Dibenzothiophenes	ND				ND	
C3-Dibenzothiophenes	ND				ND	
Fluoranthene	6080	5910	2.88		6080	5910 2.88
Pyrene	5990	5890	1.7		6000	5890 1.87
C1-Fluoranthenes/pyrenes	ND				ND	
C2-Fluoranthenes/pyrenes	ND				ND	
C3-Fluoranthenes/pyrenes	ND				ND	
Benzo[a]anthracene	3450	3590	-3.9		3440	3590 -4.18
Chrysene	7460	7030	6.12		7310	7030 3.98
C1-Chrysenes	ND				ND	
C2-Chrysenes	ND				ND	
C3-Chrysenes	ND				ND	
C4-Chrysenes	ND				ND	
Benzo[b]fluoranthene	5490	5250	4.57		5600	5250 6.67
Benzo[k]fluoranthene	5920	5570	6.28		5590	5570 0.359
Benzo[e]pyrene	6050	5620	7.65		5790	5620 3.02
Benzo[a]pyrene	7000	6790	3.09		6830	6790 0.589
Perylene	7360	7120	3.37		7020	7120 -1.4
Indeno[1,2,3-c,d]pyrene	6380	6290	1.43		6210	6290 -1.27
Dibenzo[a,h]anthracene	5660	5180	9.27		5570	5180 7.53
Benzo[g,h,i]perylene	5400	5290	2.08		5340	5290 0.945
d8-Naphthalene	94				94	
d10-Acenaphthene	94				94	
d10-Phenanthrene	92				92	
d12-Benzo[a]pyrene	90				90	

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference Standard				Instrument Reference Standard			
Sample Type	IRM				IRM			
Matrix	IRM				IRM			
Sample Size	0.1 mL				0.1 mL			
Weight Basis	WET				WET			
Associated Blank	NA				NA			
Field Date	10/15/02				10/15/02			
Extract Date	10/15/02				10/15/02			
Analysis Date	11/05/02				10/29/02			
Date Received	10/15/02				10/15/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	250				250			
Units	ug/L	T	%D	Q	ug/L	T	%D	Q

Polynuclear Aromatic Hydro								
Naphthalene	7050	6890	2.32		6700	6890	-2.61	
C1-Naphthalenes	ND				ND			
C2-Naphthalenes	ND				ND			
C3-Naphthalenes	ND				ND			
C4-Naphthalenes	ND				ND			
Acenaphthylene	6520	6960	-6.32		6400	6960	-7.33	
Acenaphthene	6570	7280	-9.75		6400	7280	-12.1	
Biphenyl	7160	7000	2.28		6900	7000	-1.43	
Fluorene	6370	7270	-12.4		6200	7270	-14.7	
C1-Fluorenes	ND				ND			
C2-Fluorenes	ND				ND			
C3-Fluorenes	ND				ND			
Anthracene	7140	7820	-8.7		7000	7820	-11	
Phenanthrene	6820	7010	-2.71		6800	7010	-3.71	
C1-Phenanthrenes/anthracenes	ND				ND			
C2-Phenanthrenes/anthracenes	ND				ND			
C3-Phenanthrenes/anthracenes	ND				ND			
C4-Phenanthrenes/anthracenes	ND				ND			
Dibenzothiophene	ND				ND			
C1-Dibenzothiophenes	ND				ND			
C2-Dibenzothiophenes	ND				ND			
C3-Dibenzothiophenes	ND				ND			
Fluoranthene	6030	5910	2.03		6000	5910	1.35	
Pyrene	5860	5890	-0.509		5800	5890	-0.679	
C1-Fluoranthenes/pyrenes	ND				ND			
C2-Fluoranthenes/pyrenes	ND				ND			
C3-Fluoranthenes/pyrenes	ND				ND			
Benzo[a]anthracene	3400	3590	-5.29		3400	3590	-5.29	
Chrysene	7140	7030	1.56		7000	7030	0.142	
C1-Chrysenes	ND				ND			
C2-Chrysenes	ND				ND			
C3-Chrysenes	ND				ND			
C4-Chrysenes	ND				ND			
Benzo[b]fluoranthene	5540	5250	5.52		5600	5250	5.9	
Benzo[k]fluoranthene	5760	5570	3.41		5400	5570	-1.97	
Benzo[e]pyrene	5930	5620	5.52		5700	5620	1.78	
Benzo[a]pyrene	6760	6790	-0.442		6700	6790	-1.18	
Perylene	7230	7120	1.54		6900	7120	-2.53	
Indeno[1,2,3-c,d]pyrene	6350	6290	0.954		6200	6290	-0.795	
Dibenzo[a,h]anthracene	5570	5180	7.53		5500	5180	6.56	
Benzo[g,h,i]perylene	5440	5290	2.84		5200	5290	-0.945	
d8-Naphthalene	94				97			
d10-Acenaphthene	94				97			
d10-Phenanthrene	94				97			
d12-Benzo[a]pyrene	87				94			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard			
	ORS	OIL	5.1 mg	OIL	ORS	OIL	5.1 mg	OIL
Sample Type	ORS				ORS			
Matrix	OIL				OIL			
Sample Size	5.1 mg				5.1 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02			
Analysis Date	10/27/02				11/01/02			
Date Received	04/23/02				04/23/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q
<b>Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	838	710	18		844	710	18.9	
C1-Naphthalenes	1490	1600	-6.88		1590	1600	-0.625	
C2-Naphthalenes	1920	2300	-16.5		2100	2300	-8.7	
C3-Naphthalenes	1410	1960	-28.1		1420	1960	-27.6	
C4-Naphthalenes	794	1180	-32.7		828	1180	-29.8	
Acenaphthylene	ND				ND			
Acenaphthene	ND				ND			
Biphenyl	231	214	7.94		232	214	8.41	
Fluorene	106	95.2	11.3		102	95.2	7.14	
C1-Fluorenes	249	239	4.18		248	239	3.76	
C2-Fluorenes	342	356	-3.93		346	356	-2.81	
C3-Fluorenes	318	396	-19.7		324	396	-18.2	
Anthracene	ND				ND			
Phenanthrene	288	260	10.8		282	260	8.46	
C1-Phenanthrenes/anthracenes	555	612	-9.31		582	612	-4.9	
C2-Phenanthrenes/anthracenes	599	752	-20.3		600	752	-20.2	
C3-Phenanthrenes/anthracenes	445	534	-16.7		440	534	-17.6	
C4-Phenanthrenes/anthracenes	267	308	-13.3		276	308	-10.4	
Dibenzothiophene	256	222	15.3		254	222	14.4	
C1-Dibenzothiophenes	470	484	-2.89		490	484	1.24	
C2-Dibenzothiophenes	624	658	-5.17		613	658	-6.84	
C3-Dibenzothiophenes	514	574	-10.4		532	574	-7.32	
Fluoranthene	ND				ND			
Pyrene	15.4	13.4	14.9		14.9	13.4	11.2	
C1-Fluoranthenes/pyrenes	84.4	83.9	0.596		83.3	83.9	-0.715	
C2-Fluoranthenes/pyrenes	142	142	0		141	142	-0.704	
C3-Fluoranthenes/pyrenes	144	158	-8.86		144	158	-8.86	
Benzo[a]anthracene	ND				ND			
Chrysene	51.5	49.2	4.67		51.5	49.2	4.67	
C1-Chrysenes	80.3	81.5	-1.47		78	81.5	-4.29	
C2-Chrysenes	92.1	102	-9.7		100	102	-1.96	
C3-Chrysenes	79.6	79.6	0		65.7	79.6	-17.5	
C4-Chrysenes	55.6	64	-13.1		58.5	64	-8.59	
Benzo[b]fluoranthene	8.44	7.62	10.8		6.33	7.62	-16.9	
Benzo[k]fluoranthene	ND				ND			
Benzo[e]pyrene	11.6	12.4	-6.45		11.4	12.4	-8.06	
Benzo[a]pyrene	ND				ND			
Perylene	ND				ND			
Indeno[1,2,3-c,d]pyrene	ND				ND			
Dibenzo[a,h]anthracene	1.13 J				1.24 J			
Benzo[g,h,i]perylene	3 J	3.18	-5.66		3.04 J	3.18	-4.4	
d8-Naphthalene	88				96			
d10-Acenaphthene	95				99			
d10-Phenanthrene	99				100			
d12-Benzo[a]pyrene	111				105			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard			
Sample Type	ORS				ORS			
Matrix	OIL				OIL			
Sample Size	5.1 mg				5.1 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02			
Analysis Date	11/05/02				10/29/02			
Date Received	04/23/02				04/23/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydro								
Naphthalene	825	710	16.2		760	710	7.18	
C1-Naphthalenes	1560	1600	-2.5		1400	1600	-9.38	
C2-Naphthalenes	2090	2300	-9.13		2000	2300	-10.9	
C3-Naphthalenes	1560	1960	-20.4		1700	1960	-13.8	
C4-Naphthalenes	897	1180	-24		950	1180	-19.5	
Acenaphthylene	ND				ND			
Acenaphthene	ND				ND			
Biphenyl	230	214	7.48		220	214	4.2	
Fluorene	101	95.2	6.09		100	95.2	7.14	
C1-Fluorenes	251	239	5.02		240	239	0.837	
C2-Fluorenes	346	356	-2.81		340	356	-3.93	
C3-Fluorenes	349	396	-11.9		330	396	-16.2	
Anthracene	ND				ND			
Phenanthrene	280	260	7.69		280	260	6.54	
C1-Phenanthrenes/anthracenes	550	612	-10.1		600	612	-1.14	
C2-Phenanthrenes/anthracenes	606	752	-19.4		690	752	-8.64	
C3-Phenanthrenes/anthracenes	444	534	-16.8		510	534	-4.31	
C4-Phenanthrenes/anthracenes	275	308	-10.7		290	308	-4.54	
Dibenzothiophene	253	222	14		250	222	13.1	
C1-Dibenzothiophenes	488	484	0.826		490	484	2.27	
C2-Dibenzothiophenes	625	658	-5.02		690	658	5.32	
C3-Dibenzothiophenes	514	574	-10.4		560	574	-2.26	
Fluoranthene	ND				ND			
Pyrene	14.1	13.4	5.22		17	13.4	28.4	
C1-Fluoranthenes/pyrenes	78.9	83.9	-5.96		88	83.9	4.77	
C2-Fluoranthenes/pyrenes	143	142	0.704		150	142	5.63	
C3-Fluoranthenes/pyrenes	144	158	-8.86		170	158	6.96	
Benzo[a]anthracene	ND				ND			
Chrysene	52.8	49.2	7.32		54	49.2	10.6	
C1-Chrysenes	81.6	81.5	0.123		90	81.5	10.2	
C2-Chrysenes	89.8	102	-12		110	102	3.92	
C3-Chrysenes	77.4	79.6	-2.76		100	79.6	25.6	
C4-Chrysenes	57	64	-10.9		72	64	12.2	
Benzo[b]fluoranthene	7.58	7.62	-0.525		7	7.62	-7.87	
Benzo[k]fluoranthene	ND				ND			
Benzo[e]pyrene	12.1	12.4	-2.42		12	12.4	-1.61	
Benzo[a]pyrene	ND				ND			
Perylene	ND				ND			
Indeno[1,2,3,-c,d]pyrene	ND				ND			
Dibenzo[a,h]anthracene	1.21 J				1.5 J			
Benzo[g,h,i]perylene	2.9 J	3.18	-8.8		3.4 J	3.18	5.66	
d8-Naphthalene	92				89			
d10-Acenaphthene	96				95			
d10-Phenanthrene	97				96			
d12-Benzo[a]pyrene	104				106			

**ICF Consulting**

Environmental Chemistry and Forensics

**Project Title : MMS - AMINIDA - PHASE II****Data Package: 1004084****Data Table: BS-BSD - Surrogate Corrected**

Field ID	Procedural Blank
Sample Type	PB
Matrix	TISSUE
Sample Size	10 g
Weight Basis	WET
Associated Blank	NA
Field Date	10/16/02
Extract Date	10/16/02
Analysis Date	11/02/02
Date Received	10/16/02
Percent Solids	100
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	2.5
Units	ug/Kg

**Sterane-Triterpane Biomarkers**

T4-C23Diterpane	ND
S4-Diacholestane	ND
S5-Diacholestane	ND
T9-C29Tricyclitriterpane	ND
T10-C29Tricyclitriterpane	ND
T11-Trisnorhopane(TS)	ND
T12-Trisnorhopane(TM)	ND
S24-Methylcholestane	ND
S25-Ethylcholestane	ND
S28-Ethylcholestane	ND
T15-Norhopane	ND
T18-Oleanane	ND
T19-Hopane	ND
T21-Homohopane	ND
T22-Homohopane	ND

5B(H)-Cholane	50
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Project Title : MMS - AMINIDA - PHASE II  
 Data Package: 1004084  
 Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank
Sample Type	PB
Matrix	TISSUE
Sample Size	10 g
Weight Basis	WET
Associated Blank	NA
Field Date	10/21/02
Extract Date	10/21/02
Analysis Date	11/02/02
Date Received	10/21/02
Percent Solids	100
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	1.2
Units	ug/Kg

Sterane-Triterpane Biomarkers	
T4-C23Diterpane	ND
S4-Diacholestane	ND
S5-Diacholestane	ND
T9-C29Tricyclitriterpane	ND
T10-C29Tricyclitriterpane	ND
T11-Trisnorhopane(TS)	ND
T12-Trisnorhopane(TM)	ND
S24-Methylcholestane	ND
S25-Ethylcholestane	ND
S28-Ethylcholestane	ND
T15-Norhopane	ND
T18-Oleanane	ND
T19-Hopane	ND
T21-Homohopane	ND
T22-Homohopane	ND

5B(H)-Cholane 53

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004084  
Data Table: DUP - Surrogate Corrected

Field ID	02-4A-02-PHC-T-AN	02-4A-02-PHC-T-AN DUP		
Sample Type	N	DUP		
Matrix	TISSUE	TISSUE		
Sample Size	10.06 g	10.03 g		
Weight Basis	WET	WET		
Associated Blank	DY-S-72PB	DY-S-72PB		
Field Date	08/20/02	08/20/02		
Extract Date	10/16/02	10/16/02		
Analysis Date	11/04/02	11/04/02		
Date Received	08/23/02	08/23/02		
Percent Solids	26.9	26.9		
Dilution Factor	1	1		
Percent Lipids	0.209	0.197		
Min Reporting Limit	1.2	1.2		
Units	ug/Kg	ug/Kg	RPD	Q

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	0.066 J	0.072 J	8.7
S4-Diacholestane	0.12 J	0.1 J	18
S5-Diacholestane	0.14 J	0.14 J	0
T9-C29Tricyclitriterpane	ND	ND	
T10-C29Tricyclitriterpane	ND	ND	
T11-Trisnorhopane(TS)	0.072 J	0.087 J	19
T12-Trisnorhopane(TM)	0.16 J	0.15 J	6.4
S24-Methylcholestane	0.1 J	0.078 J	25
S25-Ethylcholestane	ND	ND	
S28-Ethylcholestane	0.34 J	0.32 J	6.1
T15-Norhopane	0.33 J	0.33 J	0
T18-Oleanane	ND	ND	
T19-Hopane	0.39 J	0.38 J	2.6
T21-Homohopane	0.15 J	0.14 J	6.9
T22-Homohopane	0.2 J	0.22 J	9.5

5B(H)-Cholane	65	71	
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Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004084  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference			
Sample Type	Standard			
Matrix	ORS			
Sample Size	OIL			
Weight Basis	5.1 mg			
Associated Blank	OIL			
Field Date	NA			
Extract Date	04/23/02			
Analysis Date	04/23/02			
Date Received	10/29/02			
Percent Solids	04/23/02			
Dilution Factor	NA			
Percent Lipids	1			
Min Reporting Limit	NA			
Units	4.9			
	mg/Kg	T	%D	Q

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	56.8	58.9	-3.56
S4-Diacholestane	40.3	46.8	-13.9
S5-Diacholestane	25.2	26.1	-3.45
T9-C29Tricyclitriterpane	14.3	15.7	-8.92
T10-C29Tricyclitriterpane	13.2	15	-12
T11-Trisnorhopane(TS)	22.3	24.8	-10.1
T12-Trisnorhopane(TM)	26.2	31	-15.5
S24-Methylcholestane	27.3	26.2	4.2
S25-Ethylcholestane	46.6	39.8	17.1
S28-Ethylcholestane	36.1	33.9	6.49
T15-Norhopane	81.7	83.8	-2.5
T18-Oleanane	ND		
T19-Hopane	122	113	7.96
T21-Homohopane	52.4	46.1	13.7
T22-Homohopane	40.7	35.2	15.6
5B(H)-Cholane	112		

# Arthur D. Little

Environmental Monitoring and Analysis

## Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control SRM

Reference Material		T	%D	Q
Field ID	1974a			
Lab ID	DH-S-66SRMF1			
Sample Type	SRM			
Matrix	TISSUE			
Sample Size	16.83 g			
Weight Basis	WET			
Associated Blank	DH-S-64PBF1			
Field Date	03/28/01			
Extract Date	03/28/01			
Analysis Date	04/11/01			
Date Received	03/28/01			
Percent Solids	11.4			
Percent Lipids	NA			
Min Reporting Limit	0.743			
Units	ug/Kg			

### Sterane-Triterpane Biomarkers - Wet

T4-C23Diterpane	1.84
S4-Diacholestane	1.59
S5-Diacholestane	0.921
T9-C29Tricyclictriterpane	0.366 J
T10-C29Tricyclictriterpane	0.429 J
T11-Trisnorhopane(TS)	2.07
T12-Trisnorhopane(TM)	1.88
S24-Methylcholestane	2.07
S25-Ethylcholestane	1.16
S28-Ethylcholestane	4.38
T15-Norhopane	6.58
T18-Oleanane	1
T19-Hopane	7.76
T21-Homohopane	2.09
T22-Homohopane	1.57

5B(H)-Cholane 72

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

	00-N13-01-PHC-T-	00-N13-01-PHC-T-AN		
Field ID	AN	DUP		
Lab ID	20A3483F1	20A3483DUPF1		
Sample Type	N	DUP		
Matrix	TISSUE	TISSUE		
Sample Size	9.86 g	10.12 g		
Weight Basis	WET	WET		
Associated Blank	DH-S-64PBF1	DH-S-64PBF1		
Field Date	08/19/00	08/19/00		
Extract Date	03/28/01	03/28/01		
Analysis Date	04/12/01	04/12/01		
Date Received	08/30/00	08/30/00		
Percent Solids	23.3	23.3		
Percent Lipids	0.987	0.775		
Min Reporting Limit	1.3	1.2		
Units	ug/Kg	ug/Kg	RPD	Q

**Sterane-Triterpane Biomarkers - Wet**

T4-C23Diterpane	0.23 J	0.22 J	4.4	
S4-Diacholestane	0.21 J	0.24 J	13	
S5-Diacholestane	0.15 J	0.15 J	0	
T9-C29Tricyclitriterpane	0.07 J	0.042 J	50	&
T10-C29Tricyclitriterpane	0.047 J	0.047 J	0	
T11-Trisnorhopane(TS)	0.22 J	0.22 J	0	
T12-Trisnorhopane(TM)	0.18 J	0.16 J	12	
S24-Methylcholestane	0.13 J	0.14 J	7.4	
S25-Ethylcholestane	0.13 J	0.096 J	30	
S28-Ethylcholestane	0.46 J	0.48 J	4.2	
T15-Norhopane	0.61 J	0.6 J	1.6	
T18-Oleanane	0.54 J	0.57 J	5.4	
T19-Hopane	0.59 J	0.64 J	8.1	
T21-Homohopane	0.26 J	0.32 J	21	
T22-Homohopane	0.31 J	0.3 J	3.3	
5B(H)-Cholane	70	74		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Blank Spike			
Lab ID	DH-S-64PBF1	DH-S-65BSF1			
Sample Type	PB	BS			
Matrix	TISSUE	TISSUE			
Sample Size	10 g	10 g			
Weight Basis	WET	WET			
Associated Blank	NA	DH-S-64PBF1			
Field Date	03/28/01	03/28/01			
Extract Date	03/28/01	03/28/01			
Analysis Date	04/11/01	04/11/01			
Date Received	03/28/01	03/28/01			
Percent Solids	100	100			
Percent Lipids	NA	NA			
Min Reporting Limit	1.2	1.2			
Units	ug/Kg	ug/Kg	T	%R	Q

**Sterane-Triterpane Biomarkers - Wet**

T4-C23Diterpane	ND	ND			
S4-Diacholestane	ND	ND			
S5-Diacholestane	ND	ND			
T9-C29Tricyclitriterpane	ND	ND			
T10-C29Tricyclitriterpane	ND	ND			
T11-Trisnorhopane(TS)	ND	ND			
T12-Trisnorhopane(TM)	ND	ND			
S24-Methylcholestane	ND	ND			
S25-Ethylcholestane	ND	ND			
S28-Ethylcholestane	ND	ND			
T15-Norhopane	ND	ND			
T18-Oleanane	ND	ND			
T19-Hopane	ND	ND			
T21-Homohopane	ND	ND			
T22-Homohopane	ND	ND			

5B(H)-Cholane	80	88			
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Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004080  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard						
	Sample Type	Matrix	Sample Size	Weight Basis	Associated Blank	Field Date	Extract Date	Analysis Date	Date Received	Percent Solids	Dilution Factor	Percent Lipids	Min Reporting Limit	Units	
	ORS	OIL	5.02 mg	OIL	NA	05/16/02	05/16/02	10/31/02	05/16/02	NA	1	NA	0.199	ug/mg	
	ORS	OIL	5.02 mg	OIL	NA	05/16/02	05/16/02	10/31/02	05/16/02	NA	1	NA	0.199	ug/mg	
	ORS	OIL	5.02 mg	OIL	NA	05/16/02	05/16/02	11/04/02	05/16/02	NA	1	NA	0.199	ug/mg	
	T	%D	Q	T	%D	Q	T	%D	Q	T	%D	Q	T	%D	Q
<b>SHC/TPH</b>															
n-Nonane	5.16	4.8	7.5				5.23	4.8	8.96				5.14	4.8	7.08
n-Decane	4.32	4.2	2.86				4.3	4.2	2.38				4.32	4.2	2.86
n-Undecane	4.18	4.3	-2.79				4.33	4.3	0.698				4.18	4.3	-2.79
n-Dodecane	4.09	4	2.25				4.25	4	6.25				4.14	4	3.5
n-Tridecane	3.79	4	-5.25				3.85	4	-3.75				3.66	4	-8.5
Isoprenoid RRT 1380	1.29	1	29				1.34	1	34				1.26	1	26
n-Tetradecane	4.65	4.2	10.7				4.63	4.2	10.2				4.35	4.2	3.57
Isoprenoid RRT 1470	1.52	1.4	8.57				1.48	1.4	5.71				1.46	1.4	4.28
n-Pentadecane	3.44	3.7	-7.03				3.6	3.7	-2.7				3.61	3.7	-2.43
n-Hexadecane	3.44	3.2	7.5				3.43	3.2	7.19				3.35	3.2	4.69
Isoprenoid RRT 1650	1.57	1.5	4.67				1.76	1.5	17.3				1.47	1.5	-2
n-Heptadecane	2.84	3.2	-11.2				2.88	3.2	-10				2.76	3.2	-13.8
Pristane	2.01	2.2	-8.64				2.08	2.2	-5.45				2.03	2.2	-7.73
n-Octadecane	2.45	2.9	-15.5				2.42	2.9	-16.6				2.47	2.9	-14.8
Phytane	1.41	1.6	-11.9				1.46	1.6	-8.75				1.43	1.6	-10.6
n-Nonadecane	2.25	2.6	-13.5				2.56	2.6	-1.54				2.37	2.6	-8.85
n-Eicosane	2.37	2.7	-12.2				2.4	2.7	-11.1				2.42	2.7	-10.4
n-Heneicosane	2.28	2.4	-5				2.28	2.4	-5				2.36	2.4	-1.67
n-Docosane	2.28	2.2	3.64				2.28	2.2	3.64				2.33	2.2	5.91
n-Tricosane	2.06	2	3				2.06	2	3				2.07	2	3.5
n-Tetracosane	1.88	2	-6				1.84	2	-8				1.92	2	-4
n-Pentacosane	1.76	1.7	3.53				1.66	1.7	-2.35				1.74	1.7	2.35
n-Hexacosane	1.52	1.5	1.33				1.5	1.5	0				1.55	1.5	3.33
n-Heptacosane	1.1	1.2	-8.33				1.16	1.2	-3.33				1.08	1.2	-10
n-Octacosane	0.937	0.88	6.48				0.946	0.88	7.5				0.924	0.88	5
n-Nonacosane	0.753	0.81	-7.04				0.839	0.81	3.58				0.728	0.81	-10.1
n-Triacontane	0.649	0.65	-0.154				0.673	0.65	3.54				0.672	0.65	3.38
n-Hentriacontane	0.59	0.58	1.72				0.748	0.58	29				0.591	0.58	1.9
n-Dotriacontane	0.418	0.44	-5				0.431	0.44	-2.04				0.422	0.44	-4.09
n-Tritriacontane	0.389	0.4	-2.75				0.35	0.4	-12.5				0.35	0.4	-12.5
n-Tetracontane	0.379	0.35	8.28				0.352	0.35	0.571				0.34	0.35	-2.86
n-Pentatriacontane	0.428	0.35	22.3				0.421	0.35	20.3				0.418	0.35	19.4
n-Hexatriacontane	0.245	0.23	6.52				0.302	0.23	31.3				0.235	0.23	2.17
n-Heptatriacontane	0.255	0.23	10.9				0.232	0.23	0.87				0.23	0.23	0
n-Octatriacontane	0.244	0.22	10.9				0.236	0.22	7.27				0.219	0.22	-0.454
n-Tetracontane	0.185 J	0.19	-2.63				0.204	0.19	7.37				0.161 J	0.19	-15.3
TPH (RES)	186	220	-15.4				172	220	-21.8				183	220	-16.8
TPH	644	660	-2.42				645	660	-2.27				621	660	-5.91
%ortho-terphenyl	98						96						100		
%5A-androstane	97						100						98		
%d50-tetracosane	102						100						103		

Arthur D. Little

Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

Field ID Lab ID Sample Type Matrix Sample Size Weight Basis Associated Blank Field Date Extract Date Analysis Date Date Received Percent Solids Percent Lipids Min Reporting Limit Units	Oil Reference Standard BU82ORS-1			Oil Reference Standard BU82ORS-2			Oil Reference Standard BU82ORS-3					
	ORS OIL 5.04 mg OIL NA 05/19/00 05/19/00 04/06/01 05/19/00 NA NA 0.198 ug/mg	T	%D	Q	ORS OIL 5.04 mg OIL NA 05/19/00 05/19/00 04/06/01 05/19/00 NA NA 0.198 ug/mg	T	%D	Q	ORS OIL 5.04 mg OIL NA 05/19/00 05/19/00 04/18/01 05/19/00 NA NA 0.198 ug/mg	T	%D	Q
<b>SHC/TPH - Wet</b>												
n-Octane	4.57	4.7	-2.8		4.92	4.7	4.68		4.98	4.7	5.96	
n-Nonane	5.24	4.8	9.17		4.85	4.8	1.04		4.91	4.8	2.29	
n-Decane	4.14	4.2	-1.4		4.18	4.2	-0.48		3.83	4.2	-8.8	
n-Undecane	4.17	4.3	-3		3.87	4.3	-10		3.83	4.3	-11	
n-Dodecane	3.93	4	-1.8		3.61	4	-9.75		3.64	4	-9	
n-Tridecane	3.71	4	-7.3		3.46	4	-13.5		3.47	4	-13	
Isoprenoid RRT 1380	1.27	1	27		1.04	1	4		0.979	1	-2.1	
n-Tetradecane	4.51	4.2	7.38		4.32	4.2	2.86		4.22	4.2	0.48	
Isoprenoid RRT 1470	1.4	1.4	0		1.2	1.4	-14.3		1.21	1.4	-14	
n-Pentadecane	3.53	3.7	-4.6		3.37	3.7	-8.92		3.4	3.7	-8.1	
n-Hexadecane	3.18	3.2	-0.6		3.03	3.2	-5.31		2.92	3.2	-8.8	
Isoprenoid RRT 1650	1.62	1.5	8		1.72	1.5	14.7		1.49	1.5	-0.7	
n-Heptadecane	3	3.2	-6.3		3.01	3.2	-5.94		3.01	3.2	-5.9	
Pristane	1.89	2.2	-14		2.14	2.2	-2.73		2.04	2.2	-7.3	
n-Octadecane	2.33	2.9	-20		2.68	2.9	-7.59		2.59	2.9	-11	
Phytane	1.27	1.6	-21		1.4	1.6	-12.5		1.28	1.6	-20	
n-Nonadecane	2.3	2.6	-12		2.76	2.6	6.15		2.42	2.6	-6.9	
n-Eicosane	2.35	2.7	-13		2.61	2.7	-3.33		2.56	2.7	-5.2	
n-Heneicosane	2.25	2.4	-6.3		2.41	2.4	0.417		2.33	2.4	-2.9	
n-Docosane	2.08	2.2	-5.5		2.16	2.2	-1.82		2.12	2.2	-3.6	
n-Tricosane	2.06	2	3		2.07	2	3.5		1.99	2	-0.5	
n-Tetracosane	1.82	2	-9		1.75	2	-12.5		1.76	2	-12	
n-Pentacosane	1.64	1.7	-3.5		1.64	1.7	-3.53		1.6	1.7	-5.9	
n-Hexacosane	1.43	1.5	-4.7		1.43	1.5	-4.67		1.44	1.5	-4	
n-Heptacosane	1.16	1.2	-3.3		1.1	1.2	-8.33		1.11	1.2	-7.5	
n-Octacosane	0.86	0.88	-2.3		0.87	0.88	-1.14		0.865	0.88	-1.7	
n-Nonacosane	0.776	0.81	-4.2		0.752	0.81	-7.16		0.794	0.81	-2	
n-Triacontane	0.675	0.65	3.85		0.642	0.65	-1.23		0.719	0.65	10.6	
n-Hentriacontane	0.749	0.58	29.1		0.713	0.58	22.9		0.758	0.58	30.7	
n-Dotriacontane	0.525	0.44	19.3		0.514	0.44	16.8		0.508	0.44	15.4	
n-Tritriacontane	0.379	0.4	-5.3		0.38	0.4	-5		0.385	0.4	-3.8	
n-Tetraatriacontane	0.338	0.35	-3.4		0.315	0.35	-10		0.341	0.35	-2.6	
n-Pentatriacontane	0.419	0.35	19.7		0.368	0.35	5.14		0.383	0.35	9.43	
n-Hexatriacontane	0.282	0.23	22.6		0.273	0.23	18.7		0.276	0.23	20	
n-Heptatriacontane	0.247	0.23	7.39		0.21	0.23	-8.7		0.228	0.23	-0.9	
n-Octatriacontane	0.243	0.22	10.4		0.208	0.22	-5.45		0.222	0.22	0.91	
n-Nonatriacontane	0.159 J	0.18	-12		0.128 J	0.18	-28.9		0.152 J	0.18	-16	
n-Tetracontane	0.198	0.19	4.21		0.168 J	0.19	-11.6		0.202	0.19	6.32	
TPH (RES)	185	220	-16		178	220	-19.1		174	220	-21	
TPH	637				623				621			
5A-androstane	93				104				98			
d50-tetracosane	98				100				99			



Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004080

Data Table: DUP - Surrogate Corrected

	02-4A-02-PHC-T-AN	02-4A-02-PHC-T-AN		
Field ID			DUP	
Sample Type	N		DUP	
Matrix	TISSUE		TISSUE	
Sample Size	10.06 g		10.03 g	
Weight Basis	WET		WET	
Associated Blank	DY-S-72PB		DY-S-72PB	
Field Date	08/20/02		08/20/02	
Extract Date	10/16/02		10/16/02	
Analysis Date	11/01/02		11/01/02	
Date Received	08/23/02		08/23/02	
Percent Solids	26.9		26.9	
Dilution Factor	5		5	
Percent Lipids	0.209		0.197	
Min Reporting Limit	0.05		0.05	
Units	mg/Kg		mg/Kg	RPD Q
<b>SHC/TPH</b>				
n-Nonane	ND		ND	
n-Decane	0.004 J		0.0035 J	13
n-Undecane	ND		ND	
n-Dodecane	ND		0.0021 J	
n-Tridecane	0.0028 J		0.0031 J	10
Isoprenoid RRT 1380	ND		ND	
n-Tetradecane	0.0036 J		0.0036 J	0
Isoprenoid RRT 1470	0.005 J		0.0052 J	3.9
n-Pentadecane	0.037 J		0.028 J	28
n-Hexadecane	0.0053 J		0.0048 J	9.9
Isoprenoid RRT 1650	ND		0.0034 J	
n-Heptadecane	0.063		0.057	10
Pristane	24 D		24 D	0
n-Octadecane	0.0071 J		0.0067 J	5.8
Phytane	0.0025 J		0.0023 J	8.3
n-Nonadecane	0.0086 J		0.0063 J	31
n-Eicosane	0.0049 J		0.0044 J	11
n-Heneicosane	0.012 J		0.011 J	8.7
n-Docosane	0.015 J		0.019 J	24
n-Tricosane	0.04 JB		0.049 JB	20
n-Tetracosane	0.044 JB		0.055 B	22
n-Pentacosane	0.073 B		0.086 B	16
n-Hexacosane	0.074 B		0.087 B	16
n-Heptacosane	0.097 B		0.11 B	12
n-Octacosane	0.08 B		0.091 B	13
n-Nonacosane	0.082 B		0.095 B	15
n-Triacontane	0.061 B		0.07 B	14
n-Hentriacontane	0.058 B		0.064 B	9.8
n-Dotriacontane	0.031 JB		0.036 JB	15
n-Tritriacontane	0.02 JB		0.024 JB	18
n-Tetratriacontane	0.011 JB		0.01 JB	9.5
n-Pentatriacontane	0.0058 J		0.0053 J	9
n-Hexatriacontane	0.0024 J		0.0024 J	0
n-Heptatriacontane	ND		ND	
n-Octatriacontane	ND		ND	
n-Tetracontane	ND		ND	
TPH (RES)	20		19	5.1
TPH	20		19	5.1
%ortho-terphenyl	NA		NA	
%5A-androstane	74		81	
%d50-tetracosane	79		86	

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

	00-N13-01-PHC-T-	00-N13-01-PHC-T-AN		
Field ID	AN	DUP		
Lab ID	20A3483	20A3483DUP		
Sample Type	N	DUP		
Matrix	TISSUE	TISSUE		
Sample Size	9.86 g	10.12 g		
Weight Basis	WET	WET		
Associated Blank	DH-S-64PB	DH-S-64PB		
Field Date	08/19/00	08/19/00		
Extract Date	03/28/01	03/28/01		
Analysis Date	04/07/01	04/07/01		
Date Received	08/30/00	08/30/00		
Percent Solids	23.3	23.3		
Percent Lipids	NA	NA		
Min Reporting Limit	0.051	0.049		
Units	mg/Kg	mg/Kg	RPD	Q

<b>SHC/TPH - Wet</b>				
n-Octane	ND	ND		
n-Nonane	ND	ND		
n-Decane	0.002 J	0.0017 J	16	
n-Undecane	ND	ND		
n-Dodecane	ND	0.0019 J		
n-Tridecane	0.0041 J	0.0042 J	2.4	
Isoprenoid RRT 1380	0.0087 J	0.0076 J	13	
n-Tetradecane	0.0039 J	0.0041 J	5	
Isoprenoid RRT 1470	0.017 J	0.016 J	6.1	
n-Pentadecane	0.023 J	0.024 J	4.2	
n-Hexadecane	0.0046 JB	0.005 JB	8.3	
Isoprenoid RRT 1650	0.0046 J	0.0045 J	2.2	
n-Heptadecane	0.038 JB	0.044 JB	15	
Pristane	9	9.8	8.5	
n-Octadecane	0.0063 JB	0.0069 JB	9.1	
Phytane	0.0096 J	0.01 J	4.1	
n-Nonadecane	0.0058 J	0.0059 J	1.7	
n-Eicosane	0.0051 J	0.0066 J	26	
n-Heneicosane	0.046 JB	0.041 JB	11	
n-Docosane	0.023 JB	0.024 JB	4.2	
n-Tricosane	0.076 B	0.08 B	5.1	
n-Tetracosane	0.023 JB	0.028 JB	20	
n-Pentacosane	0.044 JB	0.052 B	17	
n-Hexacosane	0.03 JB	0.042 JB	33	
n-Heptacosane	0.047 JB	0.064 B	31	
n-Octacosane	0.034 JB	0.052 B	42	&
n-Nonacosane	0.042 JB	0.059 B	34	
n-Triacontane	0.026 JB	0.046 JB	56	&
n-Hentriacontane	0.027 JB	0.04 JB	39	&
n-Dotriacontane	0.016 JB	0.025 JB	44	&
n-Tritriacontane	0.0097 JB	0.017 JB	55	&
n-Tetratriacontane	0.006 JB	0.0088 JB	38	&
n-Pentatriacontane	0.0061 JB	0.0074 JB	19	
n-Hexatriacontane	0.0026 J	0.0035 J	30	
n-Heptatriacontane	ND	0.002 J		
n-Octatriacontane	0.0089 J	ND		
n-Nonatriacontane	ND	ND		
n-Tetracontane	ND	ND		
TPH (RES)	10 B	11 B	9.5	
TPH	14	15	6.9	
5A-androstane	52	54		
d50-tetracosane	56	58		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004080  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike				Procedural Blank
Sample Type	PB	BS				PB
Matrix	TISSUE	TISSUE				TISSUE
Sample Size	10 g	10 g				10 g
Weight Basis	WET	WET				WET
Associated Blank	NA	DY-S-72PB				NA
Field Date	10/16/02	10/16/02				10/21/02
Extract Date	10/16/02	10/16/02				10/21/02
Analysis Date	10/31/02	10/31/02				10/31/02
Date Received	10/16/02	10/16/02				10/21/02
Percent Solids	100	100				100
Dilution Factor	1	1				1
Percent Lipids	NA	NA				NA
Min Reporting Limit	0.1	0.05				0.05
Units	mg/Kg	mg/Kg	T	%R	Q	mg/Kg
<b>SHC/TPH</b>						
n-Nonane	ND	ND				ND
n-Decane	ND	1.2	2.5	48		ND
n-Undecane	ND	ND				ND
n-Dodecane	ND	ND				ND
n-Tridecane	ND	ND				ND
Isoprenoid RRT 1380	ND	ND				ND
n-Tetradecane	ND	0.0064 J				ND
Isoprenoid RRT 1470	ND	ND				ND
n-Pentadecane	ND	1.7	2.5	68		ND
n-Hexadecane	ND	0.0033 J				ND
Isoprenoid RRT 1650	ND	ND				ND
n-Heptadecane	ND	0.003 J				ND
Pristane	ND	2.1	2.5	84		ND
n-Octadecane	ND	0.0027 J				ND
Phytane	ND	0.012 J				ND
n-Nonadecane	ND	ND				ND
n-Eicosane	ND	2.3	2.5	92		ND
n-Heneicosane	ND	0.0045 J				ND
n-Docosane	ND	0.011 J				0.0043 J
n-Tricosane	0.014 J	0.028 JB				0.013 J
n-Tetracosane	0.022 J	0.051 B				0.02 J
n-Pentacosane	0.037 J	2.4	2.5	95		0.034 J
n-Hexacosane	0.047 J	0.11 B				0.043 J
n-Heptacosane	0.057 J	0.13 B				0.051
n-Octacosane	0.056 J	0.12 B				0.049 J
n-Nonacosane	0.055 J	0.12 B				0.048 J
n-Triacontane	0.042 J	2.4	2.5	94		0.037 J
n-Hentriacontane	0.037 J	0.088 B				0.033 J
n-Dotriacontane	0.021 J	0.066 B				0.02 J
n-Tritriacontane	0.014 J	0.037 JB				0.011 J
n-Tetratriacontane	0.0071 J	2.3	2.5	92		0.0057 J
n-Pentatriacontane	ND	0.014 J				0.0028 J
n-Hexatriacontane	ND	2.2	2.5	88		ND
n-Heptatriacontane	ND	0.0038 J				ND
n-Octatriacontane	ND	0.0058 J				ND
n-Tetracontane	ND	0.0034 J				ND
TPH (RES)	1.2 J	18				0.83 J
TPH	1.2 J	18				0.83 J
%ortho-terphenyl	NA	NA				NA
%5A-androstane	53	72				54
%d50-tetracosane	65	85				70

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Blank Spike			
Lab ID	DH-S-64PB	DH-S-65BS			
Sample Type	PB	BS			
Matrix	TISSUE	TISSUE			
Sample Size	1.5 g	1.5 g			
Weight Basis	WET	WET			
Associated Blank	NA	DH-S-64PB			
Field Date	03/28/01	03/28/01			
Extract Date	03/28/01	03/28/01			
Analysis Date	04/07/01	04/07/01			
Date Received	03/28/01	03/28/01			
Percent Solids	100	100			
Percent Lipids	NA	NA			
Min Reporting Limit	0.33	0.33			
Units	mg/Kg	mg/Kg	T	%R	Q
<b>SHC/TPH - Wet</b>					
n-Octane	ND	ND			
n-Nonane	ND	ND			
n-Decane	ND	0.9	16.7	5.4	&
n-Undecane	ND	ND			
n-Dodecane	ND	ND			
n-Tridecane	ND	ND			
Isoprenoid RRT 1380	ND	ND			
n-Tetradecane	ND	0.015 J			
Isoprenoid RRT 1470	ND	ND			
n-Pentadecane	ND	6.5	16.7	39	&
n-Hexadecane	0.013 J	0.011 JB			
Isoprenoid RRT 1650	ND	ND			
n-Heptadecane	0.01 J	0.012 JB			
Pristane	ND	11	16.7	66	
n-Octadecane	0.016 J	0.012 JB			
Phytane	ND	0.057 J			
n-Nonadecane	ND	ND			
n-Eicosane	ND	13	16.7	78	
n-Heneicosane	0.02 J	0.023 JB			
n-Docosane	0.029 J	0.036 JB			
n-Tricosane	0.064 J	0.095 JB			
n-Tetracosane	0.082 J	0.19 JB			
n-Pentacosane	0.15 J	14	16.7	83	
n-Hexacosane	0.19 J	0.54 B			
n-Heptacosane	0.25 J	0.69 B			
n-Octacosane	0.23 J	0.66 B			
n-Nonacosane	0.23 J	0.68 B			
n-Triacontane	0.17 J	14	16.7	83	
n-Hentriacontane	0.15 J	0.44 B			
n-Dotriacontane	0.09 J	0.32 JB			
n-Tritriacontane	0.059 J	0.19 JB			
n-Tetratriacontane	0.033 J	13	16.7	78	
n-Pentatriacontane	0.02 J	0.074 JB			
n-Hexatriacontane	ND	14	16.7	84	
n-Heptatriacontane	ND	0.019 J			
n-Octatriacontane	ND	0.029 J			
n-Nonatriacontane	ND	ND			
n-Tetracontane	ND	0.022 J			
TPH (RES)	4.7	93			
TPH	ND	ND			
5A-androstane	56	55			
d50-tetracosane	69	66			

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	<b>Oil Reference</b>			
Field ID	Standard			
Lab ID	BY32ORS			
Sample Type	ORS			
Matrix	OIL			
Sample Size	5.12 mg			
Weight Basis	OIL			
Associated Blank	NA			
Field Date	03/21/01			
Extract Date	03/21/01			
Analysis Date	04/10/01			
Date Received	03/21/01			
Percent Solids	NA			
Percent Lipids	NA			
Min Reporting Limit	4.88			
Units	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydrocarbons - Wet				
Naphthalene	768	710	8.17	
C1-Naphthalenes	1580	1600	-1.3	
C2-Naphthalenes	2210	2300	-3.9	
C3-Naphthalenes	1660	1960	-15	
C4-Naphthalenes	983	1180	-17	
Acenaphthylene	ND			
Acenaphthene	ND			
Biphenyl	229	214	7.01	
Fluorene	102	95.2	7.14	
C1-Fluorenes	242	239	1.26	
C2-Fluorenes	324	356	-9	
C3-Fluorenes	344	396	-13	
Anthracene	ND			
Phenanthrene	293	260	12.7	
C1-Phenanthrenes/anthracenes	612	612	0	
C2-Phenanthrenes/anthracenes	696	752	-7.5	
C3-Phenanthrenes/anthracenes	518	534	-3	
C4-Phenanthrenes/anthracenes	272	308	-12	
Dibenzothiophene	240	222	8.11	
C1-Dibenzothiophenes	506	484	4.54	
C2-Dibenzothiophenes	682	658	3.65	
C3-Dibenzothiophenes	537	574	-6.4	
Fluoranthene	ND			
Pyrene	15.2	13.4	13.4	
C1-Fluoranthenes/pyrenes	83	83.9	-1.1	
C2-Fluoranthenes/pyrenes	143	142	0.7	
C3-Fluoranthenes/pyrenes	147	158	-7	
Benzo[a]anthracene	ND			
Chrysene	55	49.2	11.8	
C1-Chrysenes	84.2	81.5	3.31	
C2-Chrysenes	110	102	7.84	
C3-Chrysenes	87.2	79.6	9.55	
C4-Chrysenes	61.6	64	-3.8	
Benzo[b]fluoranthene	6.96	7.62	-8.7	
Benzo[k]fluoranthene	ND			
Benzo[e]pyrene	12.4	12.4	0	
Benzo[a]pyrene	ND			
Perylene	ND			
Indeno[1,2,3,-c,d]pyrene	ND			
Dibenzo[a,h]anthracene	1.47 J			
Benzo[g,h,i]perylene	2.94 J	3.18	-7.6	
d8-Naphthalene	97			
d10-Acenaphthene	97			
d10-Phenanthrene	95			
d12-Benzo[a]pyrene	99			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 1004084  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike			
Sample Type	PB	BS			
Matrix	TISSUE	TISSUE			
Sample Size	10 g	10 g			
Weight Basis	WET	WET			
Associated Blank	NA	DY-S-72PB			
Field Date	10/16/02	10/16/02			
Extract Date	10/16/02	10/16/02			
Analysis Date	11/01/02	11/01/02			
Date Received	10/16/02	10/16/02			
Percent Solids	100	100			
Dilution Factor	1	1			
Percent Lipids	NA	NA			
Min Reporting Limit	2.5	1.2			
Units	ug/Kg	ug/Kg	T	%R	Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	1.9 J	99	100	89
C1-Naphthalenes	0.48 J	0.81 JB		
C2-Naphthalenes	0.41 J	0.5 JB		
C3-Naphthalenes	ND	ND		
C4-Naphthalenes	ND	ND		
Acenaphthylene	ND	93	100	93
Acenaphthene	0.066 J	99	100	99
Biphenyl	1.3 J	0.41 JB		
Fluorene	0.21 J	100	100	99
C1-Fluorenes	ND	ND		
C2-Fluorenes	ND	ND		
C3-Fluorenes	ND	ND		
Anthracene	0.04 J	75	100	75
Phenanthrene	1.1 J	99	100	94
C1-Phenanthrenes/anthracenes	0.23 J	0.52 JB		
C2-Phenanthrenes/anthracenes	ND	ND		
C3-Phenanthrenes/anthracenes	ND	ND		
C4-Phenanthrenes/anthracenes	ND	ND		
Dibenzothiophene	ND	ND		
C1-Dibenzothiophenes	ND	ND		
C2-Dibenzothiophenes	ND	ND		
C3-Dibenzothiophenes	ND	ND		
Fluoranthene	0.14 J	120	100	119
Pyrene	0.097 J	110	100	110
C1-Fluoranthenes/pyrenes	ND	0.22 J		
C2-Fluoranthenes/pyrenes	ND	ND		
C3-Fluoranthenes/pyrenes	ND	ND		
Benzo[a]anthracene	ND	99	100	99
Chrysene	ND	110	100	110
C1-Chrysenes	ND	ND		
C2-Chrysenes	ND	ND		
C3-Chrysenes	ND	ND		
C4-Chrysenes	ND	ND		
Benzo[b]fluoranthene	ND	120	100	120
Benzo[k]fluoranthene	ND	120	100	120
Benzo[e]pyrene	ND	ND		
Benzo[a]pyrene	ND	110	100	110
Perylene	ND	ND		
Indeno[1,2,3,-c,d]pyrene	ND	100	100	100
Dibenzo[a,h]anthracene	ND	110	100	110
Benzo[g,h,i]perylene	ND	110	100	110

d8-Naphthalene	20 &	49
d10-Acenaphthene	34 &	56
d10-Phenanthrene	44 &	64
d12-Benzo[a]pyrene	46	58

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Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: BS-BSD - Surrogate Corrected

Field ID	Blank
Sample Type	PB
Matrix	TISSUE
Sample Size	10 g
Weight Basis	WET
Associated Blank	NA
Field Date	10/21/02
Extract Date	10/21/01
Analysis Date	11/09/02
Date Received	10/21/02
Percent Solids	100
Dilution Factor	1
Percent Lipids	NA
Min Reporting Limit	6.2
Units	ug/Kg

**Polynuclear Aromatic Hydr**

Naphthalene	1.4
C1-Naphthalenes	0.43 J
C2-Naphthalenes	0.47 J
C3-Naphthalenes	ND
C4-Naphthalenes	ND
Acenaphthylene	ND
Acenaphthene	0.086 J
Biphenyl	0.42 J
Fluorene	0.25 J
C1-Fluorenes	ND
C2-Fluorenes	ND
C3-Fluorenes	ND
Anthracene	0.062 J
Phenanthrene	1.4
C1-Phenanthrenes/anthracenes	0.44 J
C2-Phenanthrenes/anthracenes	ND
C3-Phenanthrenes/anthracenes	ND
C4-Phenanthrenes/anthracenes	ND
Dibenzothiophene	ND
C1-Dibenzothiophenes	ND
C2-Dibenzothiophenes	ND
C3-Dibenzothiophenes	ND
Fluoranthene	0.21 J
Pyrene	0.13 J
C1-Fluoranthenes/pyrenes	ND
C2-Fluoranthenes/pyrenes	ND
C3-Fluoranthenes/pyrenes	ND
Benzo[a]anthracene	ND
Chrysene	ND
C1-Chrysenes	ND
C2-Chrysenes	ND
C3-Chrysenes	ND
C4-Chrysenes	ND
Benzo[b]fluoranthene	ND
Benzo[k]fluoranthene	ND
Benzo[e]pyrene	ND
Benzo[a]pyrene	ND
Perylene	ND
Indeno[1,2,3,-c,d]pyrene	ND
Dibenzo[a,h]anthracene	ND
Benzo[g,h,i]perylene	ND

d8-Naphthalene	40
d10-Acenaphthene	51
d10-Phenanthrene	56
d12-Benzo[a]pyrene	51

Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: DUP - Surrogate Corrected

02-4A-02-PHC-T-AN

Field ID	02-4A-02-PHC-T-AN	DUP		
Sample Type	N	DUP		
Matrix	TISSUE	TISSUE		
Sample Size	10.06 g	10.03 g		
Weight Basis	WET	WET		
Associated Blank	DY-S-72PB	DY-S-72PB		
Field Date	08/20/02	08/20/02		
Extract Date	10/16/02	10/16/02		
Analysis Date	11/02/02	11/02/02		
Date Received	08/23/02	08/23/02		
Percent Solids	26.9	26.9		
Dilution Factor	1	1		
Percent Lipids	0.209	0.197		
Min Reporting Limit	1.2	1.2		
Units	ug/Kg	ug/Kg	RPD	Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	1.5 B	1.6 B	6.4	
C1-Naphthalenes	1 JB	1 JB	0	
C2-Naphthalenes	3.6	1.9 B	62	&
C3-Naphthalenes	1 J	0.96 J	4.1	
C4-Naphthalenes	ND	ND		
Acenaphthylene	0.028 J	0.021 J	28	
Acenaphthene	0.15 JB	0.086 JB	54	&
Biphenyl	0.61 JB	0.58 JB	5	
Fluorene	0.54 JB	0.29 JB	60	&
C1-Fluorenes	ND	ND		
C2-Fluorenes	ND	ND		
C3-Fluorenes	ND	ND		
Anthracene	0.24 J	0.06 JB	120	&
Phenanthrene	1.6 B	1.5 B	6.4	
C1-Phenanthrenes/anthracenes	1.1 JB	1.1 JB	0	
C2-Phenanthrenes/anthracenes	1.3	1.2	8	
C3-Phenanthrenes/anthracenes	0.68 J	0.74 J	8.4	
C4-Phenanthrenes/anthracenes	ND	ND		
Dibenzothiophene	0.16 J	0.17 J	6.1	
C1-Dibenzothiophenes	0.25 J	0.27 J	7.7	
C2-Dibenzothiophenes	0.57 J	0.57 J	0	
C3-Dibenzothiophenes	0.41 J	0.48 J	16	
Fluoranthene	0.34 JB	0.35 JB	2.9	
Pyrene	0.26 JB	0.25 JB	3.9	
C1-Fluoranthenes/pyrenes	0.29 J	0.32 J	9.8	
C2-Fluoranthenes/pyrenes	ND	ND		
C3-Fluoranthenes/pyrenes	ND	ND		
Benzo[a]anthracene	ND	ND		
Chrysene	0.24 J	0.21 J	13	
C1-Chrysenes	0.35 J	0.37 J	5.6	
C2-Chrysenes	ND	ND		
C3-Chrysenes	ND	ND		
C4-Chrysenes	ND	ND		
Benzo[b]fluoranthene	0.19 J	0.23 J	19	
Benzo[k]fluoranthene	0.05 J	0.057 J	13	
Benzo[e]pyrene	ND	ND		
Benzo[a]pyrene	ND	ND		
Perylene	0.96 J	0.98 J	2.1	
Indeno[1,2,3,-c,d]pyrene	0.037 J	0.037 J	0	
Dibenzo[a,h]anthracene	ND	ND		
Benzo[g,h,i]perylene	0.12 J	0.11 J	8.7	

d8-Naphthalene	52	56	
d10-Acenaphthene	60	65	
d10-Phenanthrene	72	75	
d12-Benzo[a]pyrene	64	67	



Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: SRM - Surrogates, Standards, and Reference

Field ID	Material - 2978			
Sample Type	SRM			
Matrix	TISSUE			
Sample Size	2.36 g			
Weight Basis	DRY			
Associated Blank	DY-S-72PB			
Field Date	10/16/02			
Extract Date	10/16/02			
Analysis Date	11/01/02			
Date Received	10/16/02			
Percent Solids	100			
Dilution Factor	1			
Percent Lipids	NA			
Min Reporting Limit	5.3			
Units	ug/Kg	T	%D	Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	236	31	661	&
C1-Naphthalenes	187			
C2-Naphthalenes	308			
C3-Naphthalenes	486			
C4-Naphthalenes	182			
Acenaphthylene	16	4	300	&
Acenaphthene	50	6	733	&
Biphenyl	10.8	8	35	
Fluorene	50.7	7	624	&
C1-Fluorenes	113			
C2-Fluorenes	63.4			
C3-Fluorenes	ND			
Anthracene	20.8	5.4	285	&
Phenanthrene	313	74	323	&
C1-Phenanthrenes/anthracenes	153			
C2-Phenanthrenes/anthracenes	151			
C3-Phenanthrenes/anthracenes	104			
C4-Phenanthrenes/anthracenes	81.7			
Dibenzothiophene	40			
C1-Dibenzothiophenes	77.6			
C2-Dibenzothiophenes	123			
C3-Dibenzothiophenes	126			
Fluoranthene	247	166	48.8	&
Pyrene	436	256	70.3	&
C1-Fluoranthenes/pyrenes	169			
C2-Fluoranthenes/pyrenes	68.9			
C3-Fluoranthenes/pyrenes	23.7			
Benzo[a]anthracene	37.7	25	50.8	&
Chrysene	116	59	96.6	&
C1-Chrysenes	49.2			
C2-Chrysenes	19.5			
C3-Chrysenes	ND			
C4-Chrysenes	ND			
Benzo[b]fluoranthene	85.6	81	5.68	
Benzo[k]fluoranthene	28.5	24.1	18.2	
Benzo[e]pyrene	117	89.3	31	
Benzo[a]pyrene	7.24	7	3.43	
Perylene	5.58	4.09	36.4	&
Indeno[1,2,3,-c,d]pyrene	9.76	12.2	-20	
Dibenzo[a,h]anthracene	2.42 J	3.5	-30.8	
Benzo[g,h,i]perylene	24.5	19.7	24.4	

d8-Naphthalene	39
d10-Acenaphthene	42 &
d10-Phenanthrene	50
d12-Benzo[a]pyrene	40

Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: IRM - Surrogate Corrected Reference

Instrument Reference

Field ID	Standard				Standard			
Sample Type	IRM				IRM			
Matrix	IRM				IRM			
Sample Size	0.1 mL				0.1 mL			
Weight Basis	WET				WET			
Associated Blank	NA				NA			
Field Date	10/15/02				10/15/02			
Extract Date	10/15/02				10/15/02			
Analysis Date	11/09/02				10/29/02			
Date Received	10/15/02				10/15/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	250				250			
Units	ug/L	T	%D	Q	ug/L	T	%D	Q

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	6760	6890	-1.89		6710	6890	-2.61	
C1-Naphthalenes	ND				ND			
C2-Naphthalenes	ND				ND			
C3-Naphthalenes	ND				ND			
C4-Naphthalenes	ND				ND			
Acenaphthylene	6610	6960	-5.03		6450	6960	-7.33	
Acenaphthene	6600	7280	-9.34		6400	7280	-12.1	
Biphenyl	7080	7000	1.14		6900	7000	-1.43	
Fluorene	6210	7270	-14.6		6200	7270	-14.7	
C1-Fluorenes	ND				ND			
C2-Fluorenes	ND				ND			
C3-Fluorenes	ND				ND			
Anthracene	7160	7820	-8.44		6960	7820	-11	
Phenanthrene	6710	7010	-4.28		6750	7010	-3.71	
C1-Phenanthrenes/anthracenes	ND				ND			
C2-Phenanthrenes/anthracenes	ND				ND			
C3-Phenanthrenes/anthracenes	ND				ND			
C4-Phenanthrenes/anthracenes	ND				ND			
Dibenzothiophene	ND				ND			
C1-Dibenzothiophenes	ND				ND			
C2-Dibenzothiophenes	ND				ND			
C3-Dibenzothiophenes	ND				ND			
Fluoranthene	6080	5910	2.88		5990	5910	1.35	
Pyrene	5960	5890	1.19		5850	5890	-0.679	
C1-Fluoranthenes/pyrenes	ND				ND			
C2-Fluoranthenes/pyrenes	ND				ND			
C3-Fluoranthenes/pyrenes	ND				ND			
Benzo[a]anthracene	3620	3590	0.836		3400	3590	-5.29	
Chrysene	7070	7030	0.569		7040	7030	0.142	
C1-Chrysenes	ND				ND			
C2-Chrysenes	ND				ND			
C3-Chrysenes	ND				ND			
C4-Chrysenes	ND				ND			
Benzo[b]fluoranthene	5260	5250	0.19		5560	5250	5.9	
Benzo[k]fluoranthene	5710	5570	2.51		5460	5570	-1.97	
Benzo[e]pyrene	5670	5620	0.89		5720	5620	1.78	
Benzo[a]pyrene	6610	6790	-2.65		6710	6790	-1.18	
Perylene	7030	7120	-1.26		6940	7120	-2.53	
Indeno[1,2,3,-c,d]pyrene	6200	6290	-1.43		6240	6290	-0.795	
Dibenzo[a,h]anthracene	5540	5180	6.95		5520	5180	6.56	
Benzo[g,h,i]perylene	5230	5290	-1.13		5240	5290	-0.945	

d8-Naphthalene	96				97			
d10-Acenaphthene	95				97			
d10-Phenanthrene	95				97			
d12-Benzo[a]pyrene	94				94			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 1004084

Data Table: ORS - Surrogate Correction Reference

Field ID	Standard				Oil Reference			
Sample Type	ORS				ORS			
Matrix	OIL				OIL			
Sample Size	5.1 mg				5.1 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02			
Analysis Date	11/09/02				10/29/02			
Date Received	04/23/02				04/23/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	826	710	16.3		761	710	7.18	
C1-Naphthalenes	1570	1600	-1.88		1450	1600	-9.38	
C2-Naphthalenes	2080	2300	-9.56		2050	2300	-10.9	
C3-Naphthalenes	1420	1960	-27.6		1690	1960	-13.8	
C4-Naphthalenes	788	1180	-33.2		950	1180	-19.5	
Acenaphthylene	ND				ND			
Acenaphthene	ND				ND			
Biphenyl	229	214	7.01		223	214	4.2	
Fluorene	97.6	95.2	2.52		102	95.2	7.14	
C1-Fluorenes	253	239	5.86		241	239	0.837	
C2-Fluorenes	337	356	-5.34		342	356	-3.93	
C3-Fluorenes	333	396	-15.9		332	396	-16.2	
Anthracene	ND				ND			
Phenanthrene	288	260	10.8		277	260	6.54	
C1-Phenanthrenes/anthracenes	566	612	-7.52		605	612	-1.14	
C2-Phenanthrenes/anthracenes	596	752	-20.7		687	752	-8.64	
C3-Phenanthrenes/anthracenes	460	534	-13.8		511	534	-4.31	
C4-Phenanthrenes/anthracenes	282	308	-8.44		294	308	-4.54	
Dibenzothiophene	254	222	14.4		251	222	13.1	
C1-Dibenzothiophenes	486	484	0.413		495	484	2.27	
C2-Dibenzothiophenes	633	658	-3.8		693	658	5.32	
C3-Dibenzothiophenes	567	574	-1.22		561	574	-2.26	
Fluoranthene	ND				ND			
Pyrene	15	13.4	11.9		17.2	13.4	28.4	
C1-Fluoranthenes/pyrenes	79.9	83.9	-4.77		87.9	83.9	4.77	
C2-Fluoranthenes/pyrenes	136	142	-4.22		150	142	5.63	
C3-Fluoranthenes/pyrenes	144	158	-8.86		169	158	6.96	
Benzo[a]anthracene	ND				ND			
Chrysene	50.9	49.2	3.46		54.4	49.2	10.6	
C1-Chrysenes	83	81.5	1.84		89.8	81.5	10.2	
C2-Chrysenes	107	102	4.9		106	102	3.92	
C3-Chrysenes	72.9	79.6	-8.42		100	79.6	25.6	
C4-Chrysenes	56.4	64	-11.9		71.8	64	12.2	
Benzo[b]fluoranthene	7.92	7.62	3.94		7.02	7.62	-7.87	
Benzo[k]fluoranthene	ND				ND			
Benzo[e]pyrene	11.7	12.4	-5.64		12.2	12.4	-1.61	
Benzo[a]pyrene	ND				ND			
Perylene	ND				ND			
Indeno[1,2,3,-c,d]pyrene	ND				ND			
Dibenzo[a,h]anthracene	1.27 J				1.49 J			
Benzo[g,h,i]perylene	3.21 J	3.18	0.943		3.36 J	3.18	5.66	

d8-Naphthalene	94				89			
d10-Acenaphthene	98				95			
d10-Phenanthrene	97				96			
d12-Benzo[a]pyrene	105				106			

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control IRM

	<b>Instrument</b>			
Field ID	Reference			
Lab ID	BY42IRM			
Sample Type	IRM			
Matrix	IRM			
Sample Size	0.1 mL			
Weight Basis	WET			
Associated Blank	NA			
Field Date	03/28/01			
Extract Date	03/28/01			
Analysis Date	04/10/01			
Date Received	03/28/01			
Percent Solids	NA			
Percent Lipids	NA			
Min Reporting Limit	250			
Units	ug/L	T	%D	Q

Polynuclear Aromatic Hydrocarbons - Wet				
Naphthalene	6730	6890	-2.3	
C1-Naphthalenes		ND		
C2-Naphthalenes		ND		
C3-Naphthalenes		ND		
C4-Naphthalenes		ND		
Acenaphthylene	6520	6960	-6.3	
Acenaphthene	6720	7280	-7.7	
Biphenyl	7230	7000	3.28	
Fluorene	6610	7270	-9.1	
C1-Fluorenes		ND		
C2-Fluorenes		ND		
C3-Fluorenes		ND		
Anthracene	7120	7820	-9	
Phenanthrene	7180	7010	2.42	
C1-Phenanthrenes/anthracenes		ND		
C2-Phenanthrenes/anthracenes		ND		
C3-Phenanthrenes/anthracenes		ND		
C4-Phenanthrenes/anthracenes		ND		
Dibenzothiophene		ND		
C1-Dibenzothiophenes		ND		
C2-Dibenzothiophenes		ND		
C3-Dibenzothiophenes		ND		
Fluoranthene	5930	5910	0.34	
Pyrene	5940	5890	0.85	
C1-Fluoranthenes/pyrenes		ND		
C2-Fluoranthenes/pyrenes		ND		
C3-Fluoranthenes/pyrenes		ND		
Benzo[a]anthracene	3400	3590	-5.3	
Chrysene	7370	7030	4.84	
C1-Chrysenes		ND		
C2-Chrysenes		ND		
C3-Chrysenes		ND		
C4-Chrysenes		ND		
Benzo[b]fluoranthene	4990	5250	-5	
Benzo[k]fluoranthene	6100	5570	9.52	
Benzo[e]pyrene	5950	5620	5.87	
Benzo[a]pyrene	6770	6790	-0.3	
Perylene	7750	7120	8.85	
Indeno[1,2,3,-c,d]pyrene	5870	6290	-6.7	
Dibenzo[a,h]anthracene	5420	5180	4.63	
Benzo[g,h,i]perylene	5180	5290	-2.1	
d8-Naphthalene	100			
d10-Acenaphthene	96			
d10-Phenanthrene	97			
d12-Benzo[a]pyrene	92			

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control SRM

	<b>Standard</b>			
Field ID	Reference Material			
Lab ID	DH-S-66SRMF2			
Sample Type	SRM			
Matrix	TISSUE			
Sample Size	16.83 g			
Weight Basis	WET			
Associated Blank	DH-S-64PBF2			
Field Date	03/28/01			
Extract Date	03/28/01			
Analysis Date	04/12/01			
Date Received	03/28/01			
Percent Solids	11.4			
Percent Lipids	NA			
Min Reporting Limit	6.51			
Units	ug/Kg	T	%D	Q

Polynuclear Aromatic Hydrocarbons - Wet				
Naphthalene	12.7	2.68	374	&
C1-Naphthalenes	1.36 B			
C2-Naphthalenes	0.992 B			
C3-Naphthalenes	1.86			
C4-Naphthalenes	5.01			
Acenaphthylene	1.1			
Acenaphthene	0.29 JB			
Biphenyl	0.268 JB			
Fluorene	0.362 JB			
C1-Fluorenes	ND			
C2-Fluorenes	4.76			
C3-Fluorenes	10.6			
Anthracene	2.32	0.69	236	&
Phenanthrene	2.51 B	2.53	-0.8	
C1-Phenanthrenes/anthracenes	5.36			
C2-Phenanthrenes/anthracenes	14.6			
C3-Phenanthrenes/anthracenes	18			
C4-Phenanthrenes/anthracenes	13.4			
Dibenzothiophene	0.301 J			
C1-Dibenzothiophenes	1.66			
C2-Dibenzothiophenes	9.85			
C3-Dibenzothiophenes	12.4			
Fluoranthene	21.1	18.6	13.4	
Pyrene	19.9	17.3	15	
C1-Fluoranthenes/pyrenes	12.3			
C2-Fluoranthenes/pyrenes	8.32			
C3-Fluoranthenes/pyrenes	4.2			
Benzo[a]anthracene	4.34	3.71	17	
Chrysene	10.6	10.8	-1.9	
C1-Chrysenes	5.23			
C2-Chrysenes	3.79			
C3-Chrysenes	1.69			
C4-Chrysenes	ND			
Benzo[b]fluoranthene	7.22	5.28	36.7	&
Benzo[k]fluoranthene	2.06	2.3	-10	
Benzo[e]pyrene	10.3	9.56	7.74	
Benzo[a]pyrene	1.96	1.78	10.1	
Perylene	0.943	0.87	7.89	
Indeno[1,2,3,-c,d]pyrene	1.53	1.62	-5.6	
Dibenzo[a,h]anthracene	0.37 J			
Benzo[g,h,i]perylene	2.44	2.5	-2.4	
d8-Naphthalene	53			
d10-Acenaphthene	68			
d10-Phenanthrene	77			
d12-Benzo[a]pyrene	74			

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

	00-N13-01-PHC-T-AN	00-N13-01-PHC-T-AN		
Field ID		DUP		
Lab ID	20A3483F2	20A3483DUPF2		
Sample Type	N	DUP		
Matrix	TISSUE	TISSUE		
Sample Size	9.86 g	10.12 g		
Weight Basis	WET	WET		
Associated Blank	DH-S-64PBF2	DH-S-64PBF2		
Field Date	08/19/00	08/19/00		
Extract Date	03/28/01	03/28/01		
Analysis Date	04/12/01	04/12/01		
Date Received	08/30/00	08/30/00		
Percent Solids	23.3	23.3		
Percent Lipids	0.987	0.775		
Min Reporting Limit	1.3	1.2		
Units	ug/Kg	ug/Kg	RPD	Q

Polynuclear Aromatic Hydrocarbons - Wet				
Naphthalene	0.94 JB	0.99 JB	5.2	
C1-Naphthalenes	0.72 JB	0.85 JB	16	
C2-Naphthalenes	3.7	3.6	2.7	
C3-Naphthalenes	0.82 J	0.94 J	14	
C4-Naphthalenes	ND	ND		
Acenaphthylene	ND	ND		
Acenaphthene	0.083 JB	0.1 JB	18	
Biphenyl	0.25 JB	0.25 JB	0	
Fluorene	0.25 JB	0.27 JB	7.7	
C1-Fluorenes	0.4 J	0.4 J	0	
C2-Fluorenes	ND	ND		
C3-Fluorenes	ND	ND		
Anthracene	0.091 JB	0.077 JB	17	
Phenanthrene	1.1 JB	1.6 B	37	&
C1-Phenanthrenes/anthracenes	0.64 JB	0.74 JB	14	
C2-Phenanthrenes/anthracenes	0.77 JB	0.85 JB	9.9	
C3-Phenanthrenes/anthracenes	0.79 JB	0.82 JB	3.7	
C4-Phenanthrenes/anthracenes	0.89 J	0.91 J	2.2	
Dibenzothiophene	0.099 JB	0.13 JB	27	
C1-Dibenzothiophenes	0.2 JB	0.21 JB	4.9	
C2-Dibenzothiophenes	0.39 JB	0.43 JB	9.8	
C3-Dibenzothiophenes	0.4 J	0.44 J	9.5	
Fluoranthene	0.28 JB	0.47 JB	51	&
Pyrene	0.28 JB	0.32 JB	13	
C1-Fluoranthenes/pyrenes	0.32 J	0.36 J	12	
C2-Fluoranthenes/pyrenes	ND	ND		
C3-Fluoranthenes/pyrenes	ND	ND		
Benzo[a]anthracene	ND	ND		
Chrysene	ND	ND		
C1-Chrysenes	ND	ND		
C2-Chrysenes	ND	ND		
C3-Chrysenes	ND	ND		
C4-Chrysenes	ND	ND		
Benzo[b]fluoranthene	0.19 J	0.21 J	10	
Benzo[k]fluoranthene	0.033 J	0.052 J	45	&
Benzo[e]pyrene	ND	ND		
Benzo[a]pyrene	ND	ND		
Perylene	ND	ND		
Indeno[1,2,3,-c,d]pyrene	ND	ND		
Dibenzo[a,h]anthracene	ND	ND		
Benzo[g,h,i]perylene	0.058 J	0.082 J	34	
d8-Naphthalene	47	51		
d10-Acenaphthene	59	63		
d10-Phenanthrene	65	68		
d12-Benzo[a]pyrene	64	67		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Blank Spike			
Lab ID	DH-S-64PBF2	DH-S-65BSF2			
Sample Type	PB	BS			
Matrix	TISSUE	TISSUE			
Sample Size	10 g	10 g			
Weight Basis	WET	WET			
Associated Blank	NA	DH-S-64PBF2			
Field Date	03/28/01	03/28/01			
Extract Date	03/28/01	03/28/01			
Analysis Date	04/11/01	04/12/01			
Date Received	03/28/01	03/28/01			
Percent Solids	100	100			
Percent Lipids	NA	NA			
Min Reporting Limit	1.2	1.2			
Units	ug/Kg	ug/Kg	T	%R	Q

Polynuclear Aromatic Hydrocarbons - Wet					
Naphthalene	1.9	110	100	97	
C1-Naphthalenes	0.5 J	0.43 JB			
C2-Naphthalenes	0.65 J	0.48 JB			
C3-Naphthalenes	ND	ND			
C4-Naphthalenes	ND	ND			
Acenaphthylene	ND	92	100	92	
Acenaphthene	0.1 J	100	100	99	
Biphenyl	0.26 J	0.21 JB			
Fluorene	0.29 J	130	100	128	&
C1-Fluorenes	ND	ND			
C2-Fluorenes	ND	ND			
C3-Fluorenes	ND	ND			
Anthracene	0.07 J	94	100	94	
Phenanthrene	1 J	100	100	93	
C1-Phenanthrenes/anthracenes	0.46 J	0.24 JB			
C2-Phenanthrenes/anthracenes	0.4 J	0.25 JB			
C3-Phenanthrenes/anthracenes	0.29 J	0.11 JB			
C4-Phenanthrenes/anthracenes	ND	ND			
Dibenzothiophene	0.051 J	0.47 J			
C1-Dibenzothiophenes	0.068 J	ND			
C2-Dibenzothiophenes	0.17 J	ND			
C3-Dibenzothiophenes	ND	ND			
Fluoranthene	0.31 J	150	100	148	&
Pyrene	0.15 J	150	100	149	&
C1-Fluoranthenes/pyrenes	ND	0.17 J			
C2-Fluoranthenes/pyrenes	ND	ND			
C3-Fluoranthenes/pyrenes	ND	ND			
Benzo[a]anthracene	ND	150	100	150	&
Chrysene	ND	150	100	150	&
C1-Chrysenes	ND	ND			
C2-Chrysenes	ND	ND			
C3-Chrysenes	ND	ND			
C4-Chrysenes	ND	ND			
Benzo[b]fluoranthene	ND	100	100	100	
Benzo[k]fluoranthene	ND	95	100	95	
Benzo[e]pyrene	ND	ND			
Benzo[a]pyrene	ND	110	100	110	
Perylene	ND	ND			
Indeno[1,2,3,-c,d]pyrene	ND	84	100	84	
Dibenzo[a,h]anthracene	ND	68	100	68	
Benzo[g,h,i]perylene	ND	85	100	85	
d8-Naphthalene	12 &	16 &			
d10-Acenaphthene	30 &	30 &			
d10-Phenanthrene	55	55			
d12-Benzo[a]pyrene	83	72			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4104

Data Table: ORS - Surrogate Corrected

	Oil Reference			
Field ID	Standard			
Sample Type	ORS			
Matrix	OIL			
Sample Size	5.1 mg			
Weight Basis	OIL			
Associated Blank	NA			
Field Date	04/23/02			
Extract Date	04/23/02			
Analysis Date	11/26/02			
Date Received	04/23/02			
Percent Solids	NA			
Dilution Factor	1			
Percent Lipids	NA			
Min Reporting Limit	4.9			
Units	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydrocarbons				
Naphthalene	823	710	15.9	
C1-Naphthalenes	1550	1600	-3.12	
C2-Naphthalenes	2080	2300	-9.56	
C3-Naphthalenes	1580	1960	-19.4	
C4-Naphthalenes	954	1180	-19.2	
Acenaphthylene	ND			
Acenaphthene	ND			
Biphenyl	233	214	8.88	
Fluorene	101	95.2	6.09	
C1-Fluorenes	249	239	4.18	
C2-Fluorenes	348	356	-2.25	
C3-Fluorenes	343	396	-13.4	
Anthracene	ND			
Phenanthrene	286	260	10	
C1-Phenanthrenes/anthracenes	577	612	-5.72	
C2-Phenanthrenes/anthracenes	622	752	-17.3	
C3-Phenanthrenes/anthracenes	476	534	-10.9	
C4-Phenanthrenes/anthracenes	261	308	-15.2	
Dibenzothiophene	249	222	12.2	
C1-Dibenzothiophenes	473	484	-2.27	
C2-Dibenzothiophenes	627	658	-4.71	
C3-Dibenzothiophenes	543	574	-5.4	
Fluoranthene	ND			
Pyrene	13.4	13.4	0	
C1-Fluoranthenes/pyrenes	76.9	83.9	-8.34	
C2-Fluoranthenes/pyrenes	146	142	2.82	
C3-Fluoranthenes/pyrenes	150	158	-5.06	
Benzo[a]anthracene	ND			
Chrysene	51.1	49.2	3.86	
C1-Chrysenes	80.7	81.5	-0.982	
C2-Chrysenes	89.4	102	-12.4	
C3-Chrysenes	75.1	79.6	-5.65	
C4-Chrysenes	59.3	64	-7.34	
Benzo[b]fluoranthene	7.17	7.62	-5.9	
Benzo[k]fluoranthene	ND			
Benzo[e]pyrene	11.6	12.4	-6.45	
Benzo[a]pyrene	ND			
Perylene	ND			
Indeno[1,2,3-c,d]pyrene	ND			
Dibenzo[a,h]anthracene	1.36 J			
Benzo[g,h,i]perylene	2.95 J	3.18	-7.23	
d8-Naphthalene	91			
d10-Acenaphthene	97			
d10-Phenanthrene	98			
d12-Benzo[a]pyrene	115			



Project Title : MMS - AMINIDA - PHASE II

Data Package: 4104

Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference	Standard	T	%D	Q
Sample Type		IRM			
Matrix		IRM			
Sample Size		0.1 mL			
Weight Basis		WET			
Associated Blank		NA			
Field Date		10/15/02			
Extract Date		10/15/02			
Analysis Date		11/26/02			
Date Received		10/15/02			
Percent Solids		NA			
Dilution Factor		1			
Percent Lipids		NA			
Min Reporting Limit		250			
Units		ug/L			

Polynuclear Aromatic Hydrocarbons					
Naphthalene	6900	6890	0.145		
C1-Naphthalenes		ND			
C2-Naphthalenes		ND			
C3-Naphthalenes		ND			
C4-Naphthalenes		ND			
Acenaphthylene	6690	6960	-3.88		
Acenaphthene	6740	7280	-7.42		
Biphenyl	7280	7000	4		
Fluorene	6420	7270	-11.7		
C1-Fluorenes		ND			
C2-Fluorenes		ND			
C3-Fluorenes		ND			
Anthracene	7390	7820	-5.5		
Phenanthrene	7150	7010	2		
C1-Phenanthrenes/anthracenes		ND			
C2-Phenanthrenes/anthracenes		ND			
C3-Phenanthrenes/anthracenes		ND			
C4-Phenanthrenes/anthracenes		ND			
Dibenzothiophene		ND			
C1-Dibenzothiophenes		ND			
C2-Dibenzothiophenes		ND			
C3-Dibenzothiophenes		ND			
Fluoranthene	6170	5910	4.4		
Pyrene	6150	5890	4.41		
C1-Fluoranthenes/pyrenes		ND			
C2-Fluoranthenes/pyrenes		ND			
C3-Fluoranthenes/pyrenes		ND			
Benzo[a]anthracene	3560	3590	-0.836		
Chrysene	7210	7030	2.56		
C1-Chrysenes		ND			
C2-Chrysenes		ND			
C3-Chrysenes		ND			
C4-Chrysenes		ND			
Benzo[b]fluoranthene	5530	5250	5.33		
Benzo[k]fluoranthene	5790	5570	3.95		
Benzo[e]pyrene	5990	5620	6.58		
Benzo[a]pyrene	6790	6790	0		
Perylene	7320	7120	2.81		
Indeno[1,2,3-c,d]pyrene	6470	6290	2.86		
Dibenzo[a,h]anthracene	5680	5180	9.65		
Benzo[g,h,i]perylene	5360	5290	1.32		
d8-Naphthalene	95				
d10-Acenaphthene	93				
d10-Phenanthrene	92				
d12-Benzo[a]pyrene	92				

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4104  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike			
Sample Type	PB	BS			
Matrix	SPMD	SPMD			
Sample Size	1	1			
Weight Basis	NA	NA			
Associated Blank	NA	DZ-S-49PB			
Field Date	11/11/02	11/11/02			
Extract Date	11/11/02	11/11/02			
Analysis Date	11/27/02	11/27/02			
Date Received	11/11/02	11/11/02			
Percent Solids	NA	NA			
Dilution Factor	1	1			
Percent Lipids	NA	NA			
Min Reporting Limit	26	25			
Units	ng	ng	T	%R	Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	24 J	990	1000	97	
C1-Naphthalenes	3.6 J	5.8 JB			
C2-Naphthalenes	ND	5.4 J			
C3-Naphthalenes	ND	ND			
C4-Naphthalenes	ND	ND			
Acenaphthylene	ND	960	1000	96	
Acenaphthene	ND	960	1000	96	
Biphenyl	27	32 B			
Fluorene	0.86 J	990	1000	99	
C1-Fluorenes	ND	ND			
C2-Fluorenes	ND	ND			
C3-Fluorenes	ND	ND			
Anthracene	ND	700	1000	70	
Phenanthrene	13 J	960	1000	95	
C1-Phenanthrenes/anthracenes	2.2 J	4.6 JB			
C2-Phenanthrenes/anthracenes	ND	ND			
C3-Phenanthrenes/anthracenes	ND	ND			
C4-Phenanthrenes/anthracenes	ND	ND			
Dibenzothiophene	ND	ND			
C1-Dibenzothiophenes	ND	ND			
C2-Dibenzothiophenes	ND	ND			
C3-Dibenzothiophenes	ND	ND			
Fluoranthene	2 J	1100	1000	110	
Pyrene	1.4 J	1000	1000	100	
C1-Fluoranthenes/pyrenes	ND	ND			
C2-Fluoranthenes/pyrenes	ND	ND			
C3-Fluoranthenes/pyrenes	ND	ND			
Benzo[a]anthracene	ND	970	1000	97	
Chrysene	ND	980	1000	98	
C1-Chrysenes	ND	ND			
C2-Chrysenes	ND	ND			
C3-Chrysenes	ND	ND			
C4-Chrysenes	ND	ND			
Benzo[b]fluoranthene	ND	1400	1000	140	&
Benzo[k]fluoranthene	ND	1100	1000	110	
Benzo[e]pyrene	ND	ND			
Benzo[a]pyrene	ND	1100	1000	110	
Perylene	ND	ND			
Indeno[1,2,3,-c,d]pyrene	ND	1200	1000	120	
Dibenzo[a,h]anthracene	ND	1300	1000	130	&
Benzo[g,h,i]perylene	1.6 J	1200	1000	120	
d8-Naphthalene	64	66			
d10-Acenaphthene	68	69			
d10-Phenanthrene	77	76			
d12-Benzo[a]pyrene	64	63			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
Sample Type	ORS				ORS				ORS			
Matrix	OIL				OIL				OIL			
Sample Size	5.1 mg				5.1 mg				5.1 mg			
Weight Basis	OIL				OIL				OIL			
Associated Blank	NA				NA				NA			
Field Date	04/23/02				04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02				04/23/02			
Analysis Date	10/27/02				10/23/02				10/29/02			
Date Received	04/23/02				04/23/02				04/23/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	4.9				4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

Sterane-Triterpane Biomarkers												
T4-C23Diterpane	53	58.9	-10		48.9	58.9	-17		56.8	58.9	-3.56	
S4-Diacholestane	43	46.8	-8.12		41.8	46.8	-10.7		40.3	46.8	-13.9	
S5-Diacholestane	28.2	26.1	8.04		20.4	26.1	-21.8		25.2	26.1	-3.45	
T9-C29Tricyclitriterpane	13.3	15.7	-15.3		13.9	15.7	-11.5		14.3	15.7	-8.92	
T10-C29Tricyclitriterpane	13.2	15	-12		13.8	15	-8		13.2	15	-12	
T11-Trisnorhopane(TS)	20.2	24.8	-18.5		23	24.8	-7.26		22.3	24.8	-10.1	
T12-Trisnorhopane(TM)	24.2	31	-21.9		25.6	31	-17.4		26.2	31	-15.5	
S24-Methylcholestane	25.9	26.2	-1.14		26.8	26.2	2.29		27.3	26.2	4.2	
S25-Ethylcholestane	42.8	39.8	7.54		42	39.8	5.53		46.6	39.8	17.1	
S28-Ethylcholestane	34.6	33.9	2.06		34.3	33.9	1.18		36.1	33.9	6.49	
T15-Norhopane	79.8	83.8	-4.77		81	83.8	-3.34		81.7	83.8	-2.5	
T18-Oleanane		ND				ND				ND		
T19-Hopane	116	113	2.65		118	113	4.42		122	113	7.96	
T21-Homohopane	49.7	46.1	7.81		52.5	46.1	13.9		52.4	46.1	13.7	
T22-Homohopane	33.8	35.2	-3.98		41.8	35.2	18.7		40.7	35.2	15.6	
5B(H)-Cholane	119				117				112			

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control NSC

Field ID	Oil Reference Standard			Oil Reference Standard			Oil Reference Standard			Oil Reference Standard		
Lab ID	BY32ORS			BX28ORS			BX28ORS-1			BX28ORS-2		
Sample Type	ORS			ORS			ORS			ORS		
Matrix	OIL			OIL			OIL			OIL		
Sample Size	5.12 mg			5.04 mg			5.04 mg			5.04 mg		
Weight Basis	OIL			OIL			OIL			OIL		
Associated Blank	NA			NA			DH-S-58PB PCA			DH-S-58PB PCA		
Field Date	03/21/01			12/19/00			12/19/00			12/19/00		
Extract Date	03/21/01			12/19/00			12/19/00			12/19/00		
Analysis Date	03/27/01			03/20/01			03/12/01			03/20/01		
Date Received	03/21/01			12/19/00			12/19/00			12/19/00		
Percent Solids	NA			NA			NA			NA		
Percent Lipids	NA			NA			NA			NA		
Min Reporting Limit	4.88			4.96			4.96			4.96		
Units	mg/Kg	T	%D Q	mg/Kg	T	%D Q	mg/Kg	T	%D Q	mg/Kg	T	%D Q
<b>Sterane-Triterpane Biomarkers</b>												
T4-C23Diterpane	49.2	58.9	-16.5	52.9	58.9	-10.2	54.8	58.9	-6.96	52.9	58.9	-10.2
S4-Diacholestane	35.2	46.8	-24.8	45.2	46.8	-3.42	44.4	46.8	-5.13	45.2	46.8	-3.42
S5-Diacholestane	21	26.1	-19.5	20.3	26.1	-22.2	23.2	26.1	-11.1	20.3	26.1	-22.2
T9-C29Tricyclitriterpane	15.5	15.7	-1.27	18.8	15.7	19.7	15.9	15.7	1.27	18.8	15.7	19.7
T10-C29Tricyclitriterpane	14.7	15	-2	15.2	15	1.33	15.2	15	1.33	15.2	15	1.33
T11-Trisnorhopane(TS)	21.1	24.8	-14.9	20.9	24.8	-15.7	21.9	24.8	-11.7	20.9	24.8	-15.7
T12-Trisnorhopane(TM)	23.6	31	-23.9	24.1	31	-22.2	24.8	31	-20	24.1	31	-22.2
S24-Methylcholestane	26.7	26.2	1.91	24.8	26.2	-5.34	28.5	26.2	8.78	24.8	26.2	-5.34
S25-Ethylcholestane	43.6	39.8	9.55	43	39.8	8.04	43.1	39.8	8.29	43	39.8	8.04
S28-Ethylcholestane	33.7	33.9	-0.59	33.2	33.9	-2.06	34.9	33.9	2.95	33.2	33.9	-2.06
T15-Norhopane	79.5	83.8	-5.13	83	83.8	-0.955	80.6	83.8	-3.82	83	83.8	-0.955
T18-Oleanane	ND			ND			ND			ND		
T19-Hopane	113	113	0	123	113	8.85	116	113	2.65	123	113	8.85
T21-Homohopane	47.5	46.1	3.04	51.5	46.1	11.7	46.7	46.1	1.3	51.5	46.1	11.7
T22-Homohopane	35	35.2	-0.568	38.3	35.2	8.81	33.2	35.2	-5.68	38.3	35.2	8.81
5B(H)-Cholane	110			111			111			111		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: DUP - Surrogate Corrected

Field ID	02-N10-01-PHC-S	02-N10-01-PHC-S DUP			02-N23-01-PHC-S	02-N23-01-PHC-S DUP			02-SAG-01-PHC-S	02-SAG-01-PHC-S		
Sample Type	N	DUP			N	DUP			N	DUP		
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT		
Sample Size	17.49 g	17.46 g			20.88 g	20.97 g			15.41 g	15.2 g		
Weight Basis	DRY	DRY			DRY	DRY			DRY	DRY		
Associated Blank	DY-S-66PB	DY-S-66PB			DY-S-63PB	DY-S-63PB			DY-S-69PB	DY-S-69PB		
Field Date	08/02/02	08/02/02			08/05/02	08/05/02			08/14/02	08/14/02		
Extract Date	10/16/02	10/16/02			10/15/02	10/15/02			10/17/02	10/17/02		
Analysis Date	10/30/02	10/30/02			10/26/02	10/26/02			10/31/02	11/01/02		
Date Received	08/15/02	08/15/02			08/15/02	08/15/02			08/23/02	08/23/02		
Percent Solids	57.2	57.2			68.5	68.5			50.4	50.4		
Dilution Factor	1	1			1	1			1	1		
Percent Lipids	NA	NA			NA	NA			NA	NA		
Min Reporting Limit	0.71	0.72			0.6	1.2			0.81	0.82		
Units	ug/Kg	ug/Kg	RPD	Q	ug/Kg	ug/Kg	RPD	Q	ug/Kg	ug/Kg	RPD	Q
<b>Sterane-Triterpane Biomarkers</b>												
T4-C23Diterpane	0.77	0.8	3.8		0.89	0.91 J	2.2		0.68 J	0.73 J	7.1	
S4-Diacholestane	1.1	1.1	0		1.4	1.3	7.4		1.5	1.5	0	
S5-Diacholestane	0.67 J	0.65 J	3		0.67	0.81 J	19		1.1	0.89	21	
T9-C29Tricyclitriterpane	0.17 J	0.22 J	26		0.26 J	0.26 J	0		0.33 J	0.24 J	32	
T10-C29Tricyclitriterpane	0.16 J	0.16 J	0		0.25 J	0.24 J	4.1		0.26 J	0.26 J	0	
T11-Trisnorhopane(TS)	1.1	1.1	0		1.2	1.2	0		1.4	1.4	0	
T12-Trisnorhopane(TM)	3.5	3.5	0		3.3	3.4	3		3.4	3.4	0	
S24-Methylcholestane	3	2.9	3.4		2.7	2.9	7.1		2.4	2.5	4.1	
S25-Ethylcholestane	0.62 J	0.63 J	1.6		0.93	0.86 J	7.8		0.98	1	2	
S28-Ethylcholestane	18	19	5.4		13	14	7.4		13	14	7.4	
T15-Norhopane	7.3	7.2	1.4		7.9	7.7	2.6		6	6	0	
T18-Oleanane	ND	ND			ND	ND			ND	ND		
T19-Hopane	8	7.9	1.2		8.3	8.3	0		8.9	9.2	3.3	
T21-Homohopane	3	3.1	3.3		3.3	3.6	8.7		2.8	2.8	0	
T22-Homohopane	8	7.7	3.8		6.8	6.4	6.1		22	21	4.6	
5B(H)-Cholane	92	87			75	71			69	81		

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

Field ID	00-N06-01-PHC-S	00-N06-01-PHC-S DUP		00-N09-01-PHC-S	00-N09-01-PHC-S		00-C0L-01-PHC-S	00-C0L-01-PHC-S DUP	
Lab ID	20A3468 REF F1	20A3468DUP REF F1		20A3528 F1	20A3528DUP F1		20A3500 F1	20A3500DUP F1	
Sample Type	N	DUP		N	DUP		N	DUP	
Matrix	SEDIMENT	SEDIMENT		SEDIMENT	SEDIMENT		SEDIMENT	SEDIMENT	
Sample Size	19.64 g	19.2 g		19.82 g	19.96 g		24.52 g	24.52 g	
Weight Basis	DRY	DRY		DRY	DRY		DRY	DRY	
Associated Blank	DH-S-55PB F1	DH-S-55PB F1		DH-S-61PB F1	DH-S-61PB F1		DH-S-58PB PCA	DH-S-58PB PCA	
Field Date	08/17/00	08/17/00		08/18/00	08/18/00		08/24/00	08/24/00	
Extract Date	02/20/01	02/20/01		03/08/01	03/08/01		03/07/01	03/07/01	
Analysis Date	03/27/01	03/27/01		03/20/01	03/20/01		03/15/01	03/15/01	
Date Received	08/30/00	08/30/00		08/30/00	08/30/00		08/30/00	08/30/00	
Percent Solids	63.8	63.8		65.8	65.8		79.7	79.7	
Percent Lipids	NA	NA		NA	NA		NA	NA	
Min Reporting Limit	0.64	0.65		0.63	0.63		0.51	0.51	
Units	ug/Kg	ug/Kg	RPD Q	ug/Kg	ug/Kg	RPD Q	ug/Kg	ug/Kg	RPD Q

**Sterane-Triterpane Biomarkers**

T4-C23Diterpane	0.73	0.62 J	16	0.28 J	0.28 J	0	0.5 J	0.57	13
S4-Diacholestane	0.97	0.82	17	0.39 J	0.38 J	2.6	0.4 J	0.44 J	9.5
S5-Diacholestane	0.49 J	0.5 J	2	0.26 J	0.24 J	8	0.27 J	0.32 J	17
T9-C29Tricyclitriterpane	0.48 J	0.18 J	91 &	0.17 J	0.075 J	78 &	0.12 J	0.13 J	8
T10-C29Tricyclitriterpane	0.17 J	0.17 J	0	0.21 J	0.078 J	92 &	0.11 J	0.13 J	17
T11-Trisnorhopane(TS)	0.91	0.82	10	0.38 J	0.43 J	12	0.43 J	0.49 J	13
T12-Trisnorhopane(TM)	2.3	2.3	0	1.1	1.2	8.7	1.8	1.8	0
S24-Methylcholestane	2.4	2.4	0	1.1	1.1	0	2	2.7	30
S25-Ethylcholestane	0.54 J	0.57 J	5.4	0.31 J	0.29 J	6.7	0.46 J	0.4 J	14
S28-Ethylcholestane	9.7	10	3	5.1	5	2	6.7	8.7	26
T15-Norhopane	5.7	5.6	1.8	3.2	2.7	17	3.3	3.4	3
T18-Oleanane	0.098 J	0.1 J	2	ND	ND		ND	ND	
T19-Hopane	6.5	6.3	3.1	2.9	3.2	9.8	4.2	4.6	9.1
T21-Homohopane	2.4	2.7	12	1.4	1.2	15	1.4	1.4	0
T22-Homohopane	5.1	5.1	0	2.9	2.7	7.1	4.9	5.8	17

5B(H)-Cholane	77	75		83	77		93	94	
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Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Procedural Blank	Procedural Blank
Sample Type	PB	PB	PB
Matrix	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	20 g	20 g	20 g
Weight Basis	DRY	DRY	DRY
Associated Blank	NA	NA	NA
Field Date	10/16/02	10/15/02	10/17/02
Extract Date	10/16/02	10/15/02	10/17/02
Analysis Date	10/28/02	10/24/02	10/29/02
Date Received	10/16/02	10/15/02	10/17/02
Percent Solids	100	100	100
Dilution Factor	1	1	1
Percent Lipids	NA	NA	NA
Min Reporting Limit	0.62	0.62	0.62
Units	ug/Kg	ug/Kg	ug/Kg

### Sterane-Triterpane Biomarkers

T4-C23Diterpane	ND	ND	ND
S4-Diacholestane	ND	ND	ND
S5-Diacholestane	ND	ND	ND
T9-C29Tricyclitriterpane	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND
T11-Trisnorhopane(TS)	ND	ND	ND
T12-Trisnorhopane(TM)	ND	ND	ND
S24-Methylcholestane	ND	ND	ND
S25-Ethylcholestane	ND	ND	ND
S28-Ethylcholestane	ND	ND	ND
T15-Norhopane	ND	ND	ND
T18-Oleanane	ND	ND	ND
T19-Hopane	ND	ND	ND
T21-Homohopane	ND	ND	ND
T22-Homohopane	ND	ND	ND
5B(H)-Cholane	87	71	84

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Procedural Blank	Procedural Blank
Lab ID	DH-S-55PB F1	DH-S-61PB F1	DH-S-58PB PCA
Sample Type	PB	PB	PB
Matrix	SEDIMENT	SEDIMENT	SEDIMENT
Sample Size	20 g	20 g	20 g
Weight Basis	DRY	DRY	DRY
Associated Blank	NA	NA	DH-S-58PB PCA
Field Date	02/20/01	03/08/01	03/07/01
Extract Date	02/20/01	03/08/01	03/07/01
Analysis Date	03/27/01	03/20/01	03/20/01
Date Received	02/20/01	03/08/01	03/07/01
Percent Solids	100	100	100
Percent Lipids	NA	NA	NA
Min Reporting Limit	1.2	0.62	0.62
Units	ug/Kg	ug/Kg	ug/Kg

**Sterane-Triterpane Biomarkers**

T4-C23Diterpane	ND	ND	ND
S4-Diacholestane	ND	ND	ND
S5-Diacholestane	ND	ND	ND
T9-C29Tricyclitriterpane	ND	ND	ND
T10-C29Tricyclitriterpane	ND	ND	ND
T11-Trisnorhopane(TS)	ND	ND	ND
T12-Trisnorhopane(TM)	ND	ND	ND
S24-Methylcholestane	ND	ND	ND
S25-Ethylcholestane	ND	ND	ND
S28-Ethylcholestane	ND	ND	ND
T15-Norhopane	ND	ND	ND
T18-Oleanane	ND	ND	ND
T19-Hopane	ND	ND	ND
T21-Homohopane	ND	ND	ND
T22-Homohopane	ND	ND	ND

5B(H)-Cholane	85	75	85
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Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike				Procedural Blank	Blank Spike
Sample Type	PB	BS				PB	BS
Matrix	SEDIMENT	SEDIMENT				SEDIMENT	SEDIMENT
Sample Size	20 g	20 g				20 g	20 g
Weight Basis	DRY	DRY				DRY	DRY
Associated Blank	NA	EB-S-63PB				NA	DY-S-66PB
Field Date	02/21/03	02/21/03				10/16/02	10/16/02
Extract Date	02/21/03	02/21/03				10/16/02	10/16/02
Analysis Date	02/28/03	03/01/03				10/25/02	10/25/02
Date Received	02/21/03	02/21/03				10/16/02	10/16/02
Percent Solids	100	100				100	100
Dilution Factor	1	1				1	1
Percent Lipids	NA	NA				NA	NA
Min Reporting Limit	0.025	0.025				0.025	0.025
Units	mg/Kg	mg/Kg	T	%R	Q	mg/Kg	mg/Kg
<b>SHC/TPH</b>							
n-Nonane	ND	ND				ND	ND
n-Decane	ND	0.71	1.25	57		0.0015 J	1.2
n-Undecane	ND	ND				ND	0.0011 J
n-Dodecane	ND	ND				0.0016 J	0.002 JB
n-Tridecane	ND	ND				ND	0.0012 J
Isoprenoid RRT 1380	ND	ND				ND	ND
n-Tetradecane	ND	0.003 J				0.002 J	0.0075 JB
Isoprenoid RRT 1470	ND	ND				ND	0.0014 J
n-Pentadecane	ND	1	1.25	80		ND	1.9
n-Hexadecane	ND	0.0013 J				0.016 J	0.015 JB
Isoprenoid RRT 1650	ND	ND				ND	0.0014 J
n-Heptadecane	ND	ND				0.00086 J	0.0022 JB
Pristane	ND	1.1	1.25	88		ND	2.3
n-Octadecane	ND	0.0011 J				0.0015 J	0.003 JB
Phytane	ND	0.006 J				ND	0.012 J
n-Nonadecane	ND	ND				ND	0.0022 J
n-Eicosane	ND	1.2	1.25	96		0.0012 J	2.4
n-Heneicosane	ND	0.00086 J				0.0014 J	0.0039 JB
n-Docosane	0.0012 J	0.0015 JB				0.0021 J	0.0047 JB
n-Tricosane	0.0045 J	0.004 JB				0.005 J	0.0083 JB
n-Tetracosane	0.0034 J	0.0054 JB				0.0058 J	0.016 JB
n-Pentacosane	0.0068 J	1.3	1.25	103		0.0086 J	2.4
n-Hexacosane	0.0079 J	0.013 JB				0.0098 J	0.036 B
n-Heptacosane	0.011 J	0.011 JB				0.012 J	0.036 B
n-Octacosane	0.0085 J	0.011 JB				0.011 J	0.038 B
n-Nonacosane	0.0082 J	0.012 JB				0.011 J	0.041 B
n-Triacontane	0.0072 J	1.2	1.25	95		0.0081 J	2.3
n-Hentriacontane	0.0061 J	0.0072 JB				0.0076 J	0.029 B
n-Dotriacontane	0.0031 J	0.0095 JB				0.004 J	0.027
n-Tritriacontane	0.0034 J	0.004 JB				0.0027 J	0.012 JB
n-Tetracontane	0.0035 J	1.1	1.25	88		0.0012 J	2.3
n-Pentatriacontane	0.0013 J	0.0034 JB				ND	0.0078 J
n-Hexatriacontane	0.002 J	1	1.25	80		ND	2.2
n-Heptatriacontane	ND	ND				ND	0.0016 J
n-Octatriacontane	ND	ND				ND	0.0036 J
n-Tetracontane	ND	ND				ND	0.0025 J
TPH (RES)	0.4 J	9.6				0.35 J	17
TPH	0.4 J	9.6				0.35 J	17
%ortho-terphenyl	NA	NA				NA	NA
%5A-androstane	75	74				86	93
%d50-tetracosane	86	83				102	106

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank			Blank Spike			Procedural Blank		
Sample Type	PB			BS			PB		
Matrix	SEDIMENT			SEDIMENT			SEDIMENT		
Sample Size	20 g			20 g			20 g		
Weight Basis	DRY			DRY			DRY		
Associated Blank	NA			DZ-S-03PB			NA		
Field Date	10/28/02			10/28/02			10/30/02		
Extract Date	10/28/02			10/28/02			10/30/02		
Analysis Date	11/04/02			11/05/02			11/07/02		
Date Received	10/28/02			10/28/02			10/30/02		
Percent Solids	100			100			100		
Dilution Factor	1			1			1		
Percent Lipids	NA			NA			NA		
Min Reporting Limit	0.025			0.025			0.025		
Units	T	%R	Q	mg/Kg	mg/Kg	T	%R	Q	mg/Kg
<b>SHC/TPH</b>									
n-Nonane				ND	ND				ND
n-Decane	2.5	48		0.0017 J	1.2	2.5	48		0.0013 J
n-Undecane				0.0013 J	0.0014 JB				0.00083 J
n-Dodecane				0.0032 J	0.0041 JB				0.0019 J
n-Tridecane				0.0017 J	0.0016 JB				0.00092 J
Isoprenoid RRT 1380				ND	ND				ND
n-Tetradecane				0.0037 J	0.0086 JB				0.0028 J
Isoprenoid RRT 1470				ND	0.0018 J				ND
n-Pentadecane	2.5	76		0.0011 J	1.7	2.5	68		0.00084 J
n-Hexadecane				0.0035 J	0.021 J				0.0053 J
Isoprenoid RRT 1650				0.0012 J	0.0013 JB				0.001 J
n-Heptadecane				0.0018 J	ND				0.0011 J
Pristane	2.5	92		ND	2	2.5	80		ND
n-Octadecane				0.0035 J	0.004 JB				0.0019 J
Phytane				ND	0.0098 J				ND
n-Nonadecane				0.0019 J	0.0024 JB				0.0012 J
n-Eicosane	2.5	96		0.0037 J	2.3	2.5	92		0.005 J
n-Heneicosane				0.0052 J	0.0025 JB				0.0081 J
n-Docosane				0.007 J	0.0038 JB				0.0079 J
n-Tricosane				0.012 J	0.0087 JB				0.012 J
n-Tetracosane				0.016 J	0.016 JB				0.015 J
n-Pentacosane	2.5	96		0.023 J	2.3	2.5	91		0.02 J
n-Hexacosane				0.026	0.03 B				0.023 J
n-Heptacosane				0.031	0.026 B				0.028
n-Octacosane				0.028	0.025 B				0.026
n-Nonacosane				0.027	0.027 B				0.025
n-Triacontane	2.5	92		0.021 J	2.3	2.5	91		0.019 J
n-Hentriacontane				0.018 J	0.017 JB				0.017 J
n-Dotriacontane				0.011 J	0.02 JB				0.01 J
n-Tritriacontane				0.0066 J	0.0075 JB				0.0062 J
n-Tetracontane	2.5	92		0.0034 J	2.2	2.5	88		0.0029 J
n-Pentatriacontane				0.0018 J	0.0064 JB				0.0016 J
n-Hexatriacontane	2.5	88		0.00081 J	2.1	2.5	84		ND
n-Heptatriacontane				ND	0.0011 J				ND
n-Octatriacontane				ND	0.003 J				ND
n-Tetracontane				ND	0.0021 J				ND
TPH (RES)				0.52 J	17				0.35 J
TPH				0.52 J	17				0.35 J
%ortho-terphenyl				NA	NA				NA
%5A-androstane				82	83				80
%d50-tetracosane				108	96				108

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Blank Spike				Procedural Blank				Blank Spike
Sample Type	BS				PB				BS
Matrix	SEDIMENT				SEDIMENT				SEDIMENT
Sample Size	20 g				25 g				25 g
Weight Basis	DRY				DRY				DRY
Associated Blank	DZ-S-29PB				NA				DZ-S-65PB
Field Date	10/30/02				11/20/02				11/20/02
Extract Date	10/30/02				11/20/02				11/20/02
Analysis Date	11/07/02				11/26/02				11/26/02
Date Received	10/30/02				11/20/02				11/20/02
Percent Solids	100				100				100
Dilution Factor	1				1				1
Percent Lipids	NA				NA				NA
Min Reporting Limit	0.025				0.02				0.02
Units	mg/Kg	T	%R	Q	mg/Kg	mg/Kg	T	%R	Q
<b>SHC/TPH</b>									
n-Nonane	ND				ND				
n-Decane	0.98	2.5	39		0.0026 J	1.1	2	55	
n-Undecane	ND				0.0013 J	0.001 JB			
n-Dodecane	0.0017 JB				0.0033 J	0.0023 JB			
n-Tridecane	0.00089 JB				0.0014 J	0.0012 JB			
Isoprenoid RRT 1380	ND				ND				
n-Tetradecane	0.0057 JB				0.0045 J	0.0068 JB			
Isoprenoid RRT 1470	0.00093 J				ND	0.0011 J			
n-Pentadecane	1.5	2.5	60		0.0012 J	1.6	2	80	
n-Hexadecane	0.0026 JB				0.0068 J	0.018 JB			
Isoprenoid RRT 1650	ND				ND	0.00088 J			
n-Heptadecane	0.0018 JB				0.0015 J	ND			
Pristane	2	2.5	80		ND	1.9	2	95	
n-Octadecane	0.0029 JB				0.0026 J	0.0031 JB			
Phytane	0.011 J				ND	0.0098 J			
n-Nonadecane	0.0018 JB				0.0012 J	0.0018 JB			
n-Eicosane	2.2	2.5	88		0.0023 J	2	2	100	
n-Heneicosane	0.0035 JB				0.0021 J	0.0064 JB			
n-Docosane	0.0049 JB				0.0045 J	0.0068 JB			
n-Tricosane	0.0087 JB				0.012 J	0.011 JB			
n-Tetracosane	0.014 JB				0.019 J	0.02 B			
n-Pentacosane	2.2	2.5	87		0.031	2	2	98	
n-Hexacosane	0.022 JB				0.037	0.038 B			
n-Heptacosane	0.016 JB				0.045	0.038 B			
n-Octacosane	0.015 JB				0.042	0.037 B			
n-Nonacosane	0.017 JB				0.039	0.039 B			
n-Triacontane	2.2	2.5	87		0.031	2	2	98	
n-Hentriacontane	0.01 JB				0.026	0.024 B			
n-Dotriacontane	0.016 JB				0.016 J	0.023 B			
n-Tritriacontane	0.005 JB				0.01 J	0.0098 JB			
n-Tetracontane	2.1	2.5	84		0.0054 J	1.9	2	95	
n-Pentatriacontane	0.0059 JB				0.0026 J	0.0071 JB			
n-Hexatriacontane	2	2.5	80		0.0012 J	1.8	2	90	
n-Heptatriacontane	0.0012 J				0.0007 J	0.0017 JB			
n-Octatriacontane	0.003 J				ND	0.0033 J			
n-Tetracontane	0.002 J				ND	0.0024 J			
TPH (RES)	15				1.3	15			
TPH	15				1.3	15			
%ortho-terphenyl	NA				NA	NA			
%5A-androstane	84				84	92			
%d50-tetracosane	104				102	108			

	02-L01-01-PHC-S		02-L01-01-PHC-S		02-N10-01-PHC-S		02-N10-01-PHC-S		02-N23-01-PHC-S		02-N23-01-PHC-S		02-SAG-01-PHC-S	
Field ID	02-L01-01-PHC-S		02-L01-01-PHC-S		02-N10-01-PHC-S		02-N10-01-PHC-S		02-N23-01-PHC-S		02-N23-01-PHC-S		02-SAG-01-PHC-S	
Sample Type	N		DUP		N		DUP		N		DUP		N	
Matrix	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
Sample Size	23.63 g		23.65 g		17.49 g		17.46 g		20.6 g		20.65 g		15.32 g	
Weight Basis	DRY		DRY		DRY		DRY		DRY		DRY		DRY	
Associated Blank	EB-S-63PB		EB-S-63PB		DY-S-66PB		DY-S-66PB		DZ-S-03PB		DZ-S-03PB		DZ-S-29PB	
Field Date	07/31/02		07/31/02		08/02/02		08/02/02		08/05/02		08/05/02		08/14/02	
Extract Date	02/21/03		02/21/03		10/16/02		10/16/02		10/28/02		10/28/02		10/30/02	
Analysis Date	03/03/03		03/03/03		10/25/02		10/25/02		11/06/02		11/06/02		11/07/02	
Date Received	08/15/02		08/15/02		08/15/02		08/15/02		08/15/02		08/15/02		08/23/02	
Percent Solids	78.6		78.6		57.2		57.2		68.5		68.5		50.4	
Dilution Factor	1		1		1		1		1		1		1	
Percent Lipids	NA		NA		NA		NA		NA		NA		NA	
Min Reporting Limit	0.021		0.021		0.028		0.029		0.024		0.024		0.033	
Units	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
			RPD	Q			RPD	Q			RPD	Q		
<b>SHC/TPH</b>														
n-Nonane	ND	ND			0.007 J	0.0062 J	12		0.0043 J	0.0041 J	4.8		0.0034 J	
n-Decane	0.0023 J	0.002 J	14		0.016 J	0.014 J	13		0.0094 J	0.011 J	16		0.0098 J	
n-Undecane	0.0019 J	0.0022 J	15		0.022 J	0.019 J	15		0.012 J	0.014 J	15		0.017 J	
n-Dodecane	0.0051 J	0.0036 J	34		0.03	0.025 J	18		0.02 J	0.022 J	9.5		0.03 J	
n-Tridecane	0.005 J	0.0045 J	10		0.038	0.034	11		0.029	0.03	3.4		0.047	
Isoprenoid RRT 1380	0.002 J	0.0015 J	28		0.012 J	0.01 J	18		0.0084 J	0.0086 J	2.4		0.014 J	
n-Tetradecane	0.0052 J	0.005 J	3.9		0.045	0.043	4.5		0.035	0.034	2.9		0.06	
Isoprenoid RRT 1470	0.0038 J	0.0033 J	14		0.029	0.026 J	11		0.02 J	0.02 J	0		0.039	
n-Pentadecane	0.0076 J	0.0069 J	9.6		0.062	0.059	5		0.049	0.048	2.1		0.13	
n-Hexadecane	0.01 J	0.0098 J	2		0.059 B	0.055 B	7		0.047	0.047	0		0.1	
Isoprenoid RRT 1650	0.0038 J	0.0027 J	34		0.028	0.025 J	11		0.023 J	0.021 J	9.1		0.029 J	
n-Heptadecane	0.015 J	0.014 J	6.9		0.096	0.091	5.3		0.068	0.065	4.5		0.22	
Pristane	0.0086 J	0.0078 J	9.8		0.069	0.064	7.5		0.056	0.056	0		0.081	
n-Octadecane	0.012 J	0.011 J	8.7		0.068	0.063	7.6		0.051	0.053	3.8		0.086	
Phytane	0.0055 J	0.004 J	32		0.028	0.026 J	7.4		0.028	0.026	7.4		0.027 J	
n-Nonadecane	0.015 J	0.013 J	14		0.11	0.11	0		0.083	0.081	2.4		0.16	
n-Eicosane	0.016 J	0.014 J	13		0.1	0.096	4.1		0.081	0.076	6.4		0.14	
n-Heneicosane	0.022	0.02 J	9.5		0.19	0.19	5.4		0.14	0.15	6.9		0.29	
n-Docosane	0.019 J	0.018 J	5.4		0.15	0.14	6.9		0.11	0.12	8.7		0.22	
n-Tricosane	0.039	0.039	0		0.39	0.37	5.3		0.25	0.26	3.9		0.58	
n-Tetracosane	0.022	0.02 J	9.5		0.14	0.14	0		0.11	0.11	0		0.19	
n-Pentacosane	0.046	0.047	2.2		0.39	0.38	2.6		0.29	0.29	0		0.67	
n-Hexacosane	0.024 B	0.022 B	8.7		0.11	0.13	17		0.094 B	0.096 B	2.1		0.15	
n-Heptacosane	0.066	0.067	1.5		0.53	0.53	0		0.44	0.44	0		0.96	
n-Octacosane	0.022 B	0.02 JB	9.5		0.091	0.11	19		0.084 B	0.086 B	2.4		0.12 B	
n-Nonacosane	0.054	0.057	5.4		0.41	0.41	0		0.42	0.41	2.4		0.7	
n-Triacontane	0.015 JB	0.012 JB	22		0.28	0.31	10		0.05 B	0.054 B	7.7		0.24	
n-Hentriacontane	0.045	0.041	9.3		0.35	0.35	0		0.3	0.35	2.8		0.59	
n-Dotriacontane	0.011 JB	0.0097 JB	12		0.027 J	0.036	28		0.03 B	0.031 B	3.3		0.045 B	
n-Tritriacontane	0.016 JB	0.012 JB	28		0.1	0.1	0		0.11	0.11	0		0.18	
n-Tetracontane	0.0051 JB	0.003 JB	52 &		0.012 J	0.014 J	15		0.011 JB	0.012 JB	8.7		0.018 J	
n-Pentatriacontane	0.0053 JB	0.003 JB	55 &		0.02 J	0.02 J	0		0.021 J	0.021 J	0		0.051	
n-Hexatriacontane	0.0031 JB	ND			0.005 J	0.0048 J	4.1		0.0048 J	0.0049 J	2.1		0.008 J	
n-Heptatriacontane	0.0026 J	ND			0.0049 J	0.0047 J	4.2		0.0056 J	0.0056 J	0		0.0086 J	
n-Octatriacontane	0.0024 J	ND			0.0035 J	0.0035 J	0		0.0042 J	0.004 J	4.9		0.0068 J	
n-Tetracontane	ND	ND			0.0027 J	0.0023 J	16		0.0026 J	0.0029 J	11		0.0046 J	
TPH (RES)	1 B	0.96 B	4.1		6.1	5.9	3.3		5.1	4.9	4		9.5	
TPH	2.9	4.7	47 &		11	9.8	12		9.6	8.9	7.6		18	
%ortho-terphenyl	NA	NA			NA	NA			NA	NA			NA	
%5A-androstane	76	79			93	96			95	94			97	
%d50-tetracosane	79	81			96	99			105	106			103	

	02-SAG-01-PHC-S		02-L09-01-PHC-S		02-L09-01-PHC-S	
Field ID	DUP		DUP		DUP	
Sample Type	DUP		N		DUP	
Matrix	SEDIMENT		SEDIMENT		SEDIMENT	
Sample Size	15.33 g		23.63 g		23.63 g	
Weight Basis	DRY		DRY		DRY	
Associated Blank	DZ-S-29PB		DZ-S-65PB		DZ-S-65PB	
Field Date	08/14/02		07/30/02		07/30/02	
Extract Date	10/30/02		11/20/02		11/20/02	
Analysis Date	11/07/02		11/26/02		11/27/02	
Date Received	08/23/02		08/15/02		08/15/02	
Percent Solids	50.4		78.7		78.7	
Dilution Factor	1		1		1	
Percent Lipids	NA		NA		NA	
Min Reporting Limit	0.033		0.021		0.021	
Units	mg/Kg	RPD Q	mg/Kg		mg/Kg	RPD Q
<b>SHC/TPH</b>						
n-Nonane	0.0035 J	2.9	0.0012 J		0.0014 J	15
n-Decane	0.0083 J	16	0.0036 JB		0.0036 JB	0
n-Undecane	0.017 J	0	0.0032 JB		0.0038 JB	17
n-Dodecane	0.029 J	3.4	0.0049 JB		0.0062 JB	23
n-Tridecane	0.046	2.2	0.006 JB		0.0069 JB	14
Isoprenoid RRT 1380	0.014 J	0	0.0022 J		0.0024 J	8.7
n-Tetradecane	0.059	1.7	0.0086 JB		0.0091 JB	5.6
Isoprenoid RRT 1470	0.039	0	0.0056 J		0.0057 J	1.8
n-Pentadecane	0.13	0	0.011 J		0.011 J	0
n-Hexadecane	0.083	18	0.032 B		0.023 B	33
Isoprenoid RRT 1650	0.03 J	3.4	0.0065 J		0.0068 J	4.5
n-Heptadecane	0.21	4.6	0.016 J		0.016 J	0
Pristane	0.086	6	0.014 J		0.012 J	15
n-Octadecane	0.083	3.6	0.013 J		0.013 J	0
Phytane	0.026 J	3.8	0.0055 J		0.005 J	9.5
n-Nonadecane	0.16	0	0.019 J		0.02 J	5.1
n-Eicosane	0.14	0	0.03		0.042	33
n-Heneicosane	0.29	0	0.03		0.053	55 &
n-Docosane	0.21	4.6	0.026		0.042	47 &
n-Tricosane	0.61	5	0.055 B		0.064	15
n-Tetracosane	0.21	10	0.032 B		0.044 B	32
n-Pentacosane	0.87	26	0.072 B		0.085 B	16
n-Hexacosane	0.19	24	0.044 B		0.058 B	27
n-Heptacosane	1.2	22	0.1 B		0.12 B	18
n-Octacosane	0.15	22	0.048 B		0.064 B	28
n-Nonacosane	0.78	11	0.083 B		0.1 B	18
n-Triacontane	0.25	4.1	0.055 B		0.066 B	18
n-Hentriacontane	0.63	6.6	0.066 B		0.076 B	14
n-Dotriacontane	0.053	16	0.017 JB		0.026 B	42 &
n-Tritriacontane	0.19	5.4	0.019 JB		0.024 B	23
n-Tetracontane	0.019 J	5.4	0.0054 JB		0.007 JB	26
n-Pentatriacontane	0.053	3.8	0.0047 JB		0.0055 JB	16
n-Hexatriacontane	0.0086 J	7.2	0.0018 JB		0.0018 JB	0
n-Heptatriacontane	0.0086 J	0	0.0013 JB		0.0012 JB	8
n-Octatriacontane	0.0061 J	11	ND		ND	
n-Tetracontane	0.005 J	8.3	ND		ND	
TPH (RES)	10	5.1	1.5 B		1.6 B	6.4
TPH	18	0	2 B		2 B	0
%ortho-terphenyl	NA		NA		NA	
%5A-androstane	100		75		71	
%d50-tetracosane	109		80		76	

Field ID Sample Type Matrix Sample Size Weight Basis Associated Blank Field Date Extract Date Analysis Date Date Received Percent Solids Dilution Factor Percent Lipids Min Reporting Limit Units	Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 02/26/03 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg WET NA 05/16/02 05/16/02 03/03/03 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 10/24/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 05/16/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/04/02 05/16/02 NA 1 NA 0.199 ug/mg			
	T	%D	Q		T	%D	Q		T	%D	Q		T	%D	Q		T	%D	Q	
<b>SHC/TPH</b>																				
n-Nonane	5.62	4.8	17.1		5.18	4.8	7.92		5.23	4.8	8.96		5.18	4.8	7.92		5.14	4.8	7.08	
n-Decane	4.51	4.2	7.38		4.37	4.2	4.05		4.41	4.2	5		4.26	4.2	1.43		4.32	4.2	2.86	
n-Undecane	4.77	4.3	10.9		4.66	4.3	8.37		4.24	4.3	-1.4		4.3	4.3	0		4.18	4.3	-2.79	
n-Dodecane	4.27	4	6.75		4.07	4	1.75		4.13	4	3.25		4.14	4	3.5		4.14	4	3.5	
n-Tridecane	4.31	4	7.75		3.9	4	-2.5		3.64	4	-9		3.79	4	-5.25		3.66	4	-8.5	
n-Tetradecane	1.04	1	4		1.1	1	10		1.3	1	30		1.3	1	30		1.26	1	26	
Isoprenoid RRT 1380	4.78	4.2	13.8		4.78	4.2	13.8		4.69	4.2	11.7		4.6	4.2	9.52		4.35	4.2	3.57	
Isoprenoid RRT 1470	1.58	1.4	12.8		1.47	1.4	5		1.53	1.4	9.28		1.52	1.4	8.57		1.46	1.4	4.28	
n-Pentadecane	4.14	3.7	11.9		4.09	3.7	10.5		3.53	3.7	-4.59		3.54	3.7	-4.32		3.61	3.7	-2.43	
n-Hexadecane	3.52	3.2	10		3.24	3.2	1.25		3.38	3.2	5.62		3.39	3.2	5.94		3.35	3.2	4.69	
Isoprenoid RRT 1650	1.6	1.5	6.67		1.39	1.5	-7.33		1.5	1.5	0		1.68	1.5	12		1.47	1.5	-2	
n-Heptadecane	3.48	3.2	8.75		3.5	3.2	9.37		3	3.2	-6.25		2.86	3.2	-10.6		2.76	3.2	-13.8	
Pristane	2.14	2.2	-2.73		2.26	2.2	2.73		2.33	2.2	5.91		2.05	2.2	-6.82		2.03	2.2	-7.73	
n-Octadecane	2.8	2.9	-3.45		2.83	2.9	-2.41		2.43	2.9	-16.2		2.76	2.9	-4.83		2.47	2.9	-14.8	
Phytane	1.51	1.6	-5.62		1.55	1.6	-3.12		1.41	1.6	-11.9		1.36	1.6	-15		1.43	1.6	-10.6	
n-Nonadecane	2.46	2.6	-5.38		2.41	2.6	-7.31		2.28	2.6	-12.3		2.43	2.6	-6.54		2.37	2.6	-8.85	
n-Eicosane	2.56	2.7	-5.18		2.54	2.7	-5.92		2.37	2.7	-12.2		2.59	2.7	-4.07		2.42	2.7	-10.4	
n-Heneicosane	2.31	2.4	-3.75		2.24	2.4	-6.67		2.21	2.4	-7.92		2.22	2.4	-7.5		2.36	2.4	-1.67	
n-Docosane	2.24	2.2	1.82		2.19	2.2	-0.454		2.33	2.2	5.91		2.2	2.2	0		2.33	2.2	5.91	
n-Tricosane	2.15	2	7.5		2.09	2	4.5		2.05	2	2.5		2.05	2	2.5		2.07	2	3.5	
n-Tetracosane	1.96	2	-2		1.9	2	-5		1.88	2	-6		1.89	2	-5.5		1.92	2	-4	
n-Pentacosane	1.69	1.7	-0.588		1.66	1.7	-2.35		1.73	1.7	1.76		1.62	1.7	-4.7		1.74	1.7	2.35	
n-Hexacosane	1.51	1.5	0.667		1.47	1.5	-2		1.53	1.5	2		1.46	1.5	-2.67		1.55	1.5	3.33	
n-Heptacosane	1.25	1.2	4.17		1.22	1.2	1.67		1.1	1.2	-8.33		1.09	1.2	-9.17		1.08	1.2	-10	
n-Octacosane	0.967	0.9	9.89		0.918	0.9	4.32		0.94	0.9	6.82		0.922	0.9	4.77		0.924	0.9	5	
n-Nonacosane	0.842	0.8	3.95		0.834	0.8	2.96		0.732	0.8	-9.63		0.758	0.8	-6.42		0.728	0.8	-10.1	
n-Triacontane	0.663	0.7	2		0.66	0.7	1.54		0.641	0.7	-1.38		0.671	0.7	3.23		0.672	0.7	3.38	
n-Hentriacontane	0.589	0.6	1.55		0.569	0.6	-1.9		0.58	0.6	0		0.748	0.6	29		0.591	0.6	1.9	
n-Dotriacontane	0.448	0.4	1.82		0.448	0.4	1.82		0.408	0.4	-7.27		0.427	0.4	-2.95		0.422	0.4	-4.09	
n-Tritriacontane	0.368	0.4	-8		0.36	0.4	-10		0.383	0.4	-4.25		0.375	0.4	-6.25		0.35	0.4	-12.5	
n-Tetracontane	0.369	0.4	5.43		0.374	0.4	6.86		0.342	0.4	-2.28		0.365	0.4	4.28		0.34	0.4	-2.86	
n-Pentatriacontane	0.35	0.4	0		0.327	0.4	-6.57		0.441	0.4	26		0.377	0.4	7.71		0.418	0.4	19.4	
n-Hexatriacontane	0.198 J	0.2	-13.9		0.216	0.2	-6.09		0.233	0.2	1.3		0.28	0.2	21.7		0.235	0.2	21.7	
n-Heptatriacontane	0.23	0.2	0		0.257	0.2	11.7		0.234	0.2	1.74		0.24	0.2	4.35		0.23	0.2	0	
n-Octatriacontane	0.225	0.2	2.27		0.215	0.2	-2.27		0.23	0.2	4.54		0.226	0.2	2.73		0.219	0.2	-0.454	
n-Tetracontane	0.18 J	0.2	-5.26		0.187 J	0.2	-1.58		0.177 J	0.2	-6.84		0.18 J	0.2	-5.26		0.161 J	0.2	-15.3	
TPH (RES)	198	220	-10		195	220	-11.4		184	220	-16.4		171	220	-22.3		183	220	-16.8	
TPH	661	660	0.152		634	660	-3.94		632	660	-4.24		628	660	-4.85		621	660	-5.91	
%ortho-terphenyl	104				105				97				97				100			
%5A-androstane	104				105				96				98				98			
%d50-tetracosane	102				104				101				102				103			

Field ID Sample Type Matrix Sample Size Weight Basis Associated Blank Field Date Extract Date Analysis Date Date Received Percent Solids Dilution Factor Percent Lipids Min Reporting Limit Units	Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/04/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/06/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/06/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/25/02 05/16/02 NA 1 NA 0.199 ug/mg				Oil Reference Standard ORS OIL 5.02 mg OIL NA 05/16/02 05/16/02 11/25/02 05/16/02 NA 1 NA 0.199 ug/mg			
	T	%D	Q		T	%D	Q		T	%D	Q		T	%D	Q		T	%D	Q	
<b>SHC/TPH</b>																				
n-Nonane	5.24	4.8	9.17		5.06	4.8	5.83		5.12	4.8	6.67		5.11	4.8	6.46		5.29	4.8	10.2	
n-Decane	4.31	4.2	2.62		4.34	4.2	3.33		4.38	4.2	4.28		4.27	4.2	1.67		4.35	4.2	3.57	
n-Undecane	4.31	4.3	0.232		4.15	4.3	-3.49		4.23	4.3	-1.63		4.19	4.3	-2.56		4.32	4.3	0.47	
n-Dodecane	4.23	4	5.75		4.14	4	3.5		4.16	4	4		4.16	4	4		4.24	4	6	
n-Tridecane	3.89	4	-2.75		3.64	4	-9		3.8	4	-5		3.8	4	-5		3.8	4	-5	
n-Tetradecane	1.27	1	27		1.25	1	25		1.26	1	26		1.19	1	19		1.34	1	34	
Isoprenoid RRT 1380	4.58	4.2	9.05		4.62	4.2	10		4.51	4.2	7.38		4.36	4.2	3.81		4.58	4.2	9.05	
Isoprenoid RRT 1470	1.47	1.4	5		1.35	1.4	-3.57		1.45	1.4	3.57		1.5	1.4	7.14		1.49	1.4	6.43	
n-Pentadecane	3.48	3.7	-5.94		3.6	3.7	-2.7		3.52	3.7	-4.86		3.62	3.7	-2.16		3.53	3.7	-4.59	
n-Hexadecane	3.42	3.2	6.87		3.34	3.2	4.37		3.46	3.2	8.12		3.35	3.2	4.69		3.5	3.2	9.37	
Isoprenoid RRT 1650	1.66	1.5	10.7		1.48	1.5	-1.33		1.65	1.5	10		1.53	1.5	2		1.71	1.5	14	
n-Heptadecane	2.92	3.2	-8.75		2.79	3.2	-12.8		2.85	3.2	-10.9		2.72	3.2	-15		2.76	3.2	-13.8	
Pristane	2.09	2.2	-5		2.29	2.2	4.09		1.98	2.2	-10		1.99	2.2	-9.54		2.01	2.2	-8.64	
n-Octadecane	2.61	2.9	-10		2.43	2.9	-16.2		2.56	2.9	-11.7		2.41	2.9	-16.9		2.36	2.9	-18.6	
Phytane	1.37	1.6	-14.4		1.43	1.6	-10.6		1.33	1.6	-16.9		1.45	1.6	-9.38		1.22	1.6	-23.8	
n-Nonadecane	2.4	2.6	-7.69		2.31	2.6	-11.2		2.39	2.6	-8.08		2.24	2.6	-13.8		2.44	2.6	-6.15	
n-Eicosane	2.35	2.7	-13		2.39	2.7	-11.5		2.51	2.7	-7.04		2.34	2.7	-13.3		2.39	2.7	-11.5	
n-Heneicosane	2.2	2.4	-8.33		2.24	2.4	-6.67		2.22	2.4	-7.5		2.26	2.4	-5.83		2.23	2.4	-7.08	
n-Docosane	2.22	2.2	0.909		2.31	2.2	5		2.2	2.2	0		2.31	2.2	5		2.28	2.2	3.64	
n-Tricosane	2.02	2	1		2.1	2	5		2.02	2	1		2.04	2	2		2.09	2	4.5	
n-Tetracosane	1.84	2	-8		1.89	2	-5.5		1.88	2	-6		1.89	2	-5.5		1.92	2	-4	
n-Pentacosane	1.63	1.7	-4.12		1.75	1.7	2.94		1.62	1.7	-4.7		1.76	1.7	3.53		1.64	1.7	-3.53	
n-Hexacosane	1.45	1.5	-3.33		1.54	1.5	-2.67		1.46	1.5	-2.67		1.53	1.5	2		1.48	1.5	-1.33	
n-Heptacosane	1.08	1.2	-10		1.08	1.2	-10		1.08	1.2	-10		1.09	1.2	-9.17		1.14	1.2	-5	
n-Octacosane	0.901	0.9	2.39		0.934	0.9	6.14		0.893	0.9	1.48		0.938	0.9	6.59		0.936	0.9	6.36	
n-Nonacosane	0.773	0.8	-4.57		0.716	0.8	-11.6		0.773	0.8	-4.57		0.746	0.8	-7.9		0.781	0.8	-3.58	
n-Triacontane	0.662	0.7	1.85		0.64	0.7	-1.54		0.685	0.7	5.38		0.641	0.7	-1.38		0.675	0.7	3.85	
n-Hentriacontane	0.76	0.6	31		0.581	0.6	0.172		0.747	0.6	28.8		0.602	0.6	3.79		0.753	0.6	29.8	
n-Dotriacontane	0.429	0.4	-2.5		0.417	0.4	-5.23		0.415	0.4	-5.68		0.412	0.4	-6.36		0.418	0.4	-5	
n-Tritriacontane	0.38	0.4	-5		0.394	0.4	-1.5		0.348	0.4	-13		0.371	0.4	-7.25		0.358	0.4	-10.5	
n-Tetraatriacontane	0.318	0.4	-8.14		0.377	0.4	7.91		0.35	0.4	0		0.353	0.4	0.86		0.384	0.4	9.71	
n-Pentatriacontane	0.398	0.4	13.7		0.44	0.4	25.7		0.392	0.4	12		0.47	0.4	34.3		0.415	0.4	18.6	
n-Hexatriacontane	0.285	0.2	23.9		0.225	0.2	-2.17		0.27	0.2	17.4		0.233	0.2	1.3		0.285	0.2	23.9	
n-Heptatriacontane	0.229	0.2	-0.435		0.23	0.2	0		0.229	0.2	-0.435		0.257	0.2	11.7		0.244	0.2	6.09	
n-Octatriacontane	0.216	0.2	-1.82		0.218	0.2	-0.909		0.225	0.2	2.27		0.235	0.2	6.82		0.246	0.2	11.8	
n-Tetracontane	0.195 J	0.2	2.63		0.15 J	0.2	-21		0.192 J	0.2	1.05		0.192 J	0.2	1.05		0.193 J	0.2	1.58	
TPH (RES)	172	220	-21.8		182	220	-17.3		171	220	-22.3		185	220	-15.9		173	220	-21.4	
TPH	632	660	-4.24		538	660	-18.5		621	660	-5.91		634	660	-3.94		633	660	-4.09	
%ortho-terphenyl	95				99				96				98				97			
%5A-androstane	99				97				95				96				102			
%d50-tetracosane	101				103				101				102				101			

Field ID	Oil Reference	Standard	T	%D	Q
Sample Type	ORS				
Matrix	OIL				
Sample Size	5.02 mg				
Weight Basis	OIL				
Associated Blank	NA				
Field Date	05/16/02				
Extract Date	05/16/02				
Analysis Date	12/10/02				
Date Received	05/16/02				
Percent Solids	NA				
Dilution Factor	1				
Percent Lipids	NA				
Min Reporting Limit	0.199				
Units	ug/mg				
<b>SHC/TPH</b>					
n-Nonane	5.19	4.8	8.12		
n-Decane	4.23	4.2	0.71		
n-Undecane	4.2	4.3	-2.32		
n-Dodecane	4.1	4	2.5		
n-Tridecane	3.6	4	-10		
Isoprenoid RRT 1380	1.26	1	26		
n-Tetradecane	4.5	4.2	7.14		
Isoprenoid RRT 1470	1.42	1.4	1.43		
n-Pentadecane	3.5	3.7	-5.4		
n-Hexadecane	3.39	3.2	5.94		
Isoprenoid RRT 1650	1.5	1.5	0		
n-Heptadecane	3	3.2	-6.25		
Pristane	2.24	2.2	1.82		
n-Octadecane	2.47	2.9	-14.8		
Phytane	1.41	1.6	-11.9		
n-Nonadecane	2.28	2.6	-12.3		
n-Eicosane	2.25	2.7	-16.7		
n-Heneicosane	2.22	2.4	-7.5		
n-Docosane	2.29	2.2	4.09		
n-Tricosane	2.07	2	3.5		
n-Tetracosane	1.94	2	-3		
n-Pentacosane	1.79	1.7	5.29		
n-Hexacosane	1.52	1.5	1.33		
n-Heptacosane	1.12	1.2	-6.67		
n-Octacosane	0.94	0.9	6.82		
n-Nonacosane	0.774	0.8	-4.44		
n-Triacotane	0.675	0.7	3.85		
n-Hentriacotane	0.59	0.6	1.72		
n-Dotriacotane	0.426	0.4	-3.18		
n-Tritriacotane	0.392	0.4	-2		
n-Tetraicacotane	0.359	0.4	2.57		
n-Pentatriacotane	0.406	0.4	16		
n-Hexatriacotane	0.238	0.2	3.48		
n-Heptatriacotane	0.228	0.2	-0.87		
n-Octatriacotane	0.217	0.2	-1.36		
n-Tetracontane	0.178 J	0.2	-6.32		
TPH (RES)	204	220	-7.27		
TPH	630	660	-4.54		
%ortho-terphenyl	98				
%5A-androstane	98				
%d50-tetracosane	102				



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS	T	%D	Q	ORS	T	%D	Q	ORS	T	%D	Q
Sample Type	ORS				ORS				ORS			
Matrix	OIL				OIL				OIL			
Sample Size	5.02 mg				5.02 mg				5.02 mg			
Weight Basis	OIL				WET				OIL			
Associated Blank	NA				NA				NA			
Field Date	05/16/02				05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02				05/16/02			
Analysis Date	02/26/03				03/03/03				10/24/02			
Date Received	05/16/02				05/16/02				05/16/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	0.199				0.199				0.199			
Units	ug/mg				ug/mg				ug/mg			
<b>SHC/TPH</b>												
n-Nonane	5.62	4.8	17.1		5.18	4.8	7.92		5.23	4.8	8.96	
n-Decane	4.51	4.2	7.38		4.37	4.2	4.05		4.41	4.2	5	
n-Undecane	4.77	4.3	10.9		4.66	4.3	8.37		4.24	4.3	-1.4	
n-Dodecane	4.27	4	6.75		4.07	4	1.75		4.13	4	3.25	
n-Tridecane	4.31	4	7.75		3.9	4	-2.5		3.64	4	-9	
Isoprenoid RRT 1380	1.04	1	4		1.1	1	10		1.3	1	30	
n-Tetradecane	4.78	4.2	13.8		4.78	4.2	13.8		4.69	4.2	11.7	
Isoprenoid RRT 1470	1.58	1.4	12.8		1.47	1.4	5		1.53	1.4	9.28	
n-Pentadecane	4.14	3.7	11.9		4.09	3.7	10.5		3.53	3.7	-4.59	
n-Hexadecane	3.52	3.2	10		3.24	3.2	1.25		3.38	3.2	5.62	
Isoprenoid RRT 1650	1.6	1.5	6.67		1.39	1.5	-7.33		1.5	1.5	0	
n-Heptadecane	3.48	3.2	8.75		3.5	3.2	9.37		3	3.2	-6.25	
Pristane	2.14	2.2	-2.73		2.26	2.2	2.73		2.33	2.2	5.91	
n-Octadecane	2.8	2.9	-3.45		2.83	2.9	-2.41		2.43	2.9	-16.2	
Phytane	1.51	1.6	-5.62		1.55	1.6	-3.12		1.41	1.6	-11.9	
n-Nonadecane	2.46	2.6	-5.38		2.41	2.6	-7.31		2.28	2.6	-12.3	
n-Eicosane	2.56	2.7	-5.18		2.54	2.7	-5.92		2.37	2.7	-12.2	
n-Heneicosane	2.31	2.4	-3.75		2.24	2.4	-6.67		2.21	2.4	-7.92	
n-Docosane	2.24	2.2	1.82		2.19	2.2	-0.454		2.33	2.2	5.91	
n-Tricosane	2.15	2	7.5		2.09	2	4.5		2.05	2	2.5	
n-Tetracosane	1.96	2	-2		1.9	2	-5		1.88	2	-6	
n-Pentacosane	1.69	1.7	-0.588		1.66	1.7	-2.35		1.73	1.7	1.76	
n-Hexacosane	1.51	1.5	0.667		1.47	1.5	-2		1.53	1.5	2	
n-Heptacosane	1.25	1.2	4.17		1.22	1.2	1.67		1.1	1.2	-8.33	
n-Octacosane	0.967	0.88	9.89		0.918	0.88	4.32		0.94	0.88	6.82	
n-Nonacosane	0.842	0.81	3.95		0.834	0.81	2.96		0.732	0.81	-9.63	
n-Triacontane	0.663	0.65	2		0.66	0.65	1.54		0.641	0.65	-1.38	
n-Hentriacontane	0.589	0.58	1.55		0.569	0.58	-1.9		0.58	0.58	0	
n-Dotriacontane	0.448	0.44	1.82		0.448	0.44	1.82		0.408	0.44	-7.27	
n-Tritriacontane	0.368	0.4	-8		0.36	0.4	-10		0.383	0.4	-4.25	
n-Tetracontane	0.369	0.35	5.43		0.374	0.35	6.86		0.342	0.35	-2.28	
n-Pentatriacontane	0.35	0.35	0		0.327	0.35	-6.57		0.441	0.35	26	
n-Hexatriacontane	0.198 J	0.23	-13.9		0.216	0.23	-6.09		0.233	0.23	1.3	
n-Heptatriacontane	0.23	0.23	0		0.257	0.23	11.7		0.234	0.23	1.74	
n-Octatriacontane	0.225	0.22	2.27		0.215	0.22	-2.27		0.23	0.22	4.54	
n-Tetracontane	0.18 J	0.19	-5.26		0.187 J	0.19	-1.58		0.177 J	0.19	-6.84	
TPH (RES)	198	220	-10		195	220	-11.4		184	220	-16.4	
TPH	661	660	0.152		634	660	-3.94		632	660	-4.24	
%ortho-terphenyl	104				105				97			
%5A-androstane	104				105				96			
%d50-tetracosane	102				104				101			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS	T	%D	Q	ORS	T	%D	Q	ORS	T	%D	Q
Sample Type	OIL				OIL				OIL			
Matrix	OIL				OIL				OIL			
Sample Size	5.02 mg				5.02 mg				5.02 mg			
Weight Basis	OIL				OIL				OIL			
Associated Blank	NA				NA				NA			
Field Date	05/16/02				05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02				05/16/02			
Analysis Date	10/24/02				11/04/02				11/04/02			
Date Received	05/16/02				05/16/02				05/16/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	0.199				0.199				0.199			
Units	ug/mg				ug/mg				ug/mg			
<b>SHC/TPH</b>												
n-Nonane	5.18	4.8	7.92		5.14	4.8	7.08		5.24	4.8	9.17	
n-Decane	4.26	4.2	1.43		4.32	4.2	2.86		4.31	4.2	2.62	
n-Undecane	4.3	4.3	0		4.18	4.3	-2.79		4.31	4.3	0.232	
n-Dodecane	4.14	4	3.5		4.14	4	3.5		4.23	4	5.75	
n-Tridecane	3.79	4	-5.25		3.66	4	-8.5		3.89	4	-2.75	
Isoprenoid RRT 1380	1.3	1	30		1.26	1	26		1.27	1	27	
n-Tetradecane	4.6	4.2	9.52		4.35	4.2	3.57		4.58	4.2	9.05	
Isoprenoid RRT 1470	1.52	1.4	8.57		1.46	1.4	4.28		1.47	1.4	5	
n-Pentadecane	3.54	3.7	-4.32		3.61	3.7	-2.43		3.48	3.7	-5.94	
n-Hexadecane	3.39	3.2	5.94		3.35	3.2	4.69		3.42	3.2	6.87	
Isoprenoid RRT 1650	1.68	1.5	12		1.47	1.5	-2		1.66	1.5	10.7	
n-Heptadecane	2.86	3.2	-10.6		2.76	3.2	-13.8		2.92	3.2	-8.75	
Pristane	2.05	2.2	-6.82		2.03	2.2	-7.73		2.09	2.2	-5	
n-Octadecane	2.76	2.9	-4.83		2.47	2.9	-14.8		2.61	2.9	-10	
Phytane	1.36	1.6	-15		1.43	1.6	-10.6		1.37	1.6	-14.4	
n-Nonadecane	2.43	2.6	-6.54		2.37	2.6	-8.85		2.4	2.6	-7.69	
n-Eicosane	2.59	2.7	-4.07		2.42	2.7	-10.4		2.35	2.7	-13	
n-Heneicosane	2.22	2.4	-7.5		2.36	2.4	-1.67		2.2	2.4	-8.33	
n-Docosane	2.2	2.2	0		2.33	2.2	5.91		2.22	2.2	0.909	
n-Tricosane	2.05	2	2.5		2.07	2	3.5		2.02	2	1	
n-Tetracosane	1.89	2	-5.5		1.92	2	-4		1.84	2	-8	
n-Pentacosane	1.62	1.7	-4.7		1.74	1.7	2.35		1.63	1.7	-4.12	
n-Hexacosane	1.46	1.5	-2.67		1.55	1.5	3.33		1.45	1.5	-3.33	
n-Heptacosane	1.09	1.2	-9.17		1.08	1.2	-10		1.08	1.2	-10	
n-Octacosane	0.922	0.88	4.77		0.924	0.88	5		0.901	0.88	2.39	
n-Nonacosane	0.758	0.81	-6.42		0.728	0.81	-10.1		0.773	0.81	-4.57	
n-Triacontane	0.671	0.65	3.23		0.672	0.65	3.38		0.662	0.65	1.85	
n-Hentriacontane	0.748	0.58	29		0.591	0.58	1.9		0.76	0.58	31	
n-Dotriacontane	0.427	0.44	-2.95		0.422	0.44	-4.09		0.429	0.44	-2.5	
n-Tritriacontane	0.375	0.4	-6.25		0.35	0.4	-12.5		0.38	0.4	-5	
n-Tetracontane	0.365	0.35	4.28		0.34	0.35	-2.86		0.318	0.35	-9.14	
n-Pentatriacontane	0.377	0.35	7.71		0.418	0.35	19.4		0.398	0.35	13.7	
n-Hexatriacontane	0.28	0.23	21.7		0.235	0.23	2.17		0.285	0.23	23.9	
n-Heptatriacontane	0.24	0.23	4.35		0.23	0.23	0		0.229	0.23	-0.435	
n-Octatriacontane	0.226	0.22	2.73		0.219	0.22	-0.454		0.216	0.22	-1.82	
n-Tetracontane	0.18 J	0.19	-5.26		0.161 J	0.19	-15.3		0.195 J	0.19	2.63	
TPH (RES)	171	220	-22.3		183	220	-16.8		172	220	-21.8	
TPH	628	660	-4.85		621	660	-5.91		632	660	-4.24	
%ortho-terphenyl	97				100				95			
%5A-androstane	98				98				99			
%d50-tetracosane	102				103				101			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS	T	%D	Q	ORS	T	%D	Q	ORS	T	%D	Q
Sample Type	ORs				ORs				ORs			
Matrix	OIL				OIL				OIL			
Sample Size	5.02 mg				5.02 mg				5.02 mg			
Weight Basis	OIL				OIL				OIL			
Associated Blank	NA				NA				NA			
Field Date	05/16/02				05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02				05/16/02			
Analysis Date	11/06/02				11/06/02				11/25/02			
Date Received	05/16/02				05/16/02				05/16/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	0.199				0.199				0.199			
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q	ug/mg	T	%D	Q
<b>SHC/TPH</b>												
n-Nonane	5.08	4.8	5.83		5.12	4.8	6.67		5.11	4.8	6.46	
n-Decane	4.34	4.2	3.33		4.38	4.2	4.28		4.27	4.2	1.67	
n-Undecane	4.15	4.3	-3.49		4.23	4.3	-1.63		4.19	4.3	-2.56	
n-Dodecane	4.14	4	3.5		4.16	4	4		4.16	4	4	
n-Tridecane	3.64	4	-9		3.8	4	-5		3.8	4	-5	
Isoprenoid RRT 1380	1.25	1	25		1.26	1	26		1.19	1	19	
n-Tetradecane	4.62	4.2	10		4.51	4.2	7.38		4.36	4.2	3.81	
Isoprenoid RRT 1470	1.35	1.4	-3.57		1.45	1.4	3.57		1.5	1.4	7.14	
n-Pentadecane	3.6	3.7	-2.7		3.52	3.7	-4.86		3.62	3.7	-2.16	
n-Hexadecane	3.34	3.2	4.37		3.46	3.2	8.12		3.35	3.2	4.69	
Isoprenoid RRT 1650	1.48	1.5	-1.33		1.65	1.5	10		1.53	1.5	2	
n-Heptadecane	2.79	3.2	-12.8		2.85	3.2	-10.9		2.72	3.2	-15	
Pristane	2.29	2.2	4.09		1.98	2.2	-10		1.99	2.2	-9.54	
n-Octadecane	2.43	2.9	-16.2		2.56	2.9	-11.7		2.41	2.9	-16.9	
Phytane	1.43	1.6	-10.6		1.33	1.6	-16.9		1.45	1.6	-9.38	
n-Nonadecane	2.31	2.6	-11.2		2.39	2.6	-8.08		2.24	2.6	-13.8	
n-Eicosane	2.39	2.7	-11.5		2.51	2.7	-7.04		2.34	2.7	-13.3	
n-Heneicosane	2.24	2.4	-6.67		2.22	2.4	-7.5		2.26	2.4	-5.83	
n-Docosane	2.31	2.2	5		2.2	2.2	0		2.31	2.2	5	
n-Tricosane	2.1	2	5		2.02	2	1		2.04	2	2	
n-Tetracosane	1.89	2	-5.5		1.88	2	-6		1.89	2	-5.5	
n-Pentacosane	1.75	1.7	2.94		1.62	1.7	-4.7		1.76	1.7	3.53	
n-Hexacosane	1.54	1.5	2.67		1.46	1.5	-2.67		1.53	1.5	2	
n-Heptacosane	1.08	1.2	-10		1.08	1.2	-10		1.09	1.2	-9.17	
n-Octacosane	0.934	0.88	6.14		0.893	0.88	1.48		0.938	0.88	6.59	
n-Nonacosane	0.716	0.81	-11.6		0.773	0.81	-4.57		0.746	0.81	-7.9	
n-Triacontane	0.64	0.65	-1.54		0.685	0.65	5.38		0.641	0.65	-1.38	
n-Hentriacontane	0.581	0.58	0.172		0.747	0.58	28.8		0.602	0.58	3.79	
n-Dotriacontane	0.417	0.44	-5.23		0.415	0.44	-5.68		0.412	0.44	-6.36	
n-Tritriacontane	0.394	0.4	-1.5		0.348	0.4	-13		0.371	0.4	-7.25	
n-Tetracontane	0.377	0.35	7.71		0.35	0.35	0		0.353	0.35	0.857	
n-Pentatriacontane	0.44	0.35	25.7		0.392	0.35	12		0.47	0.35	34.3	
n-Hexatriacontane	0.225	0.23	-2.17		0.27	0.23	17.4		0.233	0.23	1.3	
n-Heptatriacontane	0.23	0.23	0		0.229	0.23	-0.435		0.257	0.23	11.7	
n-Octatriacontane	0.218	0.22	-0.909		0.225	0.22	2.27		0.235	0.22	6.82	
n-Tetracontane	0.15 J	0.19	-21		0.192 J	0.19	1.05		0.192 J	0.19	1.05	
TPH (RES)	182	220	-17.3		171	220	-22.3		185	220	-15.9	
TPH	538	660	-18.5		621	660	-5.91		634	660	-3.94	
%ortho-terphenyl	99				96				98			
%5A-androstane	97				95				96			
%d50-tetracosane	103				101				102			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard			
	ORS				ORS			
Sample Type	OIL				OIL			
Matrix	OIL				OIL			
Sample Size	5.02 mg				5.02 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02			
Analysis Date	11/25/02				12/10/02			
Date Received	05/16/02				05/16/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	0.199				0.199			
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q
<b>SHC/TPH</b>								
n-Nonane	5.29	4.8	10.2		5.19	4.8	8.12	
n-Decane	4.35	4.2	3.57		4.23	4.2	0.714	
n-Undecane	4.32	4.3	0.465		4.2	4.3	-2.32	
n-Dodecane	4.24	4	6		4.1	4	2.5	
n-Tridecane	3.8	4	-5		3.6	4	-10	
Isoprenoid RRT 1380	1.34	1	34		1.26	1	26	
n-Tetradecane	4.58	4.2	9.05		4.5	4.2	7.14	
Isoprenoid RRT 1470	1.49	1.4	6.43		1.42	1.4	1.43	
n-Pentadecane	3.53	3.7	-4.59		3.5	3.7	-5.4	
n-Hexadecane	3.5	3.2	9.37		3.39	3.2	5.94	
Isoprenoid RRT 1650	1.71	1.5	14		1.5	1.5	0	
n-Heptadecane	2.76	3.2	-13.8		3	3.2	-6.25	
Pristane	2.01	2.2	-8.64		2.24	2.2	1.82	
n-Octadecane	2.36	2.9	-18.6		2.47	2.9	-14.8	
Phytane	1.22	1.6	-23.8		1.41	1.6	-11.9	
n-Nonadecane	2.44	2.6	-6.15		2.28	2.6	-12.3	
n-Eicosane	2.39	2.7	-11.5		2.25	2.7	-16.7	
n-Heneicosane	2.23	2.4	-7.08		2.22	2.4	-7.5	
n-Docosane	2.28	2.2	3.64		2.29	2.2	4.09	
n-Tricosane	2.09	2	4.5		2.07	2	3.5	
n-Tetracosane	1.92	2	-4		1.94	2	-3	
n-Pentacosane	1.64	1.7	-3.53		1.79	1.7	5.29	
n-Hexacosane	1.48	1.5	-1.33		1.52	1.5	1.33	
n-Heptacosane	1.14	1.2	-5		1.12	1.2	-6.67	
n-Octacosane	0.936	0.88	6.36		0.94	0.88	6.82	
n-Nonacosane	0.781	0.81	-3.58		0.774	0.81	-4.44	
n-Triacontane	0.675	0.65	3.85		0.675	0.65	3.85	
n-Hentriacontane	0.753	0.58	29.8		0.59	0.58	1.72	
n-Dotriacontane	0.418	0.44	-5		0.426	0.44	-3.18	
n-Tritriacontane	0.358	0.4	-10.5		0.392	0.4	-2	
n-Tetracontane	0.384	0.35	9.71		0.359	0.35	2.57	
n-Pentatriacontane	0.415	0.35	18.6		0.406	0.35	16	
n-Hexatriacontane	0.285	0.23	23.9		0.238	0.23	3.48	
n-Heptatriacontane	0.244	0.23	6.09		0.228	0.23	-0.87	
n-Octatriacontane	0.246	0.22	11.8		0.217	0.22	-1.36	
n-Tetracontane	0.193 J	0.19	1.58		0.178 J	0.19	-6.32	
TPH (RES)	173	220	-21.4		204	220	-7.27	
TPH	633	660	-4.09		630	660	-4.54	
%ortho-terphenyl	97				98			
%5A-androstane	102				98			
%d50-tetracosane	101				102			

**Minerals Management Service - Animida Phase I.**  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

Field ID	Oil Reference			Oil Reference				
	Standard			Standard				
Lab ID	BU82ORS-1			BU82ORS-2				
Sample Type	ORS			ORS				
Matrix	OIL			OIL				
Sample Size	5.04 mg			5.04 mg				
Weight Basis	OIL			OIL				
Associated Blank	NA			NA				
Field Date	05/19/00			05/19/00				
Extract Date	05/19/00			05/19/00				
Analysis Date	03/16/01			03/16/01				
Date Received	05/19/00			05/19/00				
Percent Solids	NA			NA				
Percent Lipids	NA			NA				
Min Reporting Limit	0.198			0.198				
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q
<b>SHC/TPH</b>								
n-Nonane	5.07	4.8	5.62		4.73	4.8	-1.46	
n-Decane	4.18	4.2	-0.48		4.05	4.2	-3.57	
n-Undecane	4.01	4.3	-6.74		3.76	4.3	-12.6	
n-Dodecane	3.83	4	-4.25		3.59	4	-10.2	
n-Tridecane	3.64	4	-9		3.46	4	-13.5	
Isoprenoid RRT 1380	1.26	1	26		1.02	1	2	
n-Tetradecane	4.28	4.2	1.9		4.28	4.2	1.9	
Isoprenoid RRT 1470	1.34	1.4	-4.28		1.25	1.4	-10.7	
n-Pentadecane	3.44	3.7	-7.03		3.28	3.7	-11.4	
n-Hexadecane	3.24	3.2	1.25		2.93	3.2	-8.44	
Isoprenoid RRT 1650	1.8	1.5	20		1.74	1.5	16	
n-Heptadecane	2.96	3.2	-7.5		2.81	3.2	-12.2	
Pristane	1.99	2.2	-9.54		1.94	2.2	-11.8	
n-Octadecane	2.68	2.9	-7.59		2.62	2.9	-9.66	
Phytane	1.18	1.6	-26.2		1.25	1.6	-21.9	
n-Nonadecane	2.51	2.6	-3.46		2.63	2.6	1.15	
n-Eicosane	2.77	2.7	2.59		2.49	2.7	-7.78	
n-Heneicosane	2.36	2.4	-1.67		2.37	2.4	-1.25	
n-Docosane	2.16	2.2	-1.82		2.12	2.2	-3.64	
n-Tricosane	2.04	2	2		1.94	2	-3	
n-Tetracosane	1.82	2	-9		1.7	2	-15	
n-Pentacosane	1.66	1.7	-2.35		1.63	1.7	-4.12	
n-Hexacosane	1.4	1.5	-6.67		1.42	1.5	-5.33	
n-Heptacosane	1.11	1.2	-7.5		1.14	1.2	-5	
n-Octacosane	0.864	0.88	-1.82		0.821	0.88	-6.7	
n-Nonacosane	0.764	0.81	-5.68		0.789	0.81	-2.59	
n-Triacontane	0.639	0.65	-1.69		0.636	0.65	-2.15	
n-Hentriacontane	0.745	0.58	28.4		0.682	0.58	17.6	
n-Dotriacontane	0.504	0.44	14.5		0.506	0.44	15	
n-Tritriacontane	0.346	0.4	-13.5		0.376	0.4	-6	
n-Tetratriacontane	0.362	0.35	3.43		0.33	0.35	-5.71	
n-Pentatriacontane	0.403	0.35	15.1		0.385	0.35	10	
n-Hexatriacontane	0.274	0.23	19.1		0.27	0.23	17.4	
n-Heptatriacontane	0.221	0.23	-3.91		0.207	0.23	-10	
n-Octatriacontane	0.211	0.22	-4.09		0.233	0.22	5.91	
n-Nonatriacontane	0.133 J	0.18	-26.1		0.151 J	0.18	-16.1	
n-Tetracontane	0.177 J	0.19	-6.84		0.183 J	0.19	-3.68	
TPH (RES)	184	220	-16.4		173	220	-21.4	
TPH	607	660	-8.03		602	660	-8.79	
%ortho-terphenyl	97				103			
%5A-androstane	100				104			
%d50-tetracosane	100				102			

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

Field ID	Oil Reference			Oil Reference				
	Standard			Standard				
Lab ID	BU82ORS-1			BU82ORS-2				
Sample Type	ORS			ORS				
Matrix	OIL			OIL				
Sample Size	5.04 mg			5.04 mg				
Weight Basis	OIL			OIL				
Associated Blank	NA			NA				
Field Date	05/19/00			05/19/00				
Extract Date	05/19/00			05/19/00				
Analysis Date	03/13/01			03/13/01				
Date Received	05/19/00			05/19/00				
Percent Solids	NA			NA				
Percent Lipids	NA			NA				
Min Reporting Limit	0.198			0.198				
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q
<b>SHC/TPH</b>								
n-Nonane	5.09	4.8	6.04		4.76	4.8	-0.83	
n-Decane	3.92	4.2	-6.67		3.92	4.2	-6.67	
n-Undecane	4.13	4.3	-3.95		3.82	4.3	-11.2	
n-Dodecane	3.83	4	-4.25		3.59	4	-10.2	
n-Tridecane	3.67	4	-8.25		3.39	4	-15.2	
Isoprenoid RRT 1380	1.25	1	25		1.23	1	23	
n-Tetradecane	4.3	4.2	2.38		4.23	4.2	0.714	
Isoprenoid RRT 1470	1.43	1.4	2.14		1.32	1.4	-5.71	
n-Pentadecane	3.45	3.7	-6.76		3.41	3.7	-7.84	
n-Hexadecane	3.26	3.2	1.87		2.95	3.2	-7.81	
Isoprenoid RRT 1650	1.71	1.5	14		1.68	1.5	12	
n-Heptadecane	2.95	3.2	-7.81		2.86	3.2	-10.6	
Pristane	1.93	2.2	-12.3		1.99	2.2	-9.54	
n-Octadecane	2.76	2.9	-4.83		2.55	2.9	-12.1	
Phytane	1.29	1.6	-19.4		1.26	1.6	-21.2	
n-Nonadecane	2.48	2.6	-4.62		2.54	2.6	-2.31	
n-Eicosane	2.64	2.7	-2.22		2.5	2.7	-7.41	
n-Heneicosane	2.29	2.4	-4.58		2.38	2.4	-0.83	
n-Docosane	2.11	2.2	-4.09		2.12	2.2	-3.64	
n-Tricosane	1.98	2	-1		1.99	2	-0.5	
n-Tetracosane	1.8	2	-10		1.73	2	-13.5	
n-Pentacosane	1.61	1.7	-5.29		1.59	1.7	-6.47	
n-Hexacosane	1.42	1.5	-5.33		1.39	1.5	-7.33	
n-Heptacosane	1.1	1.2	-8.33		1.04	1.2	-13.3	
n-Octacosane	0.85	0.88	-3.41		0.842	0.88	-4.32	
n-Nonacosane	0.769	0.81	-5.06		0.729	0.81	-10	
n-Triacontane	0.673	0.65	3.54		0.608	0.65	-6.46	
n-Hentriacontane	0.722	0.58	24.5		0.691	0.58	19.1	
n-Dotriacontane	0.418	0.44	-5		0.482	0.44	9.54	
n-Tritriacontane	0.358	0.4	-10.5		0.37	0.4	-7.5	
n-Tetratriacontane	0.349	0.35	-0.29		0.307	0.35	-12.3	
n-Pentatriacontane	0.378	0.35	8		0.372	0.35	6.28	
n-Hexatriacontane	0.269	0.23	17		0.242	0.23	5.22	
n-Heptatriacontane	0.208	0.23	-9.56		0.216	0.23	-6.09	
n-Octatriacontane	0.22	0.22	0		0.223	0.22	1.36	
n-Nonatriacontane	0.146 J	0.18	-18.9		0.136 J	0.18	-24.4	
n-Tetracontane	0.171 J	0.19	-10		0.172 J	0.19	-9.47	
TPH (RES)	184	220	-16.4		171	220	-22.3	
TPH	628	660	-4.85		611	660	-7.42	
%ortho-terphenyl	96				100			
%5A-androstane	98				102			
%d50-tetracosane	100				100			

Minerals Management Service - Animida Phase I.  
Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

Field ID	Oil Reference			Oil Reference				
	Standard			Standard				
Lab ID	BU82-1ORS			BU82-2ORS				
Sample Type	ORS			ORS				
Matrix	OIL			OIL				
Sample Size	5.04 mg			5.04 mg				
Weight Basis	OIL			OIL				
Associated Blank	NA			NA				
Field Date	05/19/00			05/19/00				
Extract Date	05/19/00			05/19/00				
Analysis Date	03/02/01			03/07/01				
Date Received	05/19/00			05/19/00				
Percent Solids	NA			NA				
Percent Lipids	NA			NA				
Min Reporting Limit	0.198			0.198				
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q
<b>SHC/TPH</b>								
n-Nonane	4.74	4.8	-1.25		5.11	4.8	6.46	
n-Decane	3.92	4.2	-6.67		4.08	4.2	-2.86	
n-Undecane	3.84	4.3	-10.7		4.13	4.3	-3.95	
n-Dodecane	3.55	4	-11.2		3.92	4	-2	
n-Tridecane	3.41	4	-14.7		3.64	4	-9	
Isoprenoid RRT 1380	1.21	1	21		1.21	1	21	
n-Tetradecane	4.17	4.2	-0.71		4.27	4.2	1.67	
Isoprenoid RRT 1470	1.27	1.4	-9.28		1.42	1.4	1.43	
n-Pentadecane	3.35	3.7	-9.46		3.38	3.7	-8.65	
n-Hexadecane	3.11	3.2	-2.81		3.23	3.2	0.937	
Isoprenoid RRT 1650	1.71	1.5	14		1.79	1.5	19.3	
n-Heptadecane	2.89	3.2	-9.69		2.98	3.2	-6.88	
Pristane	1.97	2.2	-10.4		2.01	2.2	-8.64	
n-Octadecane	2.49	2.9	-14.1		2.61	2.9	-10	
Phytane	1.28	1.6	-20		1.28	1.6	-20	
n-Nonadecane	2.46	2.6	-5.38		2.47	2.6	-5	
n-Eicosane	2.6	2.7	-3.7		2.46	2.7	-8.89	
n-Heneicosane	2.36	2.4	-1.67		2.33	2.4	-2.92	
n-Docosane	2.12	2.2	-3.64		2.1	2.2	-4.54	
n-Tricosane	1.97	2	-1.5		1.97	2	-1.5	
n-Tetracosane	1.69	2	-15.5		1.8	2	-10	
n-Pentacosane	1.62	1.7	-4.7		1.68	1.7	-1.18	
n-Hexacosane	1.4	1.5	-6.67		1.39	1.5	-7.33	
n-Heptacosane	1.06	1.2	-11.7		1.11	1.2	-7.5	
n-Octacosane	0.856	0.88	-2.73		0.854	0.88	-2.95	
n-Nonacosane	0.745	0.81	-8.02		0.801	0.81	-1.11	
n-Triacontane	0.594	0.65	-8.62		0.651	0.65	0.154	
n-Hentriacontane	0.708	0.58	22.1		0.727	0.58	25.3	
n-Dotriacontane	0.442	0.44	0.454		0.414	0.44	-5.91	
n-Tritriacontane	0.283	0.4	-29.2		0.366	0.4	-8.5	
n-Tetratriacontane	0.258	0.35	-26.3		0.335	0.35	-4.28	
n-Pentatriacontane	0.342	0.35	-2.28		0.412	0.35	17.7	
n-Hexatriacontane	0.244	0.23	6.09		0.275	0.23	19.6	
n-Heptatriacontane	0.187 J	0.23	-18.7		0.216	0.23	-6.09	
n-Octatriacontane	0.197 J	0.22	-10.4		0.222	0.22	0.909	
n-Nonatriacontane	0.133 J	0.18	-26.1		0.155 J	0.18	-13.9	
n-Tetracontane	0.15 J	0.19	-21		0.176 J	0.19	-7.37	
TPH (RES)	176	220	-20		185	220	-15.9	
TPH	608	660	-7.88		624	660	-5.45	
%ortho-terphenyl	97				97			
%5A-androstane	100				100			
%d50-tetracosane	100				100			

**Arthur D. Little**

Environmental Monitoring and Analysis

**Minerals Management Service - Animida Phase I.**

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	Oil Reference		
Field ID	Standard		
Lab ID	BU82-3ORS		
Sample Type	ORS		
Matrix	OIL		
Sample Size	5.04 mg		
Weight Basis	OIL		
Associated Blank	NA		
Field Date	05/19/00		
Extract Date	05/19/00		
Analysis Date	03/07/01		
Date Received	05/19/00		
Percent Solids	NA		
Percent Lipids	NA		
Min Reporting Limit	0.198		
Units	ug/mg	T	%D Q
<b>SHC/TPH</b>			
n-Nonane	4.86	4.8	1.25
n-Decane	4.11	4.2	-2.14
n-Undecane	3.76	4.3	-12.6
n-Dodecane	3.58	4	-10.5
n-Tridecane	3.4	4	-15
Isoprenoid RRT 1380	1.27	1	27
n-Tetradecane	4.35	4.2	3.57
Isoprenoid RRT 1470	1.29	1.4	-7.86
n-Pentadecane	3.3	3.7	-10.8
n-Hexadecane	3.09	3.2	-3.44
Isoprenoid RRT 1650	1.68	1.5	12
n-Heptadecane	2.82	3.2	-11.9
Pristane	1.97	2.2	-10.4
n-Octadecane	2.5	2.9	-13.8
Phytane	1.29	1.6	-19.4
n-Nonadecane	2.59	2.6	-0.39
n-Eicosane	2.74	2.7	1.48
n-Heneicosane	2.37	2.4	-1.25
n-Docosane	2.09	2.2	-5
n-Tricosane	1.96	2	-2
n-Tetracosane	1.7	2	-15
n-Pentacosane	1.6	1.7	-5.88
n-Hexacosane	1.38	1.5	-8
n-Heptacosane	1.08	1.2	-10
n-Octacosane	0.827	0.88	-6.02
n-Nonacosane	0.725	0.81	-10.5
n-Triacontane	0.609	0.65	-6.31
n-Hentriacontane	0.7	0.58	20.7
n-Dotriacontane	0.48	0.44	9.09
n-Tritriacontane	0.369	0.4	-7.75
n-Tetratriacontane	0.296	0.35	-15.4
n-Pentatriacontane	0.378	0.35	8
n-Hexatriacontane	0.265	0.23	15.2
n-Heptatriacontane	0.213	0.23	-7.39
n-Octatriacontane	0.197 J	0.22	-10.4
n-Nonatriacontane	0.13 J	0.18	-27.8
n-Tetracontane	0.164 J	0.19	-13.7
TPH (RES)	177	220	-19.5
TPH	616	660	-6.67
%ortho-terphenyl	101		
%5A-androstane	102		
%d50-tetracosane	102		



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

Field ID	02-L01-01-PHC-S	02-L01-01-PHC-S DUP			02-N10-01-PHC-S	02-N10-01-PHC-S DUP
Sample Type	N	DUP			N	DUP
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT
Sample Size	23.63 g	23.65 g			17.49 g	17.46 g
Weight Basis	DRY	DRY			DRY	DRY
Associated Blank	EB-S-63PB	EB-S-63PB			DY-S-66PB	DY-S-66PB
Field Date	07/31/02	07/31/02			08/02/02	08/02/02
Extract Date	02/21/03	02/21/03			10/16/02	10/16/02
Analysis Date	03/03/03	03/03/03			10/25/02	10/25/02
Date Received	08/15/02	08/15/02			08/15/02	08/15/02
Percent Solids	78.6	78.6			57.2	57.2
Dilution Factor	1	1			1	1
Percent Lipids	NA	NA			NA	NA
Min Reporting Limit	0.021	0.021			0.028	0.029
Units	mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg

### SHC/TPH

n-Nonane	ND	ND			0.007 J	0.0062 J
n-Decane	0.0023 J	0.002 J	14		0.016 J	0.014 J
n-Undecane	0.0019 J	0.0022 J	15		0.022 J	0.019 J
n-Dodecane	0.0051 J	0.0036 J	34		0.03	0.025 J
n-Tridecane	0.005 J	0.0045 J	10		0.038	0.034
Isoprenoid RRT 1380	0.002 J	0.0015 J	28		0.012 J	0.01 J
n-Tetradecane	0.0052 J	0.005 J	3.9		0.045	0.043
Isoprenoid RRT 1470	0.0038 J	0.0033 J	14		0.029	0.026 J
n-Pentadecane	0.0076 J	0.0069 J	9.6		0.062	0.059
n-Hexadecane	0.01 J	0.0098 J	2		0.059 B	0.055 B
Isoprenoid RRT 1650	0.0038 J	0.0027 J	34		0.028	0.025 J
n-Heptadecane	0.015 J	0.014 J	6.9		0.096	0.091
Pristane	0.0086 J	0.0078 J	9.8		0.069	0.064
n-Octadecane	0.012 J	0.011 J	8.7		0.068	0.063
Phytane	0.0055 J	0.004 J	32		0.028	0.026 J
n-Nonadecane	0.015 J	0.013 J	14		0.11	0.11
n-Eicosane	0.016 J	0.014 J	13		0.1	0.096
n-Heneicosane	0.022	0.02 J	9.5		0.19	0.18
n-Docosane	0.019 J	0.018 J	5.4		0.15	0.14
n-Tricosane	0.039	0.039	0		0.39	0.37
n-Tetracosane	0.022	0.02 J	9.5		0.14	0.14
n-Pentacosane	0.046	0.047	2.2		0.39	0.38
n-Hexacosane	0.024 B	0.022 B	8.7		0.11	0.13
n-Heptacosane	0.066	0.067	1.5		0.53	0.53
n-Octacosane	0.022 B	0.02 JB	9.5		0.091	0.11
n-Nonacosane	0.054	0.057	5.4		0.41	0.41
n-Triacontane	0.015 JB	0.012 JB	22		0.28	0.31
n-Hentriacontane	0.045	0.041	9.3		0.35	0.35
n-Dotriacontane	0.011 JB	0.0097 JB	12		0.027 J	0.036
n-Tritriacontane	0.016 JB	0.012 JB	28		0.1	0.1
n-Tetratriacontane	0.0051 JB	0.003 JB	52	&	0.012 J	0.014 J
n-Pentatriacontane	0.0053 JB	0.003 JB	55	&	0.02 J	0.02 J
n-Hexatriacontane	0.0031 JB	ND			0.005 J	0.0048 J
n-Heptatriacontane	0.0026 J	ND			0.0049 J	0.0047 J
n-Octatriacontane	0.0024 J	ND			0.0035 J	0.0035 J
n-Tetracontane	ND	ND			0.0027 J	0.0023 J
TPH (RES)	1 B	0.96 B	4.1		6.1	5.9
TPH	2.9	4.7	47	&	11	9.8
%ortho-terphenyl	NA	NA			NA	NA
%5A-androstane	76	79			93	96
%d50-tetracosane	79	81			96	99

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

Field ID	02-N23-01-PHC-S		02-N23-01-PHC-S DUP		02-SAG-01-PHC-S		
Sample Type	N		DUP		N		
Matrix	SEDIMENT		SEDIMENT		SEDIMENT		
Sample Size	20.6 g		20.65 g		15.32 g		
Weight Basis	DRY		DRY		DRY		
Associated Blank	DZ-S-03PB		DZ-S-03PB		DZ-S-29PB		
Field Date	08/05/02		08/05/02		08/14/02		
Extract Date	10/28/02		10/28/02		10/30/02		
Analysis Date	11/06/02		11/06/02		11/07/02		
Date Received	08/15/02		08/15/02		08/23/02		
Percent Solids	68.5		68.5		50.4		
Dilution Factor	1		1		1		
Percent Lipids	NA		NA		NA		
Min Reporting Limit	0.024		0.024		0.033		
Units	RPD	Q	mg/Kg	mg/Kg	RPD	Q	mg/Kg

### SHC/TPH

n-Nonane	12		0.0043 J	0.0041 J	4.8		0.0034 J
n-Decane	13		0.0094 J	0.011 J	16		0.0098 J
n-Undecane	15		0.012 J	0.014 J	15		0.017 J
n-Dodecane	18		0.02 J	0.022 J	9.5		0.03 J
n-Tridecane	11		0.029	0.03	3.4		0.047
Isoprenoid RRT 1380	18		0.0084 J	0.0086 J	2.4		0.014 J
n-Tetradecane	4.5		0.035	0.034	2.9		0.06
Isoprenoid RRT 1470	11		0.02 J	0.02 J	0		0.039
n-Pentadecane	5		0.049	0.048	2.1		0.13
n-Hexadecane	7		0.047	0.047	0		0.1
Isoprenoid RRT 1650	11		0.023 J	0.021 J	9.1		0.029 J
n-Heptadecane	5.3		0.068	0.065	4.5		0.22
Pristane	7.5		0.056	0.056	0		0.081
n-Octadecane	7.6		0.051	0.053	3.8		0.086
Phytane	7.4		0.028	0.026	7.4		0.027 J
n-Nonadecane	0		0.083	0.081	2.4		0.16
n-Eicosane	4.1		0.081	0.076	6.4		0.14
n-Heneicosane	5.4		0.14	0.15	6.9		0.29
n-Docosane	6.9		0.11	0.12	8.7		0.22
n-Tricosane	5.3		0.25	0.26	3.9		0.58
n-Tetracosane	0		0.11	0.11	0		0.19
n-Pentacosane	2.6		0.29	0.29	0		0.67
n-Hexacosane	17		0.094 B	0.096 B	2.1		0.15
n-Heptacosane	0		0.44	0.44	0		0.96
n-Octacosane	19		0.084 B	0.086 B	2.4		0.12 B
n-Nonacosane	0		0.42	0.41	2.4		0.7
n-Triacontane	10		0.05 B	0.054 B	7.7		0.24
n-Hentriacontane	0		0.36	0.35	2.8		0.59
n-Dotriacontane	28		0.03 B	0.031 B	3.3		0.045 B
n-Tritriacontane	0		0.11	0.11	0		0.18
n-Tetratriacontane	15		0.011 JB	0.012 JB	8.7		0.018 J
n-Pentatriacontane	0		0.021 J	0.021 J	0		0.051
n-Hexatriacontane	4.1		0.0048 J	0.0049 J	2.1		0.008 J
n-Heptatriacontane	4.2		0.0056 J	0.0056 J	0		0.0086 J
n-Octatriacontane	0		0.0042 J	0.004 J	4.9		0.0068 J
n-Tetracontane	16		0.0026 J	0.0029 J	11		0.0046 J
TPH (RES)	3.3		5.1	4.9	4		9.5
TPH	12		9.6	8.9	7.6		18
%ortho-terphenyl			NA	NA			NA
%5A-androstane			95	94			97
%d50-tetracosane			105	106			103

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

	02-SAG-01-PHC-S			02-L09-01-PHC-S			02-L09-01-PHC-S DUP		
Field ID	DUP			N			DUP		
Sample Type	DUP			N			DUP		
Matrix	SEDIMENT			SEDIMENT			SEDIMENT		
Sample Size	15.33 g			23.63 g			23.63 g		
Weight Basis	DRY			DRY			DRY		
Associated Blank	DZ-S-29PB			DZ-S-65PB			DZ-S-65PB		
Field Date	08/14/02			07/30/02			07/30/02		
Extract Date	10/30/02			11/20/02			11/20/02		
Analysis Date	11/07/02			11/26/02			11/27/02		
Date Received	08/23/02			08/15/02			08/15/02		
Percent Solids	50.4			78.7			78.7		
Dilution Factor	1			1			1		
Percent Lipids	NA			NA			NA		
Min Reporting Limit	0.033			0.021			0.021		
Units	mg/Kg	RPD	Q	mg/Kg	RPD	Q	mg/Kg	RPD	Q

### SHC/TPH

n-Nonane	0.0035 J	2.9		0.0012 J		0.0014 J	15	
n-Decane	0.0083 J	16		0.0036 JB		0.0036 JB	0	
n-Undecane	0.017 J	0		0.0032 JB		0.0038 JB	17	
n-Dodecane	0.029 J	3.4		0.0049 JB		0.0062 JB	23	
n-Tridecane	0.046	2.2		0.006 JB		0.0069 JB	14	
Isoprenoid RRT 1380	0.014 J	0		0.0022 J		0.0024 J	8.7	
n-Tetradecane	0.059	1.7		0.0086 JB		0.0091 JB	5.6	
Isoprenoid RRT 1470	0.039	0		0.0056 J		0.0057 J	1.8	
n-Pentadecane	0.13	0		0.011 J		0.011 J	0	
n-Hexadecane	0.083	18		0.032 B		0.023 B	33	
Isoprenoid RRT 1650	0.03 J	3.4		0.0065 J		0.0068 J	4.5	
n-Heptadecane	0.21	4.6		0.016 J		0.016 J	0	
Pristane	0.086	6		0.014 J		0.012 J	15	
n-Octadecane	0.083	3.6		0.013 J		0.013 J	0	
Phytane	0.026 J	3.8		0.0055 J		0.005 J	9.5	
n-Nonadecane	0.16	0		0.019 J		0.02 J	5.1	
n-Eicosane	0.14	0		0.03		0.042	33	
n-Heneicosane	0.29	0		0.03		0.053	55	&
n-Docosane	0.21	4.6		0.026		0.042	47	&
n-Tricosane	0.61	5		0.055 B		0.064	15	
n-Tetracosane	0.21	10		0.032 B		0.044 B	32	
n-Pentacosane	0.87	26		0.072 B		0.085 B	16	
n-Hexacosane	0.19	24		0.044 B		0.058 B	27	
n-Heptacosane	1.2	22		0.1 B		0.12 B	18	
n-Octacosane	0.15	22		0.048 B		0.064 B	28	
n-Nonacosane	0.78	11		0.083 B		0.1 B	18	
n-Triacontane	0.25	4.1		0.055 B		0.066 B	18	
n-Hentriacontane	0.63	6.6		0.066 B		0.076 B	14	
n-Dotriacontane	0.053	16		0.017 JB		0.026 B	42	&
n-Tritriacontane	0.19	5.4		0.019 JB		0.024 B	23	
n-Tetratriacontane	0.019 J	5.4		0.0054 JB		0.007 JB	26	
n-Pentatriacontane	0.053	3.8		0.0047 JB		0.0055 JB	16	
n-Hexatriacontane	0.0086 J	7.2		0.0018 JB		0.0018 JB	0	
n-Heptatriacontane	0.0086 J	0		0.0013 JB		0.0012 JB	8	
n-Octatriacontane	0.0061 J	11		ND		ND		
n-Tetracontane	0.005 J	8.3		ND		ND		
TPH (RES)	10	5.1		1.5 B		1.6 B	6.4	
TPH	18	0		2 B		2 B	0	
%ortho-terphenyl	NA			NA		NA		
%5A-androstane	100			75		71		
%d50-tetracosane	109			80		76		

Arthur D. Little

Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control DUP

Field ID	00-N09-01-PHC-S	00-N09-01-PHC-S			00-C0L-01-PHC-S	00-C0L-01-PHC-S			00-N06-01-PHC-S	00-N06-01-PHC-S		
Lab ID	20A3528	20A3528DUP			20A3500	20A3500DUP			20A3468	20A3468DUP		
Sample Type	N	DUP			N	DUP			N	DUP		
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT		
Sample Size	19.82 g	19.96 g			24.52 g	24.52 g			19.64 g	19.2 g		
Weight Basis	DRY	DRY			DRY	DRY			DRY	DRY		
Associated Blank	DH-S-61PB	DH-S-61PB			DH-S-58PB	DH-S-58PB			DH-S-55PB	DH-S-55PB		
Field Date	08/18/00	08/18/00			08/24/00	08/24/00			08/17/00	08/17/00		
Extract Date	03/08/01	03/08/01			03/07/01	03/07/01			02/20/01	02/20/01		
Analysis Date	03/17/01	03/17/01			03/14/01	03/14/01			03/02/01	03/02/01		
Date Received	08/30/00	08/30/00			08/30/00	08/30/00			08/30/00	08/30/00		
Percent Solids	65.8	65.8			79.7	79.7			63.8	63.8		
Percent Lipids	NA	NA			NA	NA			NA	NA		
Min Reporting Limit	0.025	0.025			0.02	0.02			0.025	0.026		
Units	mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg	RPD	Q

SHC/TPH												
n-Nonane	0.0029 J	0.0028 J	3.5		0.00095 J	0.00084 J	12		0.0074 J	0.0058 J	24	
n-Decane	0.0055 J	0.0048 J	14		0.0026 J	0.0021 J	21		0.012 J	0.01 J	18	
n-Undecane	0.0075 J	0.0071 J	5.5		0.0044 J	0.0033 J	28		0.015 J	0.012 J	22	
n-Dodecane	0.0084 J	0.0078 J	7.4		0.0053 J	0.0039 J	30		0.016 J	0.013 J	21	
n-Tridecane	0.011 J	0.011 J	0		0.0074 J	0.0057 J	26		0.022 J	0.018 J	20	
Isoprenoid RRT 1380	0.0041 J	0.0037 J	10		0.0032 J	0.0028 J	13		0.0074 J	0.0056 J	28	
n-Tetradecane	0.014 J	0.012 J	15		0.0093 J	0.0079 J	16		0.027	0.02 J	30	
Isoprenoid RRT 1470	0.0096 J	0.0089 J	7.6		0.0078 J	0.0072 J	8		0.018 J	0.013 J	32	&
n-Pentadecane	0.019 J	0.017 J	11		0.018 J	0.017 J	5.7		0.038	0.03	24	
n-Hexadecane	0.019 J	0.017 J	11		0.013 J	0.013 J	0		0.039	0.034	14	
Isoprenoid RRT 1650	0.0093 J	0.0089 J	4.4		0.0076 J	0.0073 J	4		0.02 J	0.017 J	16	
n-Heptadecane	0.028	0.026	7.4		0.031	0.031	0		0.059	0.055	7	
Pristane	0.022 J	0.021 J	4.6		0.016 J	0.015 J	6.4		0.043	0.041	4.8	
n-Octadecane	0.024 J	0.022 J	8.7		0.018 J	0.018 J	0		0.048	0.044	8.7	
Phytane	0.0094 J	0.0099 J	5.2		0.0079 J	0.0074 J	6.5		0.019 J	0.018 J	5.4	
n-Nonadecane	0.034	0.033	3		0.028	0.028	0		0.07	0.068	2.9	
n-Eicosane	0.03	0.032	6.4		0.027	0.029	7.1		0.059	0.056	5.2	
n-Heneicosane	0.059	0.059	0		0.058	0.063	8.3		0.12	0.12	0	
n-Docosane	0.043	0.044	2.3		0.042	0.044	4.6		0.089	0.086	3.4	
n-Tricosane	0.12	0.13	8		0.17	0.18	5.7		0.25	0.24	4.1	
n-Tetracosane	0.042	0.05	17		0.046	0.044	4.4		0.074	0.07	5.6	
n-Pentacosane	0.12	0.13	8		0.13	0.14	7.4		0.23	0.22	4.4	
n-Hexacosane	0.044 B	0.063 B	36	&	0.037	0.038	2.7		0.071	0.06	17	
n-Heptacosane	0.16 B	0.18 B	12		0.14	0.15	6.9		0.32	0.29	9.8	
n-Octacosane	0.039 B	0.061 B	44	&	0.031 B	0.033 B	6.2		0.053	0.044	18	
n-Nonacosane	0.13 B	0.15 B	14		0.098	0.1	2		0.23	0.21	9.1	
n-Triacontane	0.048 B	0.067 B	33	&	0.025 B	0.024 B	4.1		0.082	0.083	1.2	
n-Hentriacontane	0.1 B	0.12	18		0.07	0.072	2.8		0.2	0.18	10	
n-Dotriacontane	0.014 JB	0.025 B	56	&	0.01 JB	0.011 JB	9.5		0.038	0.038	0	
n-Tritriacontane	0.034 B	0.039 B	14		0.029	0.03	3.4		0.052	0.047	10	
n-Tetraatriacontane	0.0046 JB	0.0084 JB	58	&	0.0052 JB	0.0052 JB	0		0.006 J	0.0052 J	14	
n-Pentatriacontane	0.0071 JB	0.0093 JB	27		0.0086 J	0.0088 J	2.3		0.01 J	0.0098 J	2	
n-Hexatriacontane	0.0023 JB	0.0038 JB	49	&	0.0028 JB	0.0029 JB	3.5		0.0035 J	0.0031 J	12	
n-Heptatriacontane	0.0027 JB	0.0029 JB	7.1		0.0024 J	0.0023 J	4.2		0.0028 J	0.0025 J	11	
n-Octatriacontane	0.0024 J	0.0021 J	13		0.0019 JB	0.002 JB	5.1		0.0021 J	0.002 J	4.9	
n-Nonatriacontane	ND	0.0012 J			0.0016 J	0.0013 J	21		0.0017 J	0.0013 J	27	
n-Tetracontane	ND	0.0012 J			0.0017 J	0.0016 J	6.1		0.002 J	0.0013 J	42	&
TPH (RES)	1.9 B	2 B	5.1		1.7	1.7	0		3.4	3.1	9.2	
TPH	4.1	3.7	10		4.3	3.3	26		7.1	6.4	10	
%ortho-terphenyl	0 &	0 &			0 &	0 &			0 &	0 &		
%5A-androstane	69	66			82	83			84	78		
%d50-tetracosane	75	73			89	89			88	83		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank	Blank Spike				Procedural Blank	Blank Spike
Sample Type	PB	BS				PB	BS
Matrix	SEDIMENT	SEDIMENT				SEDIMENT	SEDIMENT
Sample Size	20 g	20 g				20 g	20 g
Weight Basis	DRY	DRY				DRY	DRY
Associated Blank	NA	EB-S-63PB				NA	DY-S-66PB
Field Date	02/21/03	02/21/03				10/16/02	10/16/02
Extract Date	02/21/03	02/21/03				10/16/02	10/16/02
Analysis Date	02/28/03	03/01/03				10/25/02	10/25/02
Date Received	02/21/03	02/21/03				10/16/02	10/16/02
Percent Solids	100	100				100	100
Dilution Factor	1	1				1	1
Percent Lipids	NA	NA				NA	NA
Min Reporting Limit	0.025	0.025				0.025	0.025
Units	mg/Kg	mg/Kg	T	%R	Q	mg/Kg	mg/Kg
<b>SHC/TPH</b>							
n-Nonane	ND	ND				ND	ND
n-Decane	ND	0.71	1.25	57		0.0015 J	1.2
n-Undecane	ND	ND				ND	0.0011 J
n-Dodecane	ND	ND				0.0016 J	0.002 JB
n-Tridecane	ND	ND				ND	0.0012 J
Isoprenoid RRT 1380	ND	ND				ND	ND
n-Tetradecane	ND	0.003 J				0.002 J	0.0075 JB
Isoprenoid RRT 1470	ND	ND				ND	0.0014 J
n-Pentadecane	ND	1	1.25	80		ND	1.9
n-Hexadecane	ND	0.0013 J				0.016 J	0.015 JB
Isoprenoid RRT 1650	ND	ND				ND	0.0014 J
n-Heptadecane	ND	ND				0.00086 J	0.0022 JB
Pristane	ND	1.1	1.25	88		ND	2.3
n-Octadecane	ND	0.0011 J				0.0015 J	0.003 JB
Phytane	ND	0.006 J				ND	0.012 J
n-Nonadecane	ND	ND				ND	0.0022 J
n-Eicosane	ND	1.2	1.25	96		0.0012 J	2.4
n-Heneicosane	ND	0.00086 J				0.0014 J	0.0039 JB
n-Docosane	0.0012 J	0.0015 JB				0.0021 J	0.0047 JB
n-Tricosane	0.0045 J	0.004 JB				0.005 J	0.0083 JB
n-Tetracosane	0.0034 J	0.0054 JB				0.0058 J	0.016 JB
n-Pentacosane	0.0068 J	1.3	1.25	103		0.0086 J	2.4
n-Hexacosane	0.0079 J	0.013 JB				0.0098 J	0.036 B
n-Heptacosane	0.011 J	0.011 JB				0.012 J	0.036 B
n-Octacosane	0.0085 J	0.011 JB				0.011 J	0.038 B
n-Nonacosane	0.0082 J	0.012 JB				0.011 J	0.041 B
n-Triacontane	0.0072 J	1.2	1.25	95		0.0081 J	2.3
n-Hentriacontane	0.0061 J	0.0072 JB				0.0076 J	0.029 B
n-Dotriacontane	0.0031 J	0.0095 JB				0.004 J	0.027
n-Tritriacontane	0.0034 J	0.004 JB				0.0027 J	0.012 JB
n-Tetracontane	0.0035 J	1.1	1.25	88		0.0012 J	2.3
n-Pentatriacontane	0.0013 J	0.0034 JB				ND	0.0078 J
n-Hexatriacontane	0.002 J	1	1.25	80		ND	2.2
n-Heptatriacontane	ND	ND				ND	0.0016 J
n-Octatriacontane	ND	ND				ND	0.0036 J
n-Tetracontane	ND	ND				ND	0.0025 J
TPH (RES)	0.4 J	9.6				0.35 J	17
TPH	0.4 J	9.6				0.35 J	17
%ortho-terphenyl	NA	NA				NA	NA
%5A-androstane	75	74				86	93
%d50-tetracosane	86	83				102	106

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Procedural Blank			Blank Spike			Procedural Blank			
Sample Type	PB			BS			PB			
Matrix	SEDIMENT			SEDIMENT			SEDIMENT			
Sample Size	20 g			20 g			20 g			
Weight Basis	DRY			DRY			DRY			
Associated Blank	NA			DZ-S-03PB			NA			
Field Date	10/28/02			10/28/02			10/30/02			
Extract Date	10/28/02			10/28/02			10/30/02			
Analysis Date	11/04/02			11/05/02			11/07/02			
Date Received	10/28/02			10/28/02			10/30/02			
Percent Solids	100			100			100			
Dilution Factor	1			1			1			
Percent Lipids	NA			NA			NA			
Min Reporting Limit	0.025			0.025			0.025			
Units	T	%R	Q	mg/Kg			T	%R	Q	mg/Kg
<b>SHC/TPH</b>										
n-Nonane				ND			ND			ND
n-Decane	2.5	48		0.0017 J			1.2	2.5	48	0.0013 J
n-Undecane				0.0013 J			0.0014 JB			0.00083 J
n-Dodecane				0.0032 J			0.0041 JB			0.0019 J
n-Tridecane				0.0017 J			0.0016 JB			0.00092 J
Isoprenoid RRT 1380				ND			ND			ND
n-Tetradecane				0.0037 J			0.0086 JB			0.0028 J
Isoprenoid RRT 1470				ND			0.0018 J			ND
n-Pentadecane	2.5	76		0.0011 J			1.7	2.5	68	0.00084 J
n-Hexadecane				0.0035 J			0.021 J			0.0053 J
Isoprenoid RRT 1650				0.0012 J			0.0013 JB			0.001 J
n-Heptadecane				0.0018 J			ND			0.0011 J
Pristane	2.5	92		ND			2	2.5	80	ND
n-Octadecane				0.0035 J			0.004 JB			0.0019 J
Phytane				ND			0.0098 J			ND
n-Nonadecane				0.0019 J			0.0024 JB			0.0012 J
n-Eicosane	2.5	96		0.0037 J			2.3	2.5	92	0.005 J
n-Heneicosane				0.0052 J			0.0025 JB			0.0081 J
n-Docosane				0.007 J			0.0038 JB			0.0079 J
n-Tricosane				0.012 J			0.0087 JB			0.012 J
n-Tetracosane				0.016 J			0.016 JB			0.015 J
n-Pentacosane	2.5	96		0.023 J			2.3	2.5	91	0.02 J
n-Hexacosane				0.026			0.03 B			0.023 J
n-Heptacosane				0.031			0.026 B			0.028
n-Octacosane				0.028			0.025 B			0.026
n-Nonacosane				0.027			0.027 B			0.025
n-Triacontane	2.5	92		0.021 J			2.3	2.5	91	0.019 J
n-Hentriacontane				0.018 J			0.017 JB			0.017 J
n-Dotriacontane				0.011 J			0.02 JB			0.01 J
n-Tritriacontane				0.0066 J			0.0075 JB			0.0062 J
n-Tetracontane	2.5	92		0.0034 J			2.2	2.5	88	0.0029 J
n-Pentatriacontane				0.0018 J			0.0064 JB			0.0016 J
n-Hexatriacontane	2.5	88		0.00081 J			2.1	2.5	84	ND
n-Heptatriacontane				ND			0.0011 J			ND
n-Octatriacontane				ND			0.003 J			ND
n-Tetracontane				ND			0.0021 J			ND
TPH (RES)				0.52 J			17			0.35 J
TPH				0.52 J			17			0.35 J
%ortho-terphenyl				NA			NA			NA
%5A-androstane				82			83			80
%d50-tetracosane				108			96			108

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: BS-BSD - Surrogate Corrected

Field ID	Blank Spike				Procedural Blank				Blank Spike
Sample Type	BS				PB				BS
Matrix	SEDIMENT				SEDIMENT				SEDIMENT
Sample Size	20 g				25 g				25 g
Weight Basis	DRY				DRY				DRY
Associated Blank	DZ-S-29PB				NA				DZ-S-65PB
Field Date	10/30/02				11/20/02				11/20/02
Extract Date	10/30/02				11/20/02				11/20/02
Analysis Date	11/07/02				11/26/02				11/26/02
Date Received	10/30/02				11/20/02				11/20/02
Percent Solids	100				100				100
Dilution Factor	1				1				1
Percent Lipids	NA				NA				NA
Min Reporting Limit	0.025				0.02				0.02
Units	mg/Kg	T	%R	Q	mg/Kg	mg/Kg	T	%R	Q
<b>SHC/TPH</b>									
n-Nonane	ND				ND				
n-Decane	0.98	2.5	39		0.0026 J		1.1	2	55
n-Undecane	ND				0.0013 J		0.001 JB		
n-Dodecane	0.0017 JB				0.0033 J		0.0023 JB		
n-Tridecane	0.00089 JB				0.0014 J		0.0012 JB		
Isoprenoid RRT 1380	ND				ND		ND		
n-Tetradecane	0.0057 JB				0.0045 J		0.0068 JB		
Isoprenoid RRT 1470	0.00093 J				ND		0.0011 J		
n-Pentadecane	1.5	2.5	60		0.0012 J		1.6	2	80
n-Hexadecane	0.0026 JB				0.0068 J		0.018 JB		
Isoprenoid RRT 1650	ND				ND		0.00088 J		
n-Heptadecane	0.0018 JB				0.0015 J		ND		
Pristane	2	2.5	80		ND		1.9	2	95
n-Octadecane	0.0029 JB				0.0026 J		0.0031 JB		
Phytane	0.011 J				ND		0.0098 J		
n-Nonadecane	0.0018 JB				0.0012 J		0.0018 JB		
n-Eicosane	2.2	2.5	88		0.0023 J		2	2	100
n-Heneicosane	0.0035 JB				0.0021 J		0.0064 JB		
n-Docosane	0.0049 JB				0.0045 J		0.0068 JB		
n-Tricosane	0.0087 JB				0.012 J		0.011 JB		
n-Tetracosane	0.014 JB				0.019 J		0.02 B		
n-Pentacosane	2.2	2.5	87		0.031		2	2	98
n-Hexacosane	0.022 JB				0.037		0.038 B		
n-Heptacosane	0.016 JB				0.045		0.038 B		
n-Octacosane	0.015 JB				0.042		0.037 B		
n-Nonacosane	0.017 JB				0.039		0.039 B		
n-Triacontane	2.2	2.5	87		0.031		2	2	98
n-Hentriacontane	0.01 JB				0.026		0.024 B		
n-Dotriacontane	0.016 JB				0.016 J		0.023 B		
n-Tritriacontane	0.005 JB				0.01 J		0.0098 JB		
n-Tettratriacontane	2.1	2.5	84		0.0054 J		1.9	2	95
n-Pentatriacontane	0.0059 JB				0.0026 J		0.0071 JB		
n-Hexatriacontane	2	2.5	80		0.0012 J		1.8	2	90
n-Heptatriacontane	0.0012 J				0.0007 J		0.0017 JB		
n-Octatriacontane	0.003 J				ND		0.0033 J		
n-Tetracontane	0.002 J				ND		0.0024 J		
TPH (RES)	15				1.3		15		
TPH	15				1.3		15		
%ortho-terphenyl	NA				NA		NA		
%5A-androstane	84				84		92		
%d50-tetracosane	104				102		108		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

Field ID	02-L01-01-PHC-S	02-L01-01-PHC-S DUP			02-N10-01-PHC-S	02-N10-01-PHC-S DUP		
Sample Type	N	DUP			N	DUP		
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT		
Sample Size	23.63 g	23.65 g			17.49 g	17.46 g		
Weight Basis	DRY	DRY			DRY	DRY		
Associated Blank	EB-S-63PB	EB-S-63PB			DY-S-66PB	DY-S-66PB		
Field Date	07/31/02	07/31/02			08/02/02	08/02/02		
Extract Date	02/21/03	02/21/03			10/16/02	10/16/02		
Analysis Date	03/03/03	03/03/03			10/25/02	10/25/02		
Date Received	08/15/02	08/15/02			08/15/02	08/15/02		
Percent Solids	78.6	78.6			57.2	57.2		
Dilution Factor	1	1			1	1		
Percent Lipids	NA	NA			NA	NA		
Min Reporting Limit	0.021	0.021			0.028	0.029		
Units	mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg	RPD	
<b>SHC/TPH</b>								
n-Nonane	ND	ND			0.007 J	0.0062 J		12
n-Decane	0.0023 J	0.002 J	14		0.016 J	0.014 J		13
n-Undecane	0.0019 J	0.0022 J	15		0.022 J	0.019 J		15
n-Dodecane	0.0051 J	0.0036 J	34		0.03	0.025 J		18
n-Tridecane	0.005 J	0.0045 J	10		0.038	0.034		11
Isoprenoid RRT 1380	0.002 J	0.0015 J	28		0.012 J	0.01 J		18
n-Tetradecane	0.0052 J	0.005 J	3.9		0.045	0.043		4.5
Isoprenoid RRT 1470	0.0038 J	0.0033 J	14		0.029	0.026 J		11
n-Pentadecane	0.0076 J	0.0069 J	9.6		0.062	0.059		5
n-Hexadecane	0.01 J	0.0098 J	2		0.059 B	0.055 B		7
Isoprenoid RRT 1650	0.0038 J	0.0027 J	34		0.028	0.025 J		11
n-Heptadecane	0.015 J	0.014 J	6.9		0.096	0.091		5.3
Pristane	0.0086 J	0.0078 J	9.8		0.069	0.064		7.5
n-Octadecane	0.012 J	0.011 J	8.7		0.068	0.063		7.6
Phytane	0.0055 J	0.004 J	32		0.028	0.026 J		7.4
n-Nonadecane	0.015 J	0.013 J	14		0.11	0.11		0
n-Eicosane	0.016 J	0.014 J	13		0.1	0.096		4.1
n-Heneicosane	0.022	0.02 J	9.5		0.19	0.18		5.4
n-Docosane	0.019 J	0.018 J	5.4		0.15	0.14		6.9
n-Tricosane	0.039	0.039	0		0.39	0.37		5.3
n-Tetracosane	0.022	0.02 J	9.5		0.14	0.14		0
n-Pentacosane	0.046	0.047	2.2		0.39	0.38		2.6
n-Hexacosane	0.024 B	0.022 B	8.7		0.11	0.13		17
n-Heptacosane	0.066	0.067	1.5		0.53	0.53		0
n-Octacosane	0.022 B	0.02 JB	9.5		0.091	0.11		19
n-Nonacosane	0.054	0.057	5.4		0.41	0.41		0
n-Triacontane	0.015 JB	0.012 JB	22		0.28	0.31		10
n-Hentriacontane	0.045	0.041	9.3		0.35	0.35		0
n-Dotriacontane	0.011 JB	0.0097 JB	12		0.027 J	0.036		28
n-Tritriacontane	0.016 JB	0.012 JB	28		0.1	0.1		0
n-Tetracontane	0.0051 JB	0.003 JB	52	&	0.012 J	0.014 J		15
n-Pentatriacontane	0.0053 JB	0.003 JB	55	&	0.02 J	0.02 J		0
n-Hexatriacontane	0.0031 JB	ND			0.005 J	0.0048 J		4.1
n-Heptatriacontane	0.0026 J	ND			0.0049 J	0.0047 J		4.2
n-Octatriacontane	0.0024 J	ND			0.0035 J	0.0035 J		0
n-Tetracontane	ND	ND			0.0027 J	0.0023 J		16
TPH (RES)	1 B	0.96 B	4.1		6.1	5.9		3.3
TPH	2.9	4.7	47	&	11	9.8		12
%ortho-terphenyl	NA	NA			NA	NA		
%5A-androstane	76	79			93	96		
%d50-tetracosane	79	81			96	99		



Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

Field ID	02-N23-01-PHC-S	02-N23-01-PHC-S DUP			02-SAG-01-PHC-S	02-SAG-01-PHC-S
Sample Type	N	DUP			N	DUP
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT
Sample Size	20.6 g	20.65 g			15.32 g	15.33 g
Weight Basis	DRY	DRY			DRY	DRY
Associated Blank	DZ-S-03PB	DZ-S-03PB			DZ-S-29PB	DZ-S-29PB
Field Date	08/05/02	08/05/02			08/14/02	08/14/02
Extract Date	10/28/02	10/28/02			10/30/02	10/30/02
Analysis Date	11/06/02	11/06/02			11/07/02	11/07/02
Date Received	08/15/02	08/15/02			08/23/02	08/23/02
Percent Solids	68.5	68.5			50.4	50.4
Dilution Factor	1	1			1	1
Percent Lipids	NA	NA			NA	NA
Min Reporting Limit	0.024	0.024			0.033	0.033
Units	Q mg/Kg	mg/Kg	RPD	Q	mg/Kg	mg/Kg

**SHC/TPH**

n-Nonane	0.0043 J	0.0041 J	4.8		0.0034 J	0.0035 J
n-Decane	0.0094 J	0.011 J	16		0.0098 J	0.0083 J
n-Undecane	0.012 J	0.014 J	15		0.017 J	0.017 J
n-Dodecane	0.02 J	0.022 J	9.5		0.03 J	0.029 J
n-Tridecane	0.029	0.03	3.4		0.047	0.046
Isoprenoid RRT 1380	0.0084 J	0.0086 J	2.4		0.014 J	0.014 J
n-Tetradecane	0.035	0.034	2.9		0.06	0.059
Isoprenoid RRT 1470	0.02 J	0.02 J	0		0.039	0.039
n-Pentadecane	0.049	0.048	2.1		0.13	0.13
n-Hexadecane	0.047	0.047	0		0.1	0.083
Isoprenoid RRT 1650	0.023 J	0.021 J	9.1		0.029 J	0.03 J
n-Heptadecane	0.068	0.065	4.5		0.22	0.21
Pristane	0.056	0.056	0		0.081	0.086
n-Octadecane	0.051	0.053	3.8		0.086	0.083
Phytane	0.028	0.026	7.4		0.027 J	0.026 J
n-Nonadecane	0.083	0.081	2.4		0.16	0.16
n-Eicosane	0.081	0.076	6.4		0.14	0.14
n-Heneicosane	0.14	0.15	6.9		0.29	0.29
n-Docosane	0.11	0.12	8.7		0.22	0.21
n-Tricosane	0.25	0.26	3.9		0.58	0.61
n-Tetracosane	0.11	0.11	0		0.19	0.21
n-Pentacosane	0.29	0.29	0		0.67	0.87
n-Hexacosane	0.094 B	0.096 B	2.1		0.15	0.19
n-Heptacosane	0.44	0.44	0		0.96	1.2
n-Octacosane	0.084 B	0.086 B	2.4		0.12 B	0.15
n-Nonacosane	0.42	0.41	2.4		0.7	0.78
n-Triacontane	0.05 B	0.054 B	7.7		0.24	0.25
n-Hentriacontane	0.36	0.35	2.8		0.59	0.63
n-Dotriacontane	0.03 B	0.031 B	3.3		0.045 B	0.053
n-Tritriacontane	0.11	0.11	0		0.18	0.19
n-Tetracontane	0.011 JB	0.012 JB	8.7		0.018 J	0.019 J
n-Pentatriacontane	0.021 J	0.021 J	0		0.051	0.053
n-Hexatriacontane	0.0048 J	0.0049 J	2.1		0.008 J	0.0086 J
n-Heptatriacontane	0.0056 J	0.0056 J	0		0.0086 J	0.0086 J
n-Octatriacontane	0.0042 J	0.004 J	4.9		0.0068 J	0.0061 J
n-Tetracontane	0.0026 J	0.0029 J	11		0.0046 J	0.005 J
TPH (RES)	5.1	4.9	4		9.5	10
TPH	9.6	8.9	7.6		18	18
%ortho-terphenyl	NA	NA			NA	NA
%5A-androstane	95	94			97	100
%d50-tetracosane	105	106			103	109

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: DUP - Surrogate Corrected

Field ID	02-L09-01-PHC-S		02-L09-01-PHC-S DUP			
Sample Type	N		DUP			
Matrix	SEDIMENT		SEDIMENT			
Sample Size	23.63 g		23.63 g			
Weight Basis	DRY		DRY			
Associated Blank	DZ-S-65PB		DZ-S-65PB			
Field Date	07/30/02		07/30/02			
Extract Date	11/20/02		11/20/02			
Analysis Date	11/26/02		11/27/02			
Date Received	08/15/02		08/15/02			
Percent Solids	78.7		78.7			
Dilution Factor	1		1			
Percent Lipids	NA		NA			
Min Reporting Limit	0.021		0.021			
Units	RPD	Q	mg/Kg	mg/Kg	RPD	Q
<b>SHC/TPH</b>						
n-Nonane	2.9		0.0012 J	0.0014 J	15	
n-Decane	16		0.0036 JB	0.0036 JB	0	
n-Undecane	0		0.0032 JB	0.0038 JB	17	
n-Dodecane	3.4		0.0049 JB	0.0062 JB	23	
n-Tridecane	2.2		0.006 JB	0.0069 JB	14	
Isoprenoid RRT 1380	0		0.0022 J	0.0024 J	8.7	
n-Tetradecane	1.7		0.0086 JB	0.0091 JB	5.6	
Isoprenoid RRT 1470	0		0.0056 J	0.0057 J	1.8	
n-Pentadecane	0		0.011 J	0.011 J	0	
n-Hexadecane	18		0.032 B	0.023 B	33	
Isoprenoid RRT 1650	3.4		0.0065 J	0.0068 J	4.5	
n-Heptadecane	4.6		0.016 J	0.016 J	0	
Pristane	6		0.014 J	0.012 J	15	
n-Octadecane	3.6		0.013 J	0.013 J	0	
Phytane	3.8		0.0055 J	0.005 J	9.5	
n-Nonadecane	0		0.019 J	0.02 J	5.1	
n-Eicosane	0		0.03	0.042	33	
n-Heneicosane	0		0.03	0.053	55	&
n-Docosane	4.6		0.026	0.042	47	&
n-Tricosane	5		0.055 B	0.064	15	
n-Tetracosane	10		0.032 B	0.044 B	32	
n-Pentacosane	26		0.072 B	0.085 B	16	
n-Hexacosane	24		0.044 B	0.058 B	27	
n-Heptacosane	22		0.1 B	0.12 B	18	
n-Octacosane	22		0.048 B	0.064 B	28	
n-Nonacosane	11		0.083 B	0.1 B	18	
n-Triacontane	4.1		0.055 B	0.066 B	18	
n-Hentriacontane	6.6		0.066 B	0.076 B	14	
n-Dotriacontane	16		0.017 JB	0.026 B	42	&
n-Tritriacontane	5.4		0.019 JB	0.024 B	23	
n-Tetratriacontane	5.4		0.0054 JB	0.007 JB	26	
n-Pentatriacontane	3.8		0.0047 JB	0.0055 JB	16	
n-Hexatriacontane	7.2		0.0018 JB	0.0018 JB	0	
n-Heptatriacontane	0		0.0013 JB	0.0012 JB	8	
n-Octatriacontane	11		ND	ND		
n-Tetracontane	8.3		ND	ND		
TPH (RES)	5.1		1.5 B	1.6 B	6.4	
TPH	0		2 B	2 B	0	
%ortho-terphenyl			NA	NA		
%5A-androstane			75	71		
%d50-tetracosane			80	76		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS				ORS				ORS			
Sample Type	OIL				OIL				OIL			
Matrix	OIL				OIL				OIL			
Sample Size	5.02 mg				5.02 mg				5.02 mg			
Weight Basis	OIL				WET				OIL			
Associated Blank	NA				NA				NA			
Field Date	05/16/02				05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02				05/16/02			
Analysis Date	02/26/03				03/03/03				10/24/02			
Date Received	05/16/02				05/16/02				05/16/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	0.199				0.199				0.199			
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q	ug/mg	T		
<b>SHC/TPH</b>												
n-Nonane	5.62	4.8	17.1		5.18	4.8	7.92		5.23	4.8		
n-Decane	4.51	4.2	7.38		4.37	4.2	4.05		4.41	4.2		
n-Undecane	4.77	4.3	10.9		4.66	4.3	8.37		4.24	4.3		
n-Dodecane	4.27	4	6.75		4.07	4	1.75		4.13	4		
n-Tridecane	4.31	4	7.75		3.9	4	-2.5		3.64	4		
Isoprenoid RRT 1380	1.04	1	4		1.1	1	10		1.3	1		
n-Tetradecane	4.78	4.2	13.8		4.78	4.2	13.8		4.69	4.2		
Isoprenoid RRT 1470	1.58	1.4	12.8		1.47	1.4	5		1.53	1.4		
n-Pentadecane	4.14	3.7	11.9		4.09	3.7	10.5		3.53	3.7		
n-Hexadecane	3.52	3.2	10		3.24	3.2	1.25		3.38	3.2		
Isoprenoid RRT 1650	1.6	1.5	6.67		1.39	1.5	-7.33		1.5	1.5		
n-Heptadecane	3.48	3.2	8.75		3.5	3.2	9.37		3	3.2		
Pristane	2.14	2.2	-2.73		2.26	2.2	2.73		2.33	2.2		
n-Octadecane	2.8	2.9	-3.45		2.83	2.9	-2.41		2.43	2.9		
Phytane	1.51	1.6	-5.62		1.55	1.6	-3.12		1.41	1.6		
n-Nonadecane	2.46	2.6	-5.38		2.41	2.6	-7.31		2.28	2.6		
n-Eicosane	2.56	2.7	-5.18		2.54	2.7	-5.92		2.37	2.7		
n-Heneicosane	2.31	2.4	-3.75		2.24	2.4	-6.67		2.21	2.4		
n-Docosane	2.24	2.2	1.82		2.19	2.2	-0.454		2.33	2.2		
n-Tricosane	2.15	2	7.5		2.09	2	4.5		2.05	2		
n-Tetracosane	1.96	2	-2		1.9	2	-5		1.88	2		
n-Pentacosane	1.69	1.7	-0.588		1.66	1.7	-2.35		1.73	1.7		
n-Hexacosane	1.51	1.5	0.667		1.47	1.5	-2		1.53	1.5		
n-Heptacosane	1.25	1.2	4.17		1.22	1.2	1.67		1.1	1.2		
n-Octacosane	0.967	0.88	9.89		0.918	0.88	4.32		0.94	0.88		
n-Nonacosane	0.842	0.81	3.95		0.834	0.81	2.96		0.732	0.81		
n-Triacontane	0.663	0.65	2		0.66	0.65	1.54		0.641	0.65		
n-Hentriacontane	0.589	0.58	1.55		0.569	0.58	-1.9		0.58	0.58		
n-Dotriacontane	0.448	0.44	1.82		0.448	0.44	1.82		0.408	0.44		
n-Tritriacontane	0.368	0.4	-8		0.36	0.4	-10		0.383	0.4		
n-Tetracontane	0.369	0.35	5.43		0.374	0.35	6.86		0.342	0.35		
n-Pentatriacontane	0.35	0.35	0		0.327	0.35	-6.57		0.441	0.35		
n-Hexatriacontane	0.198 J	0.23	-13.9		0.216	0.23	-6.09		0.233	0.23		
n-Heptatriacontane	0.23	0.23	0		0.257	0.23	11.7		0.234	0.23		
n-Octatriacontane	0.225	0.22	2.27		0.215	0.22	-2.27		0.23	0.22		
n-Tetracontane	0.18 J	0.19	-5.26		0.187 J	0.19	-1.58		0.177 J	0.19		
TPH (RES)	198	220	-10		195	220	-11.4		184	220		
TPH	661	660	0.152		634	660	-3.94		632	660		
%ortho-terphenyl	104				105				97			
%5A-androstane	104				105				96			
%d50-tetracosane	102				104				101			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard					Oil Reference Standard					Oil Reference Standard				
	ORS					ORS					ORS				
Sample Type	OIL					OIL					OIL				
Matrix	5.02 mg					5.02 mg					5.02 mg				
Sample Size	OIL					OIL					OIL				
Weight Basis	NA					NA					NA				
Associated Blank	05/16/02					05/16/02					05/16/02				
Field Date	05/16/02					05/16/02					05/16/02				
Extract Date	10/24/02					11/04/02					11/04/02				
Analysis Date	05/16/02					05/16/02					05/16/02				
Date Received	NA					NA					NA				
Percent Solids	1					1					1				
Dilution Factor	NA					NA					NA				
Percent Lipids	0.199					0.199					0.199				
Min Reporting Limit	%D	Q	ug/mg	T	%D	Q	ug/mg	T	%D	Q	ug/mg	T	%D	Q	ug/mg
<b>SHC/TPH</b>															
n-Nonane	8.96		5.18	4.8	7.92		5.14	4.8	7.08		5.24				
n-Decane	5		4.26	4.2	1.43		4.32	4.2	2.86		4.31				
n-Undecane	-1.4		4.3	4.3	0		4.18	4.3	-2.79		4.31				
n-Dodecane	3.25		4.14	4	3.5		4.14	4	3.5		4.23				
n-Tridecane	-9		3.79	4	-5.25		3.66	4	-8.5		3.89				
Isoprenoid RRT 1380	30		1.3	1	30		1.26	1	26		1.27				
n-Tetradecane	11.7		4.6	4.2	9.52		4.35	4.2	3.57		4.58				
Isoprenoid RRT 1470	9.28		1.52	1.4	8.57		1.46	1.4	4.28		1.47				
n-Pentadecane	-4.59		3.54	3.7	-4.32		3.61	3.7	-2.43		3.48				
n-Hexadecane	5.62		3.39	3.2	5.94		3.35	3.2	4.69		3.42				
Isoprenoid RRT 1650	0		1.68	1.5	12		1.47	1.5	-2		1.66				
n-Heptadecane	-6.25		2.86	3.2	-10.6		2.76	3.2	-13.8		2.92				
Pristane	5.91		2.05	2.2	-6.82		2.03	2.2	-7.73		2.09				
n-Octadecane	-16.2		2.76	2.9	-4.83		2.47	2.9	-14.8		2.61				
Phytane	-11.9		1.36	1.6	-15		1.43	1.6	-10.6		1.37				
n-Nonadecane	-12.3		2.43	2.6	-6.54		2.37	2.6	-8.85		2.4				
n-Eicosane	-12.2		2.59	2.7	-4.07		2.42	2.7	-10.4		2.35				
n-Heneicosane	-7.92		2.22	2.4	-7.5		2.36	2.4	-1.67		2.2				
n-Docosane	5.91		2.2	2.2	0		2.33	2.2	5.91		2.22				
n-Tricosane	2.5		2.05	2	2.5		2.07	2	3.5		2.02				
n-Tetracosane	-6		1.89	2	-5.5		1.92	2	-4		1.84				
n-Pentacosane	1.76		1.62	1.7	-4.7		1.74	1.7	2.35		1.63				
n-Hexacosane	2		1.46	1.5	-2.67		1.55	1.5	3.33		1.45				
n-Heptacosane	-8.33		1.09	1.2	-9.17		1.08	1.2	-10		1.08				
n-Octacosane	6.82		0.922	0.88	4.77		0.924	0.88	5		0.901				
n-Nonacosane	-9.63		0.758	0.81	-6.42		0.728	0.81	-10.1		0.773				
n-Triacontane	-1.38		0.671	0.65	3.23		0.672	0.65	3.38		0.662				
n-Hentriacontane	0		0.748	0.58	29		0.591	0.58	1.9		0.76				
n-Dotriacontane	-7.27		0.427	0.44	-2.95		0.422	0.44	-4.09		0.429				
n-Tritriacontane	-4.25		0.375	0.4	-6.25		0.35	0.4	-12.5		0.38				
n-Tetratriacontane	-2.28		0.365	0.35	4.28		0.34	0.35	-2.86		0.318				
n-Pentatriacontane	26		0.377	0.35	7.71		0.418	0.35	19.4		0.398				
n-Hexatriacontane	1.3		0.28	0.23	21.7		0.235	0.23	2.17		0.285				
n-Heptatriacontane	1.74		0.24	0.23	4.35		0.23	0.23	0		0.229				
n-Octatriacontane	4.54		0.226	0.22	2.73		0.219	0.22	-0.454		0.216				
n-Tetracontane	-6.84		0.18 J	0.19	-5.26		0.161 J	0.19	-15.3		0.195				
TPH (RES)	-16.4		171	220	-22.3		183	220	-16.8		172				
TPH	-4.24		628	660	-4.85		621	660	-5.91		632				
%ortho-terphenyl			97				100				95				
%5A-androstane			98				98				99				
%d50-tetracosane			102				103				101				

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard			Oil Reference Standard					
	T	%D	Q	T	%D	Q			
Sample Type	ORS			ORS					
Matrix	OIL			OIL					
Sample Size	5.02 mg			5.02 mg					
Weight Basis	OIL			OIL					
Associated Blank	NA			NA					
Field Date	05/16/02			05/16/02					
Extract Date	05/16/02			05/16/02					
Analysis Date	11/06/02			11/06/02					
Date Received	05/16/02			05/16/02					
Percent Solids	NA			NA					
Dilution Factor	1			1					
Percent Lipids	NA			NA					
Min Reporting Limit	0.199			0.199					
Units	ug/mg			ug/mg					
<b>SHC/TPH</b>									
n-Nonane	4.8	9.17		5.08	4.8	5.83	5.12	4.8	6.67
n-Decane	4.2	2.62		4.34	4.2	3.33	4.38	4.2	4.28
n-Undecane	4.3	0.232		4.15	4.3	-3.49	4.23	4.3	-1.63
n-Dodecane	4	5.75		4.14	4	3.5	4.16	4	4
n-Tridecane	4	-2.75		3.64	4	-9	3.8	4	-5
Isoprenoid RRT 1380	1	27		1.25	1	25	1.26	1	26
n-Tetradecane	4.2	9.05		4.62	4.2	10	4.51	4.2	7.38
Isoprenoid RRT 1470	1.4	5		1.35	1.4	-3.57	1.45	1.4	3.57
n-Pentadecane	3.7	-5.94		3.6	3.7	-2.7	3.52	3.7	-4.86
n-Hexadecane	3.2	6.87		3.34	3.2	4.37	3.46	3.2	8.12
Isoprenoid RRT 1650	1.5	10.7		1.48	1.5	-1.33	1.65	1.5	10
n-Heptadecane	3.2	-8.75		2.79	3.2	-12.8	2.85	3.2	-10.9
Pristane	2.2	-5		2.29	2.2	4.09	1.98	2.2	-10
n-Octadecane	2.9	-10		2.43	2.9	-16.2	2.56	2.9	-11.7
Phytane	1.6	-14.4		1.43	1.6	-10.6	1.33	1.6	-16.9
n-Nonadecane	2.6	-7.69		2.31	2.6	-11.2	2.39	2.6	-8.08
n-Eicosane	2.7	-13		2.39	2.7	-11.5	2.51	2.7	-7.04
n-Heneicosane	2.4	-8.33		2.24	2.4	-6.67	2.22	2.4	-7.5
n-Docosane	2.2	0.909		2.31	2.2	5	2.2	2.2	0
n-Tricosane	2	1		2.1	2	5	2.02	2	1
n-Tetracosane	2	-8		1.89	2	-5.5	1.88	2	-6
n-Pentacosane	1.7	-4.12		1.75	1.7	2.94	1.62	1.7	-4.7
n-Hexacosane	1.5	-3.33		1.54	1.5	2.67	1.46	1.5	-2.67
n-Heptacosane	1.2	-10		1.08	1.2	-10	1.08	1.2	-10
n-Octacosane	0.88	2.39		0.934	0.88	6.14	0.893	0.88	1.48
n-Nonacosane	0.81	-4.57		0.716	0.81	-11.6	0.773	0.81	-4.57
n-Triacontane	0.65	1.85		0.64	0.65	-1.54	0.685	0.65	5.38
n-Hentriacontane	0.58	31		0.581	0.58	0.172	0.747	0.58	28.8
n-Dotriacontane	0.44	-2.5		0.417	0.44	-5.23	0.415	0.44	-5.68
n-Tritriacontane	0.4	-5		0.394	0.4	-1.5	0.348	0.4	-13
n-Tetracontane	0.35	-9.14		0.377	0.35	7.71	0.35	0.35	0
n-Pentatriacontane	0.35	13.7		0.44	0.35	25.7	0.392	0.35	12
n-Hexatriacontane	0.23	23.9		0.225	0.23	-2.17	0.27	0.23	17.4
n-Heptatriacontane	0.23	-0.435		0.23	0.23	0	0.229	0.23	-0.435
n-Octatriacontane	0.22	-1.82		0.218	0.22	-0.909	0.225	0.22	2.27
n-Tetracontane	J 0.19	2.63		0.15 J	0.19	-21	0.192 J	0.19	1.05
TPH (RES)	220	-21.8		182	220	-17.3	171	220	-22.3
TPH	660	-4.24		538	660	-18.5	621	660	-5.91
%ortho-terphenyl				99			96		
%5A-androstane				97			95		
%d50-tetracosane				103			101		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard				Oil Reference Standard			
	ORS				ORS				ORS			
Sample Type	OIL				OIL				OIL			
Matrix	OIL				OIL				OIL			
Sample Size	5.02 mg				5.02 mg				5.02 mg			
Weight Basis	OIL				OIL				OIL			
Associated Blank	NA				NA				NA			
Field Date	05/16/02				05/16/02				05/16/02			
Extract Date	05/16/02				05/16/02				05/16/02			
Analysis Date	11/25/02				11/25/02				12/10/02			
Date Received	05/16/02				05/16/02				05/16/02			
Percent Solids	NA				NA				NA			
Dilution Factor	1				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	0.199				0.199				0.199			
Units	ug/mg	T	%D	Q	ug/mg	T	%D	Q	ug/mg	T	%D	
<b>SHC/TPH</b>												
n-Nonane	5.11	4.8	6.46		5.29	4.8	10.2		5.19	4.8	8.12	
n-Decane	4.27	4.2	1.67		4.35	4.2	3.57		4.23	4.2	0.714	
n-Undecane	4.19	4.3	-2.56		4.32	4.3	0.465		4.2	4.3	-2.32	
n-Dodecane	4.16	4	4		4.24	4	6		4.1	4	2.5	
n-Tridecane	3.8	4	-5		3.8	4	-5		3.6	4	-10	
Isoprenoid RRT 1380	1.19	1	19		1.34	1	34		1.26	1	26	
n-Tetradecane	4.36	4.2	3.81		4.58	4.2	9.05		4.5	4.2	7.14	
Isoprenoid RRT 1470	1.5	1.4	7.14		1.49	1.4	6.43		1.42	1.4	1.43	
n-Pentadecane	3.62	3.7	-2.16		3.53	3.7	-4.59		3.5	3.7	-5.4	
n-Hexadecane	3.35	3.2	4.69		3.5	3.2	9.37		3.39	3.2	5.94	
Isoprenoid RRT 1650	1.53	1.5	2		1.71	1.5	14		1.5	1.5	0	
n-Heptadecane	2.72	3.2	-15		2.76	3.2	-13.8		3	3.2	-6.25	
Pristane	1.99	2.2	-9.54		2.01	2.2	-8.64		2.24	2.2	1.82	
n-Octadecane	2.41	2.9	-16.9		2.36	2.9	-18.6		2.47	2.9	-14.8	
Phytane	1.45	1.6	-9.38		1.22	1.6	-23.8		1.41	1.6	-11.9	
n-Nonadecane	2.24	2.6	-13.8		2.44	2.6	-6.15		2.28	2.6	-12.3	
n-Eicosane	2.34	2.7	-13.3		2.39	2.7	-11.5		2.25	2.7	-16.7	
n-Heneicosane	2.26	2.4	-5.83		2.23	2.4	-7.08		2.22	2.4	-7.5	
n-Docosane	2.31	2.2	5		2.28	2.2	3.64		2.29	2.2	4.09	
n-Tricosane	2.04	2	2		2.09	2	4.5		2.07	2	3.5	
n-Tetracosane	1.89	2	-5.5		1.92	2	-4		1.94	2	-3	
n-Pentacosane	1.76	1.7	3.53		1.64	1.7	-3.53		1.79	1.7	5.29	
n-Hexacosane	1.53	1.5	2		1.48	1.5	-1.33		1.52	1.5	1.33	
n-Heptacosane	1.09	1.2	-9.17		1.14	1.2	-5		1.12	1.2	-6.67	
n-Octacosane	0.938	0.88	6.59		0.936	0.88	6.36		0.94	0.88	6.82	
n-Nonacosane	0.746	0.81	-7.9		0.781	0.81	-3.58		0.774	0.81	-4.44	
n-Triacontane	0.641	0.65	-1.38		0.675	0.65	3.85		0.675	0.65	3.85	
n-Hentriacontane	0.602	0.58	3.79		0.753	0.58	29.8		0.59	0.58	1.72	
n-Dotriacontane	0.412	0.44	-6.36		0.418	0.44	-5		0.426	0.44	-3.18	
n-Tritriacontane	0.371	0.4	-7.25		0.358	0.4	-10.5		0.392	0.4	-2	
n-Tetracontane	0.353	0.35	0.857		0.384	0.35	9.71		0.359	0.35	2.57	
n-Pentatriacontane	0.47	0.35	34.3		0.415	0.35	18.6		0.406	0.35	16	
n-Hexatriacontane	0.233	0.23	1.3		0.285	0.23	23.9		0.238	0.23	3.48	
n-Heptatriacontane	0.257	0.23	11.7		0.244	0.23	6.09		0.228	0.23	-0.87	
n-Octatriacontane	0.235	0.22	6.82		0.246	0.22	11.8		0.217	0.22	-1.36	
n-Tetracontane	0.192 J	0.19	1.05		0.193 J	0.19	1.58		0.178 J	0.19	-6.32	
TPH (RES)	185	220	-15.9		173	220	-21.4		204	220	-7.27	
TPH	634	660	-3.94		633	660	-4.09		630	660	-4.54	
%ortho-terphenyl	98				97				98			
%5A-androstane	96				102				98			
%d50-tetracosane	102				101				102			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4175  
Data Table: ORS - Surrogate Corrected

Field ID  
Sample Type  
Matrix  
Sample Size  
Weight Basis  
Associated Blank  
Field Date  
Extract Date  
Analysis Date  
Date Received  
Percent Solids  
Dilution Factor  
Percent Lipids  
Min Reporting Limit  
Units Q

**SHC/TPH**

n-Nonane  
n-Decane  
n-Undecane  
n-Dodecane  
n-Tridecane  
Isoprenoid RRT 1380  
n-Tetradecane  
Isoprenoid RRT 1470  
n-Pentadecane  
n-Hexadecane  
Isoprenoid RRT 1650  
n-Heptadecane  
Pristane  
n-Octadecane  
Phytane  
n-Nonadecane  
n-Eicosane  
n-Heneicosane  
n-Docosane  
n-Tricosane  
n-Tetracosane  
n-Pentacosane  
n-Hexacosane  
n-Heptacosane  
n-Octacosane  
n-Nonacosane  
n-Triacontane  
n-Hentriacontane  
n-Dotriacontane  
n-Tritriacontane  
n-Tetratriacontane  
n-Pentatriacontane  
n-Hexatriacontane  
n-Heptatriacontane  
n-Octatriacontane  
n-Tetracontane  
TPH (RES)  
TPH  
%ortho-terphenyl  
%5A-androstane  
%d50-tetracosane

Arthur D. Little

Environmental Monitoring and Analysis

Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control BS-BSD

Field ID	Procedural Blank	Blank Spike	Procedural Blank	Blank Spike	Procedural Blank	Blank Spike	Procedural Blank	Blank Spike	Procedural Blank	Blank Spike	T	%R	Q
Lab ID	DH-S-61PB	DH-S-62BS	DH-S-58PB	DH-S-59BS	DH-S-55PB	DH-S-56BS							
Sample Type	PB	BS	PB	BS	PB	BS							
Matrix	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT							
Sample Size	20 g	20 g	20 g	20 g	20 g	20 g							
Weight Basis	DRY	DRY	DRY	DRY	DRY	DRY							
Associated Blank	NA	DH-S-61PB	NA	DH-S-58PB	NA	DH-S-55PB							
Field Date	03/08/01	03/08/01	03/07/01	03/07/01	02/20/01	02/20/01							
Extract Date	03/08/01	03/08/01	03/07/01	03/07/01	02/20/01	02/20/01							
Analysis Date	03/16/01	03/17/01	03/14/01	03/14/01	03/02/01	03/02/01							
Date Received	03/08/01	03/08/01	03/07/01	03/07/01	02/20/01	02/20/01							
Percent Solids	100	100	100	100	100	100							
Percent Lipids	NA	NA	NA	NA	NA	NA							
Min Reporting Limit	0.025	0.025	0.025	0.025	0.025	0.025							
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg							
<b>SHC/TPH</b>													
n-Nonane	ND	ND	ND	ND	ND	ND							
n-Decane	ND	0.64	1.25	0.54	1.25	0.44	2.5	18					
n-Undecane	ND	ND	ND	ND	ND	ND							
n-Dodecane	ND	ND	ND	ND	ND	ND							
n-Tridecane	ND	ND	ND	ND	ND	ND							
Isoprenoid RRT 1380	ND	ND	ND	ND	ND	ND							
n-Tetradecane	ND	ND	ND	0.0017 J	ND	0.0027 J							
Isoprenoid RRT 1470	ND	ND	ND	ND	ND	ND							
n-Pentadecane	ND	0.8	1.25	0.75	1.25	1.2	2.5	48					
n-Hexadecane	ND	ND	ND	0.00084 J	ND	0.0012 J							
Isoprenoid RRT 1650	ND	ND	ND	ND	ND	ND							
n-Heptadecane	ND	ND	ND	0.00076 J	ND	ND							
Pristane	ND	0.94	1.25	0.86	1.25	1.8	2.5	72					
n-Octadecane	ND	ND	ND	ND	ND	0.0008 J							
Phytane	ND	ND	ND	0.0042 J	ND	0.0088 J							
n-Nonadecane	ND	ND	ND	ND	ND	0.00093 J							
n-Eicosane	ND	1	1.25	0.95	1.25	2.1	2.5	84					
n-Heneicosane	0.001 J	ND	ND	0.0012 J	0.00092 JB	0.001 J							
n-Docosane	0.0015 J	ND	ND	0.0011 J	0.00099 JB	0.0013 JB							
n-Tricosane	0.0048 J	0.055	ND	0.0033 J	0.0024 JB	0.0018 JB							
n-Tetracosane	0.0084 J	0.18	ND	0.0027 J	0.0039 JB	0.0044 JB							
n-Pentacosane	0.02 J	1.7	1.25	0.005 J	0.98	2.2	2.5	88					
n-Hexacosane	0.031	0.78	ND	0.0069 J	0.0091 JB	0.0079 JB							
n-Heptacosane	0.042	1.1	ND	0.0092 J	0.0076 JB	0.0041 JB							
n-Octacosane	0.04	1.1	ND	0.009 J	0.0074 JB	0.004 JB							
n-Nonacosane	0.039	1.1	ND	0.0094 J	0.0094 JB	0.0072 JB							
n-Triacontane	0.029	1.9	1.25	0.0059 J	0.95	2.2	2.5	88					
n-Hentriacontane	0.024 J	0.66	ND	0.0063 J	0.0061 JB	0.0035 JB							
n-Dotriacontane	0.015 J	0.4	ND	0.0032 J	0.0076 JB	0.0083 JB							
n-Tritriacontane	0.0093 J	0.25	ND	0.002 J	0.003 JB	0.0017 JB							
n-Tetraatriacontane	0.0052 J	1.3	1.25	0.0013 J	0.96	2.1	2.5	84					
n-Pentatriacontane	0.0033 J	0.086	ND	0.00093 J	0.0023 JB	0.0028 J							
n-Hexatriacontane	0.0018 J	1.2	1.25	0.00072 J	0.95	2.1	2.5	84					
n-Heptatriacontane	0.0012 J	0.028	ND	ND	0.00081 J	0.0013 J							
n-Octatriacontane	ND	0.053	0.00099 J	0.00099 J	0.0015 JB	0.0026 J							
n-Nonatriacontane	ND	ND	ND	ND	ND	ND							
n-Tetracontane	ND	ND	ND	ND	0.0019 J	0.0028 J							
TPH (RES)	0.57 J	18	0.27 J	7.2	0.31 J	14							
TPH	0.57 J	18	0.27 J	7.2	0.31 J	14							
%ortho-terphenyl	0 &	0 &	0 &	0 &	0 &	0 &							
%5A-androstane	58	3 &	84	76	63	76							
%d50-tetracosane	69	3 &	108	86	84	85							



Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard			
	ORS	OIL	5.1 mg	OIL	ORS	OIL	5.1 mg	OIL
Sample Type	ORS				ORS			
Matrix	OIL				OIL			
Sample Size	5.1 mg				5.1 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02			
Analysis Date	10/27/02				11/01/02			
Date Received	04/23/02				04/23/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q
<b>Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	838	710	18		844	710	18.9	
C1-Naphthalenes	1490	1600	-6.88		1590	1600	-0.625	
C2-Naphthalenes	1920	2300	-16.5		2100	2300	-8.7	
C3-Naphthalenes	1410	1960	-28.1		1420	1960	-27.6	
C4-Naphthalenes	794	1180	-32.7		828	1180	-29.8	
Acenaphthylene	ND				ND			
Acenaphthene	ND				ND			
Biphenyl	231	214	7.94		232	214	8.41	
Fluorene	106	95.2	11.3		102	95.2	7.14	
C1-Fluorenes	249	239	4.18		248	239	3.76	
C2-Fluorenes	342	356	-3.93		346	356	-2.81	
C3-Fluorenes	318	396	-19.7		324	396	-18.2	
Anthracene	ND				ND			
Phenanthrene	288	260	10.8		282	260	8.46	
C1-Phenanthrenes/anthracenes	555	612	-9.31		582	612	-4.9	
C2-Phenanthrenes/anthracenes	599	752	-20.3		600	752	-20.2	
C3-Phenanthrenes/anthracenes	445	534	-16.7		440	534	-17.6	
C4-Phenanthrenes/anthracenes	267	308	-13.3		276	308	-10.4	
Dibenzothiophene	256	222	15.3		254	222	14.4	
C1-Dibenzothiophenes	470	484	-2.89		490	484	1.24	
C2-Dibenzothiophenes	624	658	-5.17		613	658	-6.84	
C3-Dibenzothiophenes	514	574	-10.4		532	574	-7.32	
Fluoranthene	ND				ND			
Pyrene	15.4	13.4	14.9		14.9	13.4	11.2	
C1-Fluoranthenes/pyrenes	84.4	83.9	0.596		83.3	83.9	-0.715	
C2-Fluoranthenes/pyrenes	142	142	0		141	142	-0.704	
C3-Fluoranthenes/pyrenes	144	158	-8.86		144	158	-8.86	
Benzo[a]anthracene	ND				ND			
Chrysene	51.5	49.2	4.67		51.5	49.2	4.67	
C1-Chrysenes	80.3	81.5	-1.47		78	81.5	-4.29	
C2-Chrysenes	92.1	102	-9.7		100	102	-1.96	
C3-Chrysenes	79.6	79.6	0		65.7	79.6	-17.5	
C4-Chrysenes	55.6	64	-13.1		58.5	64	-8.59	
Benzo[b]fluoranthene	8.44	7.62	10.8		6.33	7.62	-16.9	
Benzo[k]fluoranthene	ND				ND			
Benzo[e]pyrene	11.6	12.4	-6.45		11.4	12.4	-8.06	
Benzo[a]pyrene	ND				ND			
Perylene	ND				ND			
Indeno[1,2,3-c,d]pyrene	ND				ND			
Dibenzo[a,h]anthracene	1.13 J				1.24 J			
Benzo[g,h,i]perylene	3 J	3.18	-5.66		3.04 J	3.18	-4.4	
d8-Naphthalene	88				96			
d10-Acenaphthene	95				99			
d10-Phenanthrene	99				100			
d12-Benzo[a]pyrene	111				105			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: ORS - Surrogate Corrected

Field ID	Oil Reference Standard				Oil Reference Standard			
Sample Type	ORS				ORS			
Matrix	OIL				OIL			
Sample Size	5.1 mg				5.1 mg			
Weight Basis	OIL				OIL			
Associated Blank	NA				NA			
Field Date	04/23/02				04/23/02			
Extract Date	04/23/02				04/23/02			
Analysis Date	11/05/02				10/29/02			
Date Received	04/23/02				04/23/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	4.9				4.9			
Units	mg/Kg	T	%D	Q	mg/Kg	T	%D	Q

Polynuclear Aromatic Hydro								
Naphthalene	825	710	16.2		760	710	7.18	
C1-Naphthalenes	1560	1600	-2.5		1400	1600	-9.38	
C2-Naphthalenes	2090	2300	-9.13		2000	2300	-10.9	
C3-Naphthalenes	1560	1960	-20.4		1700	1960	-13.8	
C4-Naphthalenes	897	1180	-24		950	1180	-19.5	
Acenaphthylene	ND				ND			
Acenaphthene	ND				ND			
Biphenyl	230	214	7.48		220	214	4.2	
Fluorene	101	95.2	6.09		100	95.2	7.14	
C1-Fluorenes	251	239	5.02		240	239	0.837	
C2-Fluorenes	346	356	-2.81		340	356	-3.93	
C3-Fluorenes	349	396	-11.9		330	396	-16.2	
Anthracene	ND				ND			
Phenanthrene	280	260	7.69		280	260	6.54	
C1-Phenanthrenes/anthracenes	550	612	-10.1		600	612	-1.14	
C2-Phenanthrenes/anthracenes	606	752	-19.4		690	752	-8.64	
C3-Phenanthrenes/anthracenes	444	534	-16.8		510	534	-4.31	
C4-Phenanthrenes/anthracenes	275	308	-10.7		290	308	-4.54	
Dibenzothiophene	253	222	14		250	222	13.1	
C1-Dibenzothiophenes	488	484	0.826		490	484	2.27	
C2-Dibenzothiophenes	625	658	-5.02		690	658	5.32	
C3-Dibenzothiophenes	514	574	-10.4		560	574	-2.26	
Fluoranthene	ND				ND			
Pyrene	14.1	13.4	5.22		17	13.4	28.4	
C1-Fluoranthenes/pyrenes	78.9	83.9	-5.96		88	83.9	4.77	
C2-Fluoranthenes/pyrenes	143	142	0.704		150	142	5.63	
C3-Fluoranthenes/pyrenes	144	158	-8.86		170	158	6.96	
Benzo[a]anthracene	ND				ND			
Chrysene	52.8	49.2	7.32		54	49.2	10.6	
C1-Chrysenes	81.6	81.5	0.123		90	81.5	10.2	
C2-Chrysenes	89.8	102	-12		110	102	3.92	
C3-Chrysenes	77.4	79.6	-2.76		100	79.6	25.6	
C4-Chrysenes	57	64	-10.9		72	64	12.2	
Benzo[b]fluoranthene	7.58	7.62	-0.525		7	7.62	-7.87	
Benzo[k]fluoranthene	ND				ND			
Benzo[e]pyrene	12.1	12.4	-2.42		12	12.4	-1.61	
Benzo[a]pyrene	ND				ND			
Perylene	ND				ND			
Indeno[1,2,3-c,d]pyrene	ND				ND			
Dibenzo[a,h]anthracene	1.21 J				1.5 J			
Benzo[g,h,i]perylene	2.9 J	3.18	-8.8		3.4 J	3.18	5.66	
d8-Naphthalene	92				89			
d10-Acenaphthene	96				95			
d10-Phenanthrene	97				96			
d12-Benzo[a]pyrene	104				106			

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference			Instrument Reference		
	Standard			Standard		
Sample Type	IRM			IRM		
Matrix	IRM			IRM		
Sample Size	0.1 mL			0.1 mL		
Weight Basis	WET			WET		
Associated Blank	NA			NA		
Field Date	10/15/02			10/15/02		
Extract Date	10/15/02			10/15/02		
Analysis Date	10/27/02			11/01/02		
Date Received	10/15/02			10/15/02		
Percent Solids	NA			NA		
Dilution Factor	1			1		
Percent Lipids	NA			NA		
Min Reporting Limit	250			250		
Units	ug/L	T	%D	Q	ug/L	T %D Q

### Polynuclear Aromatic Hydrocarbons

Naphthalene	6940	6890	0.726		6990	6890	1.45
C1-Naphthalenes	ND				ND		
C2-Naphthalenes	ND				ND		
C3-Naphthalenes	ND				ND		
C4-Naphthalenes	ND				ND		
Acenaphthylene	6770	6960	-2.73		6550	6960	-5.89
Acenaphthene	6550	7280	-10		6560	7280	-9.89
Biphenyl	7180	7000	2.57		7170	7000	2.43
Fluorene	6320	7270	-13.1		6210	7270	-14.6
C1-Fluorenes	ND				ND		
C2-Fluorenes	ND				ND		
C3-Fluorenes	ND				ND		
Anthracene	7300	7820	-6.65		7160	7820	-8.44
Phenanthrene	7040	7010	0.428		6830	7010	-2.57
C1-Phenanthrenes/anthracenes	ND				ND		
C2-Phenanthrenes/anthracenes	ND				ND		
C3-Phenanthrenes/anthracenes	ND				ND		
C4-Phenanthrenes/anthracenes	ND				ND		
Dibenzothiophene	ND				ND		
C1-Dibenzothiophenes	ND				ND		
C2-Dibenzothiophenes	ND				ND		
C3-Dibenzothiophenes	ND				ND		
Fluoranthene	6080	5910	2.88		6080	5910	2.88
Pyrene	5990	5890	1.7		6000	5890	1.87
C1-Fluoranthenes/pyrenes	ND				ND		
C2-Fluoranthenes/pyrenes	ND				ND		
C3-Fluoranthenes/pyrenes	ND				ND		
Benzo[a]anthracene	3450	3590	-3.9		3440	3590	-4.18
Chrysene	7460	7030	6.12		7310	7030	3.98
C1-Chrysenes	ND				ND		
C2-Chrysenes	ND				ND		
C3-Chrysenes	ND				ND		
C4-Chrysenes	ND				ND		
Benzo[b]fluoranthene	5490	5250	4.57		5600	5250	6.67
Benzo[k]fluoranthene	5920	5570	6.28		5590	5570	0.359
Benzo[e]pyrene	6050	5620	7.65		5790	5620	3.02
Benzo[a]pyrene	7000	6790	3.09		6830	6790	0.589
Perylene	7360	7120	3.37		7020	7120	-1.4
Indeno[1,2,3-c,d]pyrene	6380	6290	1.43		6210	6290	-1.27
Dibenzo[a,h]anthracene	5660	5180	9.27		5570	5180	7.53
Benzo[g,h,i]perylene	5400	5290	2.08		5340	5290	0.945
d8-Naphthalene	94				94		
d10-Acenaphthene	94				94		
d10-Phenanthrene	92				92		
d12-Benzo[a]pyrene	90				90		

Project Title : MMS - AMINIDA - PHASE II  
Data Package: 4079  
Data Table: IRM - Surrogate Corrected

Field ID	Instrument Reference				Instrument Reference			
	Standard				Standard			
Sample Type	IRM				IRM			
Matrix	IRM				IRM			
Sample Size	0.1 mL				0.1 mL			
Weight Basis	WET				WET			
Associated Blank	NA				NA			
Field Date	10/15/02				10/15/02			
Extract Date	10/15/02				10/15/02			
Analysis Date	11/05/02				10/29/02			
Date Received	10/15/02				10/15/02			
Percent Solids	NA				NA			
Dilution Factor	1				1			
Percent Lipids	NA				NA			
Min Reporting Limit	250				250			
Units	ug/L	T	%D	Q	ug/L	T	%D	Q

### Polynuclear Aromatic Hydro

Naphthalene	7050	6890	2.32		6700	6890	-2.61	
C1-Naphthalenes	ND				ND			
C2-Naphthalenes	ND				ND			
C3-Naphthalenes	ND				ND			
C4-Naphthalenes	ND				ND			
Acenaphthylene	6520	6960	-6.32		6400	6960	-7.33	
Acenaphthene	6570	7280	-9.75		6400	7280	-12.1	
Biphenyl	7160	7000	2.28		6900	7000	-1.43	
Fluorene	6370	7270	-12.4		6200	7270	-14.7	
C1-Fluorenes	ND				ND			
C2-Fluorenes	ND				ND			
C3-Fluorenes	ND				ND			
Anthracene	7140	7820	-8.7		7000	7820	-11	
Phenanthrene	6820	7010	-2.71		6800	7010	-3.71	
C1-Phenanthrenes/anthracenes	ND				ND			
C2-Phenanthrenes/anthracenes	ND				ND			
C3-Phenanthrenes/anthracenes	ND				ND			
C4-Phenanthrenes/anthracenes	ND				ND			
Dibenzothiophene	ND				ND			
C1-Dibenzothiophenes	ND				ND			
C2-Dibenzothiophenes	ND				ND			
C3-Dibenzothiophenes	ND				ND			
Fluoranthene	6030	5910	2.03		6000	5910	1.35	
Pyrene	5860	5890	-0.509		5800	5890	-0.679	
C1-Fluoranthenes/pyrenes	ND				ND			
C2-Fluoranthenes/pyrenes	ND				ND			
C3-Fluoranthenes/pyrenes	ND				ND			
Benzo[a]anthracene	3400	3590	-5.29		3400	3590	-5.29	
Chrysene	7140	7030	1.56		7000	7030	0.142	
C1-Chrysenes	ND				ND			
C2-Chrysenes	ND				ND			
C3-Chrysenes	ND				ND			
C4-Chrysenes	ND				ND			
Benzo[b]fluoranthene	5540	5250	5.52		5600	5250	5.9	
Benzo[k]fluoranthene	5760	5570	3.41		5400	5570	-1.97	
Benzo[e]pyrene	5930	5620	5.52		5700	5620	1.78	
Benzo[a]pyrene	6760	6790	-0.442		6700	6790	-1.18	
Perylene	7230	7120	1.54		6900	7120	-2.53	
Indeno[1,2,3-c,d]pyrene	6350	6290	0.954		6200	6290	-0.795	
Dibenzo[a,h]anthracene	5570	5180	7.53		5500	5180	6.56	
Benzo[g,h,i]perylene	5440	5290	2.84		5200	5290	-0.945	
d8-Naphthalene	94				97			
d10-Acenaphthene	94				97			
d10-Phenanthrene	94				97			
d12-Benzo[a]pyrene	87				94			

Project Title : MMS - AMINIDA - PHASE II

Data Package: 4079

Data Table: SRM - Surrogate Corrected

Field ID	Standard Reference				Standard Reference				Standard Reference			
	Material - 1944				Material - 1944				Material - 1944			
Sample Type	SRM				SRM				SRM			
Matrix	SEDIMENT				SEDIMENT				SEDIMENT			
Sample Size	1.01 g				1.01 g				1.02 g			
Weight Basis	DRY				DRY				DRY			
Associated Blank	DY-S-66PB				DZ-S-03PB				DY-S-69PB			
Field Date	10/16/02				10/28/02				10/17/02			
Extract Date	10/16/02				10/28/02				10/17/02			
Analysis Date	10/27/02				11/05/02				10/29/02			
Date Received	10/16/02				10/28/02				10/17/02			
Percent Solids	98.8				98.8				98.8			
Dilution Factor	2				1				1			
Percent Lipids	NA				NA				NA			
Min Reporting Limit	49.5				99				49			
Units	ug/Kg				ug/Kg				ug/Kg			
	T	%D	Q		T	%D	Q		T	%D	Q	

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	935	1650	-43.3	&	762	1650	-53.8	&	694	1650	-57.9	&
C1-Naphthalenes	459				374				379			
C2-Naphthalenes	1380				1170				1230			
C3-Naphthalenes	1790				1620				1820			
C4-Naphthalenes	1980				2270				2140			
Acenaphthylene	1060				903				894			
Acenaphthene	452				358	570	-37.2	&	391			
Biphenyl	157				123	320	-61.6	&	116			
Fluorene	699				592	850	-30.4		625			
C1-Fluorenes	837				716				718			
C2-Fluorenes	1290				1150				1040			
C3-Fluorenes	1520				1420				1300			
Anthracene	1680	1770	-5.08		1380	1770	-22		1370	1770	-22.6	
Phenanthrene	5780	5270	9.68		4670	5270	-11.4		4430	5270	-15.9	
C1-Phenanthrenes/anthracenes	6140				4950				5200			
C2-Phenanthrenes/anthracenes	6480				5100				5740			
C3-Phenanthrenes/anthracenes	4310				3610				3700			
C4-Phenanthrenes/anthracenes	3710				2870				3100			
Dibenzothiophene	862				685	620	10.5		731			
C1-Dibenzothiophenes	2040				1580				1660			
C2-Dibenzothiophenes	3120				2560				2950			
C3-Dibenzothiophenes	2850				2270				2380			
Fluoranthene	10200 D	8920	14.3		8990	8920	0.785		7940	8920	-11	
Pyrene	10400 D	9700	7.22		9290	9700	-4.23		8120	9700	-16.3	
C1-Fluoranthenes/pyrenes	8950				6550				6860			
C2-Fluoranthenes/pyrenes	4450				3060				2940			
C3-Fluoranthenes/pyrenes	1760				1340				1570			
Benzo[a]anthracene	5880	4720	24.6		4590	4720	-2.75		4320	4720	-8.47	
Chrysene	7050	4860	45.1	&	5190	5900	-12		5010	5900	-15.1	
C1-Chrysenes	4560				3420				3730			
C2-Chrysenes	2740				2050				2120			
C3-Chrysenes	1290				910				1140			
C4-Chrysenes	474				406				752			
Benzo[b]fluoranthene	7760	5960	30.2		5840	5960	-2.01		5220	5960	-12.4	
Benzo[k]fluoranthene	2200	2300	-4.35		1980	2300	-13.9		1680	2300	-27	
Benzo[e]pyrene	4400	3280	34.1		3420	3280	4.27		3140	3280	-4.27	
Benzo[a]pyrene	5400	4300	25.6		3890	4300	-9.53		3750	4300	-12.8	
Perylene	1330	1170	13.7		1020	1170	-12.8		1050	1170	-10.2	
Indeno[1,2,3-c,d]pyrene	3860	2780	38.8	&	2810	2780	1.08		2690	2780	-3.24	
Dibenzo[a,h]anthracene	1000	759	31.8		657	759	-13.4		786	759	3.56	
Benzo[g,h,i]perylene	3610	2840	27.1		2680	2840	-5.63		2580	2840	-9.15	
d8-Naphthalene	52				44				45			
d10-Acenaphthene	76				72				75			
d10-Phenanthrene	98				98				97			
d12-Benzo[a]pyrene	98				92				95			

Field ID	02-N10-01-PHC-S	02-N10-01-PHC-S DUP			02-N23-01-PHC-S	02-N23-01-PHC-S DUP			02-SAG-01-PHC-S	02-SAG-01-PHC-S		
Sample Type	N	DUP			N	DUP			N	DUP		
Matrix	SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT			SEDIMENT	SEDIMENT		
Sample Size	17.49 g	17.46 g			20.6 g	20.65 g			15.41 g	15.2 g		
Weight Basis	DRY	DRY			DRY	DRY			DRY	DRY		
Associated Blank	DY-S-66PB	DY-S-66PB			DZ-S-03PB	DZ-S-03PB			DY-S-69PB	DY-S-69PB		
Field Date	08/02/02	08/02/02			08/05/02	08/05/02			08/14/02	08/14/02		
Extract Date	10/16/02	10/16/02			10/28/02	10/28/02			10/17/02	10/17/02		
Analysis Date	10/28/02	10/28/02			11/06/02	11/06/02			10/30/02	10/30/02		
Date Received	08/15/02	08/15/02			08/15/02	08/15/02			08/23/02	08/23/02		
Percent Solids	57.2	57.2			68.5	68.5			50.4	50.4		
Dilution Factor	1	1			1	1			1	1		
Percent Lipids	NA	NA			NA	NA			NA	NA		
Min Reporting Limit	0.71	0.72			0.61	0.6			0.81	0.82		
Units	ug/Kg	ug/Kg	RPD	Q	ug/Kg	ug/Kg	RPD	Q	ug/Kg	ug/Kg	RPD	Q

**Polynuclear Aromatic Hydrocarbons**

Naphthalene	12	11	8.7		7.4	7.2	2.7		6.9	7.4	7
C1-Naphthalenes	25	24	4.1		16	17	6.1		17	15	12
C2-Naphthalenes	41	40	2.5		29	30	3.4		35	34	2.9
C3-Naphthalenes	28	29	3.5		22	22	0		41	38	7.6
C4-Naphthalenes	14	15	6.9		15	15	0		25	24	4.1
Acenaphthylene	0.039 J	0.085 J	74	&	0.048 JB	0.046 JB	4.2		0.084 J	0.097 J	14
Acenaphthene	1	1	0		0.89	0.89	0		0.81	0.78 J	3.8
Biphenyl	6.4	6.2	3.2		5.2	5.2	0		6.1	5.8	5
Fluorene	5.4	5.5	1.8		4	3.9	2.5		5.5	5.3	3.7
C1-Fluorenes	9.4	9.6	2.1		7.1	6.7	5.8		7.3	7.2	1.4
C2-Fluorenes	13	13	0		9.6	9.5	1		12	11	8.7
C3-Fluorenes	11	12	8.7		8.6	9.2	6.7		12	12	0
Anthracene	0.66 J	0.6 J	9.5		0.61	0.58 J	5		0.83	0.81 J	2.4
Phenanthrene	27	26	3.8		19	19	0		26	25	3.9
C1-Phenanthrenes/anthracenes	39	39	0		30	30	0		47	45	4.3
C2-Phenanthrenes/anthracenes	32	33	3.1		26	26	0		44	44	0
C3-Phenanthrenes/anthracenes	22	22	0		17	18	5.7		29	29	0
C4-Phenanthrenes/anthracenes	10	9.6	4.1		8.8	8.8	0		14	13	7.4
Dibenzothiophene	4.1	4	2.5		2.9	3	3.4		4.1	4.1	0
C1-Dibenzothiophenes	8.8	8.7	1.1		6.3	6.4	1.6		21	19	10
C2-Dibenzothiophenes	11	11	0		8.4	7.9	6.1		25	25	0
C3-Dibenzothiophenes	8.4	8.6	2.4		6.5	6.1	6.3		16	18	12
Fluoranthene	6.2	5.7	8.4		4.2	4.3	2.4		6.9	6.8	1.4
Pyrene	7.8	7.7	1.3		6.1	6.2	1.6		8.6	8.6	0
C1-Fluoranthenes/pyrenes	20	20	0		15	15	0		23	23	0
C2-Fluoranthenes/pyrenes	20	19	5.1		14	14	0		20	20	0
C3-Fluoranthenes/pyrenes	12	12	0		9.3	9	3.3		15	14	6.9
Benzo[a]anthracene	1.7	1.8	5.7		1.6	1.6	0		2.3	2.6	12
Chrysene	12	12	0		10	10	0		13	13	0
C1-Chrysenes	13	12	8		11	12	8.7		16	17	6.1
C2-Chrysenes	12	12	0		9.9	10	1		20	15	28
C3-Chrysenes	6	6.1	1.6		4.4	4.5	2.2		9.5	10	5.1
C4-Chrysenes	3.2	3	6.4		3.6	3.1	15		6	7	15
Benzo[b]fluoranthene	7.2	7.1	1.4		6.5	6.3	3.1		9.5	9.4	1
Benzo[k]fluoranthene	0.6 J	0.85	34	&	0.47 J	0.48 J	2.1		0.96	0.93	3.2
Benzo[e]pyrene	8.7	8.8	1.1		8.2	8	2.5		8.8	9.1	3.4
Benzo[a]pyrene	2.2	2.2	0		1.6	1.7	6.1		4.4	3.9	12
Perylene	59	57	3.4		56	56	0		100	97	3
Indeno[1,2,3-c,d]pyrene	1.7	1.7	0		1.3	1.4	7.4		2.5	2.4	4.1
Dibenzo[a,h]anthracene	0.89	0.85	4.6		0.75	0.83	10		1.1	1	9.5
Benzo[g,h,i]perylene	6.1	6	1.6		5.4	5.8	7.1		6	5.9	1.7
d8-Naphthalene	54	46			50	56			44	51	
d10-Acenaphthene	77	73			75	76			66	81	
d10-Phenanthrene	95	95			92	93			78	93	
d12-Benzo[a]pyrene	97	95			83	90			74	90	

# Arthur D. Little

Environmental Monitoring and Analysis

## Minerals Management Service - Animida Phase I.

Summer 1999 Final Data (Surrogate Corrected) - Lab Quality Control ORS

	<b>Oil Reference</b>			
Field ID	<b>Standard</b>			
Lab ID	<b>BY32ORS</b>			
Sample Type	<b>ORS</b>			
Matrix	<b>OIL</b>			
Sample Size	<b>5.12 mg</b>			
Weight Basis	<b>OIL</b>			
Associated Blank	<b>NA</b>			
Field Date	<b>03/21/01</b>			
Extract Date	<b>03/21/01</b>			
Analysis Date	<b>04/10/01</b>			
Date Received	<b>03/21/01</b>			
Percent Solids	<b>NA</b>			
Percent Lipids	<b>NA</b>			
Min Reporting Limit	<b>4.88</b>			
Units	<b>mg/Kg</b>	<b>T</b>	<b>%D</b>	<b>Q</b>

### Sterane-Triterpane Biomarkers - Wet

T4-C23Diterpane	51.3	58.9	-13
S4-Diacholestane	42.8	46.8	-8.6
S5-Diacholestane	28.7	26.1	9.96
T9-C29Tricyclitriterpane	13.3	15.7	-15
T10-C29Tricyclitriterpane	17	15	13.3
T11-Trisnorhopane(TS)	19	24.8	-23
T12-Trisnorhopane(TM)	23	31	-26
S24-Methylcholestane	27.6	26.2	5.34
S25-Ethylcholestane	46.6	39.8	17.1
S28-Ethylcholestane	35.1	33.9	3.54
T15-Norhopane	75.1	83.8	-10
T18-Oleanane	ND		
T19-Hopane	110	113	-2.7
T21-Homohopane	47.3	46.1	2.6
T22-Homohopane	32.8	35.2	-6.8
5B(H)-Cholane	112		

**Last Revised 3/21/01**

## Station Data for Trace Metal Organism Samples

Sample Identification	Station Identification	Station Grouping	Collection Date	Organism Type	Comments
00-N03-01-PHC-T-AN	N03	Northstar	8/17/2000	Anonyx amphipods	
00-N12-01-PHC-T-AN	N12	Northstar	8/19/2000	Anonyx amphipods	
00-N13-01-PHC-T-AN	N13	Northstar	8/19/2000	Anonyx amphipods	
00-N18-01-PHC-T-AN	N18	Northstar	8/22/2000	Anonyx amphipods	
00-L08-01-PHC-T-AS	L08	Liberty	8/21/2000	Astarte clams	
00-L09-01-PHC-T-AS	L09	Liberty	8/21/2000	Astarte clams	
00-3A-01-PHC-T-AS	3A	Liberty	8/20/2000	Astarte clams	
00-4A-01-PHC-T-AN	43	Liberty	8/21/2000	Anonyx amphipods	
00-5F-01-PHC-T-CY	5F	Northstar	8/19/2000	Cyrtodaria clams	Gwydyr Bay
00-5H-01-PHC-T-AS	5H	In Between N & L	8/22/2000	Astarte clams	
00-5(0)-01-PHC-T-AN	5(0)	In Between N & L	8/22/2000	Anonyx amphipods	



Results for the Marine Sediment Standard Reference Material (SRM) MESS-2 certified by the National Research Council of Canada (NRC).

Standard Reference Material	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
SRM MESS-2	0.19	8.60	21.4	966	2.41	0.25	13.5	107	37.7	4.20	0.089	354	44.5	21.9	1.24	1.01	247	157
This Study	0.16	8.52	20.6	986	2.41	0.25	13.5	104	38.4	4.17	0.089	353	44.8	21.7	1.22	0.99	246	158
	0.16	8.65	21.5	1060	2.41	0.25	14.5	104	37.5	4.16	0.093	353	48.5	22.4	1.18	1.04	253	165
	0.16	8.71	20.9	1040	2.38	0.24	14.0	108	39.4	4.17	0.087	352	47.8	22.4	1.21	1.03	259	159
		8.86						106	39.3	4.20	0.098	363					250	167
		8.68						101	38.4	4.26	0.092	356					259	159
SRM MESS-2	0.18	8.57	20.7	-	2.32	0.24	13.8	106	39.3	4.35	0.092	365	49.3	21.9	1.09	0.98*	252	172
NRC Certified Values	± 0.02	± 0.26	± 0.8	-	± 0.12	± 0.01	± 1.4	± 8	± 2.0	± 0.22	± 0.009	± 21	± 1.8	± 1.2	± 0.13	-	± 10	± 16

\* Reference Value, not Certified.

\*\* Total Carbon (Inorganic plus Organic).

Method Detection Limits (MDLs).

	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
Method Detection Limit	0.01	0.01	0.2	1	0.2	0.02	0.3	4	2	0.01	0.001	3	0.5	0.2	0.04	0.04	10	2

MMS Beaufort Sea ANIMDA Project: Summer 2000 Sampling

Quality Assurance and Quality Control Data for Sediment Metal Analyses.

Percent Spike Recovery.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg***	Mn	Ni	Pb	Sb	Tl	V**	Zn
Mean	93.1	105.5	105.9	98.5	96.3	98.8	101.8	109.7	103.3	97.1	84.4	102.1	94.1	99.0	100.7	101.3	117.3	97.4
Standard Deviation	3.1	5.1	2.4	4.6	4.9	3.3	5.2	13.4	6.4	3.9	6.2	7.7	.7	6.3	3.3	3.6	3.4	1.8
(n =)	4	3	4	4	4	4	4	3	3	3	13	3	3	4	4	4	3	3

\*\*\*Final concentrations are corrected for percent spike recovery.

Estimate of Precision as Percent Relative Standard Deviation (RSD) of Lab Duplicates.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Tl	V	Zn
00-N06-01-MET-S	15.7	0.4	3.4	2.1	11.8	9.0	3.8	2.6	3.1	4.4	2.4	1.2	0.9	1.8	1.5	0.0	0.8	2.1
00-N09-01-MET-S	12.9	1.2	2.3	3.8	0.0	4.9	3.4	3.7	2.2	3.8	3.4	2.7	5.8	5.0	2.7	6.1	6.4	2.8
00-5(10)-01-MET-S	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
00-KUP-02-MET-S	4.9	1.6	3.2	1.6	0.0	2.3	1.8	0.4	2.2	0.7	-	1.5	1.3	1.4	3.9	4.0	5.6	1.8

RSD = (standard deviation / mean) X 100

Table 4. Quality Assurance and Quality Control Data for Organism Metal Analyses.

Results for the Standard Reference Material (SRM) Mussel Tissue #2976 certified by the National Institute of Standards and Technology (NIST), Certified Reference Material (CRM) Dogfish Muscle DORM-2 certified by the National Research Council of Canada (NRC), and the SRM Trace Elements in Water #1643d certified by NIST.

Standard Reference Material	Ag (µg/g)	Al (µg/g)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (µg/g)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
SRM #2976 This Study	0.009	158	12.6	0.71	0.005	0.77	0.61	0.57	4.0	175	0.059	33.4	0.87	1.13	0.014	0.002	0.88	145
SRM #2976 NIST Certified Values	0.011* ± 0.005	134* ± 34	13.3 ± 1.8	-	-	0.82 ± 0.16	0.61* ± 0.02	0.50* ± 0.16	4.02 ± 0.33	171.0 ± 4.9	0.061 ± 0.0036	33* ± 2	0.93* ± 0.12	1.19 ± 0.18	-	0.001**	-	137 ± 13
CRM DORM-2 This Study	0.039	10.6	17.9	2.53	0.006	0.049	0.172	32.2	2.3	149	4.64	3.4	17.5	0.069	0.027	0.004	0.19	24.3
CRM DORM-2 NRC Certified Values	0.041 ± 0.013	10.9 ± 1.7	18.0 ± 1.1	-	-	0.043 ± 0.008	0.182 ± 0.031	34.7 ± 5.5	2.34 ± 0.16	142 ± 10	4.64 ± 0.26	3.66 ± 0.34	19.4 ± 3.1	0.065 ± 0.007	-	0.004**	-	25.6 ± 2.3
SRM #1643d This Study	-	-	-	(µg/L) 506.3	(µg/L) 12.66	-	-	-	-	-	-	-	-	-	(µg/L) 54.5	(µg/L) 7.07	(µg/L) 35.8	-
SRM #1643d NIST Certified Values	-	-	-	506.5 ± 8.9	12.53 ± 0.28	-	-	-	-	-	-	-	-	-	54.1 ± 1.1	7.28 ± 0.25	35.1 ± 1.4	-

\* Reference Value, not Certified.

\*\* Information Value, not Certified.

Method Detection Limits (MDLs).

	Ag (µg/g)	Al (µg/g)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (µg/g)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
Method Detection Limit	0.004	2.3	0.03	0.01	0.001	0.001	0.003	0.01	0.7	2.5	0.001	1.1	0.01	0.003	0.001	0.001	0.01	0.4

Table 4. Quality Assurance and Quality Control Data for Organism Metal Analyses.

Percent Spike Recovery.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg***	Mn	Ni	Pb	Sb	Tl	V	Zn
Mean	100.3	96.9	96.0	98.1	106.9	97.9	104.7	95.7	101.9	95.7	70.2	103.3	95.1	98.8	91.7	104.7	91.7	99.1
Standard Deviation	1.2	0.3	4.1	3.2	3.2	0.8	0.3	1.3	3.5	3.4	4.5	5.8	1.3	8.2	0.0	2.7	1.2	3.0
(n =)	2	2	2	2	2	2	2	3	2	2	5	2	2	2	2	2	2	2

\*\*\*Final concentrations are corrected for percent spike recovery.

Estimate of Precision as Percent Relative Standard Deviation (RSD) of Lab Duplicates.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Tl	V	Zn
02-N12-01-PHC-T-AN	1.0	1.0	0.1	1.1	0.0	0.0	1.4	4.2	0.0	2.7	3.6	1.5	3.5	0.0	3.1	0.0	3.4	0.0

Percent RSD = (standard deviation / mean) X 100

## Station Data for Trace Metal Sediment Samples.

Sample Identification	Station Identification	Station Grouping	Collection Date	Comments
02-N01-01-MET-S	N01	Northstar	8/3/2002	
02-N02-01-MET-S	N02	Northstar	8/3/2002	
02-N03-01-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N03-02-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N03-03-MET-S	N03	Northstar	8/5/2002	Field Triplicate
02-N04-01-MET-S	N04	Northstar	8/3/2002	
02-N05-01-MET-S	N05	Northstar	8/3/2002	
02-N06-01-MET-S	N06	Northstar	8/2/2002	
02-N07-01-MET-S	N07	Northstar	8/5/2002	
02-N08-01-MET-S	N08	Northstar	8/5/2002	
02-N09-01-MET-S	N09	Northstar	8/5/2002	
02-N10-01-MET-S	N10	Northstar	8/2/2002	
02-N11-01-MET-S	N11	Northstar	8/2/2002	
02-N12-01-MET-S	N12	Northstar	8/2/2002	
02-N13-01-MET-S	N13	Northstar	8/4/2002	
02-N14-01-MET-S	N14	Northstar	8/5/2002	
02-N15-01-MET-S	N15	Northstar	8/7/2002	
02-N16-01-MET-S	N16	Northstar	8/5/2002	
02-N17-01-MET-S	N17	Northstar	8/5/2002	
02-N17-01-MET-S(subsurface)	N17	Northstar	8/5/2002	Clay Layer
02-N18-01-MET-S	N18	Northstar	8/2/2002	
02-N19-01-MET-S	N19	Northstar	8/2/2002	
02-N20-01-MET-S	N20	Northstar	8/2/2002	
02-N21-01-MET-S	N21	Northstar	8/2/2002	
02-N23-01-MET-S	N23	Northstar	8/5/2002	
02-L01-01-MET-S	L01	Liberty	7/31/2002	
02-L04-01-MET-S	L04	Liberty	7/29/2002	
02-L06-01-MET-S	L06	Liberty	7/30/2002	
02-L07-01-MET-S	L07	Liberty	7/30/2002	
02-L08-01-MET-S	L08	Liberty	7/30/2002	No Clams
02-L08-02-MET-S	L08	Liberty	7/30/2002	Clams
02-L09-01-MET-S	L09	Liberty	7/30/2002	
02-3A-01-MET-S	3A	Liberty	7/29/2002	
02-3B-01-MET-S	3B	Liberty	7/29/2002	Near Pole Island
02-4A-01-MET-S	4A	Liberty	7/31/2002	
02-4B-01-MET-S	4B	Liberty	7/31/2002	Boulder Patch
02-4C-01-MET-S	4C	In Between N & L	7/31/2002	
02-5A-01-MET-S	5A	Northstar	8/3/2002	
02-5B-01-MET-S	5B	Northstar	8/3/2002	
02-5D-01-MET-S	5D	Northstar	8/5/2002	Lee of STP/West Dock, F.Trip.
02-5D-02-MET-S	5D	Northstar	8/5/2002	Field Triplicate
02-5D-03-MET-S	5D	Northstar	8/5/2002	Field Triplicate
02-5E-01-MET-S	5E	Northstar	8/4/2002	
02-5F-01-MET-S	5F	Northstar	8/7/2002	Gwydyr Bay
02-5H-01-MET-S	5H	In Between N & L	8/1/2002	
02-5(0)-01-MET-S	5(0)	In Between N & L	8/1/2002	
02-5(1)-01-MET-S	5(1)	In Between N & L	8/1/2002	
02-5(5)-01-MET-S	5(5)	Northstar	8/1/2002	
02-5(10)-01-MET-S	5(10)	Northstar	8/1/2002	
02-CAN-01-MET-S	Canning River	Source	8/9/2002	
02-KUPB-01-MET-S	Kuparuk	Source	8/7/2002	Borrow Pit

Sample Identification	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)	Comments
02-N01-01-MET-S	0.06	1.73	7.4	212	0.9	0.05	6.5	28.6	5.4	1.21	0.009	189	11.1	6.5	0.27	0.20	28.4	29.8	
02-N02-01-MET-S	0.08	4.51	12.7	501	1.1	0.13	16.2	67.5	19.4	2.64	0.044	424	26.9	13.8	0.48	0.47	112	79.9	
02-N03-01-MET-S	0.09	5.17	12.7	511	1.2	0.15	11.2	73.1	21.8	2.88	0.046	471	29.9	13.9	0.53	0.52	137	90.9	Field Triplicate
02-N03-02-MET-S	0.08	5.36	14.3	545	1.5	0.18	11.0	78.4	23.8	2.90	0.049	219	35.8	11.5	0.54	0.59	133	88.9	Field Triplicate
02-N03-03-MET-S	0.09	5.72	13.9	554	1.3	0.18	12.7	78.6	24.5	3.11	0.071	459	35.3	17.1	0.60	0.58	137	98.2	Field Triplicate
02-N04-01-MET-S	0.06	4.13	7.9	422	0.8	0.14	9.1	59.4	16.2	2.26	0.048	369	26.6	10.3	0.44	0.41	103	77.3	
02-N05-01-MET-S #1	0.10	5.78	13.7	578	1.5	0.18	12.4	81.2	25.8	3.27	0.053	645	38.3	12.3	0.58	0.59	137	91.8	Lab Duplicate
02-N05-01-MET-S #2	0.10	5.87	13.7	584	1.5	0.18	12.5	82.2	25.6	3.29	0.057	653	38.7	12.1	0.58	0.58	139	93.1	Lab Duplicate
02-N06-01-MET-S	0.08	4.85	10.4	503	0.9	0.12	10.8	69.0	20.1	2.66	0.046	456	29.3	12.8	0.49	0.47	123	83.7	
02-N07-01-MET-S	0.05	3.26	7.5	364	0.9	0.17	7.4	49.4	13.2	1.88	0.036	292	25.5	6.2	0.37	0.42	75.2	53.0	
02-N08-01-MET-S	0.06	4.45	10.1	469	1.2	0.17	9.7	64.5	19.8	2.53	0.045	398	30.8	9.3	0.47	0.51	111	73.6	
02-N09-01-MET-S	0.04	3.71	7.9	402	1.0	0.16	8.7	53.6	14.3	1.91	0.036	517	27.3	7.3	0.39	0.44	91.4	60.6	
02-N10-01-MET-S	0.07	4.49	11.3	473	1.1	0.19	10.6	65.1	20.3	2.69	0.046	533	32.3	9.5	0.50	0.50	114	79.0	
02-N11-01-MET-S	0.07	2.73	6.7	293	1.1	0.11	7.3	54.9	10.8	1.75	0.023	294	18.3	8.9	0.37	0.30	71.6	53.1	
02-N12-01-MET-S	0.10	4.86	9.2	478	1.1	0.21	10.6	68.3	21.8	2.73	0.047	411	36.3	10.1	0.51	0.52	115	85.5	
02-N13-01-MET-S	0.12	5.58	10.6	514	1.2	0.22	12.6	82.9	25.5	3.18	0.061	648	36.6	15.3	0.60	0.53	130	107	
02-N14-01-MET-S	0.10	5.72	11.6	545	1.6	0.21	13.7	82.1	26.3	3.21	0.059	789	42.9	11.6	0.59	0.55	136	102	
02-N15-01-MET-S	0.11	1.65	6.3	302	1.0	0.11	5.2	22.4	6.4	1.14	0.015	177	10.9	6.1	0.28	0.20	41.0	29.3	
02-N16-01-MET-S	0.09	5.86	14.1	550	1.4	0.20	10.7	79.5	23.6	3.20	0.051	563	31.8	14.3	0.57	0.56	146	96.4	
02-N17-01-MET-S	0.09	5.27	13.7	518	1.1	0.21	11.6	75.5	23.5	2.94	0.057	443	30.5	13.8	0.59	0.55	131	94.8	
02-N17-01-MET-S(subsurface)	0.10	5.92	9.7	582	1.4	0.19	15.1	83.4	26.1	3.17	0.056	363	41.3	12.3	0.59	0.59	146	98.4	Clay Layer
02-N18-01-MET-S	0.05	4.50	11.4	476	1.1	0.19	10.3	66.8	18.5	2.49	0.045	393	32.7	9.1	0.45	0.49	107	71.9	
02-N19-01-MET-S	0.07	4.60	12.0	478	1.2	0.18	10.4	65.8	20.5	2.57	0.051	448	33.0	9.7	0.49	0.51	115	77.2	
02-N20-01-MET-S	0.10	1.65	4.2	291	0.9	0.07	5.2	23.8	5.8	0.89	0.011	143	8.1	5.1	0.25	0.21	35.8	27.6	
02-N21-01-MET-S	0.31	4.43	8.5	423	0.9	0.21	9.4	69.5	19.6	2.48	0.048	460	25.8	11.3	0.51	0.41	108	88.4	
02-N23-01-MET-S	0.08	4.82	9.3	575	1.2	0.27	9.7	66.9	21.0	2.45	0.047	286	33.6	10.4	0.50	0.55	118	82.0	
02-L01-01-MET-S	0.07	2.59	7.6	259	0.6	0.10	5.5	38.0	8.8	1.37	0.021	197	10.5	7.2	0.31	0.29	58.0	42.8	
02-L04-01-MET-S	0.09	3.78	10.2	385	0.7	0.16	8.3	55.6	15.6	2.11	0.036	314	20.3	11.6	0.52	0.44	95.9	72.1	
02-L06-01-MET-S	0.05	4.58	10.0	486	1.2	0.19	9.6	68.3	18.5	2.43	0.044	335	32.6	9.3	0.50	0.49	110	77.7	
02-L07-01-MET-S	0.05	4.07	8.7	437	1.0	0.19	8.4	60.3	17.6	2.15	0.041	282	29.7	8.0	0.47	0.46	102	69.7	
02-L08-01-MET-S	0.26	1.64	6.8	415	0.6	0.08	3.8	31.7	7.1	0.99	0.012	167	8.5	7.2	0.34	0.21	37.5	30.5	No Clams
02-L08-02-MET-S	0.07	3.43	9.0	534	0.9	0.17	7.3	54.5	14.5	1.97	0.033	249	26.3	7.4	0.42	0.43	85.4	61.2	Clams
02-L09-01-MET-S	0.08	2.23	11.0	243	0.8	0.10	6.2	38.8	6.9	1.70	0.019	216	11.9	9.5	0.39	0.26	52.4	50.6	
02-3A-01-MET-S	0.07	4.71	13.7	512	0.8	0.17	8.5	65.6	21.4	2.75	0.061	372	27.5	12.9	0.54	0.52	109	83.8	
02-3B-01-MET-S	0.07	5.03	12.7	518	0.9	0.23	8.8	71.3	22.1	2.81	0.058	361	28.3	14.1	0.54	0.51	115	89.1	
02-4A-01-MET-S	0.08	4.28	8.9	535	0.6	0.31	9.5	66.0	21.5	2.44	0.042	430	29.7	11.6	0.56	0.50	99.3	88.2	
02-4B-01-MET-S	0.05	2.02	4.9	221	0.5	0.17	5.5	28.7	8.2	1.27	0.016	208	13.8	5.4	0.29	0.22	48.6	44.7	
02-4C-01-MET-S	0.01	1.56	4.3	165	0.3	0.05	4.0	23.3	4.2	1.16	0.007	196	11.9	4.1	0.19	0.18	44.8	23.9	
02-5A-01-MET-S	0.07	5.42	11.3	538	1.3	0.19	11.4	72.8	21.5	2.82	0.049	533	37.1	11.0	0.52	0.55	131	87.2	
02-5B-01-MET-S	0.05	1.72	6.9	221	0.7	0.05	4.6	19.7	4.8	1.03	0.008	149	11.3	5.9	0.20	0.21	38.0	21.5	
02-5D-01-MET-S	0.03	3.36	7.3	341	0.5	0.19	7.0	54.5	11.2	1.92	0.024	321	24.1	6.3	0.39	0.30	71.1	68.9	Field Triplicate
02-5D-02-MET-S	0.07	3.74	7.4	372	0.6	0.18	8.3	58.3	13.9	2.13	0.032	386	27.5	8.2	0.41	0.35	90.9	76.4	Field Triplicate
02-5D-03-MET-S	0.05	3.82	7.3	401	0.9	0.23	9.3	55.5	13.7	2.05	0.030	340	32.2	6.2	0.40	0.42	89.0	69.6	Field Triplicate

Sample Identification	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)	Comments
02-5E-01-MET-S	0.06	1.65	8.2	203	0.5	0.06	4.0	19.2	4.3	0.78	0.009	178	8.6	5.1	0.25	0.20	36.2	24.1	
02-5F-01-MET-S	0.07	4.38	8.0	455	1.0	0.18	10.6	67.4	19.3	2.04	0.043	467	34.3	8.6	0.49	0.46	101	78.2	
02-5H-01-MET-S	0.06	2.85	8.0	313	0.6	0.14	6.1	50.5	11.3	1.75	0.026	219	19.6	8.4	0.35	0.29	65.8	60.5	
02-5(0)-01-MET-S	0.05	3.12	7.4	363	0.8	0.21	8.1	50.3	12.6	1.84	0.025	345	27.9	6.1	0.37	0.39	74.9	59.5	
02-5(1)-01-MET-S	0.05	1.72	7.5	223	0.6	0.07	4.3	20.9	4.4	1.11	0.006	149	11.0	5.3	0.25	0.33	40.2	26.7	
02-5(5)-01-MET-S	0.05	3.47	8.0	357	0.5	0.13	7.3	49.6	13.6	2.01	0.060	296	21.6	8.6	0.41	0.35	91.8	64.7	
02-5(10)-01-MET-S #1	0.07	2.62	8.5	271	0.5	0.12	6.1	39.9	10.2	1.52	0.021	234	17.7	7.3	0.33	0.26	71.0	55.7	Lab Duplicate
02-5(10)-01-MET-S #2	0.06	2.56	8.2	271	0.5	0.12	6.0	39.3	9.6	1.48	0.020	234	17.9	7.2	0.33	0.26	71.0	55.2	Lab Duplicate
02-CAN-01-MET-S	0.11	3.54	4.5	439	0.9	0.59	10.2	64.2	26.9	2.09	0.077	329	45.2	8.2	0.86	0.48	133	100	
02-KUPB-01-MET-S	0.17	3.70	13.0	589	1.4	0.28	14.5	64.4	34.1	3.03	0.066	1240	39.1	18.4	0.70	0.34	82.5	96.3	Borrow Pit

MMS Beaufort Sea ANIMDA Project: Summer 2002 Sampling

Statistics for Trace Metal Concentrations and Total Organic Carbon (TOC) Content in Sediment Samples (dry weight). Field Triplicates and Lab Duplicate have been averaged prior to statistical analysis.

Station Grouping	Statistic	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)	
Northstar Stations N01-N21	Mean	0.09	4.35	10.0	456	1.1	0.17	10.2	63.4	18.6	2.44	0.043	419	28.9	10.4	0.47	0.46	106	75.5	
	Std. Dev.	0.05	1.33	2.7	103	0.2	0.05	2.8	17.9	6.4	0.69	0.015	156	9.2	2.9	0.11	0.12	34.0	23.1	
	n	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
	Maximum	0.31	5.92	14.1	582	1.6	0.27	16.2	83.4	26.3	3.28	0.061	789	42.9	15.3	0.60	0.59	146	107	
	Minimum	0.04	1.65	4.2	212	0.8	0.05	5.2	22.4	5.4	0.89	0.009	143	8.1	5.1	0.25	0.2	28.4	27.6	
Liberty Stations L01-L09	Mean	0.10	3.19	9.0	394	0.8	0.14	7.0	49.6	12.7	1.82	0.029	251	20.0	8.6	0.42	0.37	77.3	57.8	
	Std. Dev.	0.07	1.06	1.5	109	0.2	0.05	2.0	13.5	5.0	0.50	0.012	62.2	9.8	1.6	0.08	0.11	27.9	17.2	
	n	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	Maximum	0.26	4.58	11	534	1.2	0.19	9.6	68.3	18.5	2.43	0.044	335	32.6	11.6	0.52	0.49	110	77.7	
	Minimum	0.05	1.64	6.8	243	0.6	0.08	3.8	31.7	6.9	0.99	0.012	167	8.5	7.2	0.31	0.21	37.5	30.5	
BSMP Stations 3A-5(10)	Mean	0.06	3.21	8.4	351	0.7	0.15	7.1	46.7	12.8	1.82	0.031	299	21.9	8.1	0.38	0.36	76.7	58.6	
	Std. Dev.	0.02	1.33	2.5	133	0.2	0.07	2.4	20.1	6.9	0.68	0.020	120	9.2	3.1	0.13	0.13	30.8	25.1	
	n	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Maximum	0.08	5.42	13.7	538	1.3	0.31	11.4	72.8	22.1	2.82	0.061	533	37.1	14.1	0.56	0.55	131	89.1	
	Minimum	0.01	1.56	4.3	165	0.3	0.05	4	19.2	4.2	0.78	0.006	149	8.6	4.1	0.19	0.18	36.2	21.5	
Cumulative*	Mean	0.08	3.79	9.3	411	0.9	0.16	8.7	55.7	15.7	2.14	0.037	353	25.2	9.4	0.43	0.41	91.6	67.1	
	Std. Dev.	0.05	1.39	2.6	122	0.3	0.06	3.0	19.4	6.9	0.72	0.017	149	9.9	3.0	0.12	0.13	34.6	24.2	
	n	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	Maximum	0.31	5.92	14.1	582	1.6	0.31	16.2	83.4	26.3	3.28	0.061	789	42.9	15.3	0.60	0.59	146	107	
	Minimum	0.01	1.56	4.2	165	0.3	0.05	3.8	19.2	4.2	0.78	0.006	143	8.1	4.1	0.19	0.18	28.4	21.5	

\* Excluding CAN and KUPB sediment samples.



Results for the Marine Sediment Certified Reference Materials (CRMs) MESS-2 and MESS-3 certified by the National Research Council of Canada (NRC) and Standard Reference Material (SRM) Trace Elements in Water #1643d certified by the National Institute of Standards and Technology (NIST).

Reference Material	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
CRM MESS-2	0.18	8.54	21.2	1060	2.3	0.25	14.5	109	37.5	4.29	0.088	369	48.0	20.8	1.09	0.97	257	170
This Study	0.18	8.51	21.4	1020	2.2	0.24	14.1	106	37.8	4.23	0.094	370	48.2	21.1	1.07	0.96	255	170
	0.17	8.65	21.2	987	2.3	0.25	13.8	104	38.2	4.21	-	354	48.2	22.9	1.13	1.03	249	165
	0.20	8.66	21.3	1000	2.2	0.24	14.1	105	38.0	4.20	-	357	49.6	22.7	1.11	1.03	250	166
CRM MESS-2	0.18	8.57	20.7	-	2.32	0.24	13.8	106	39.3	4.35	0.092	365	49.3	21.9	1.09	0.98*	252	172
NRC Certified Values	± 0.02	± 0.26	± 0.8	-	± 0.12	± 0.01	± 1.4	± 8	± 2.0	± 0.22	± 0.009	± 21	± 1.8	± 1.2	± 0.13	-	± 10	± 16
CRM MESS-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
This Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRM MESS-3	0.18	8.59	21.2	-	2.30	0.24	14.4	105	33.9	4.34	0.091	324	46.9	21.1	1.02	0.90	243	159
NRC Certified Values	± 0.02	± 0.23	± 1.1	-	± 0.12	± 0.01	± 2.0	± 4	± 1.6	± 0.11	± 0.009	± 12	± 2.2	± 0.7	± 0.09	± 0.06	± 10	± 8
	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)
SRM #1643d	-	-	-	509.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
This Study	-	-	-	507.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SRM #1643d	1.270	127.6	56.02	506.5	12.53	6.47	25.00	18.53	20.5	91.2	-	37.66	58.1	18.15	54.1	7.28	35.1	72.48
NIST Certified Values	± 0.057	± 3.5	± 0.73	± 8.9	± 0.28	± 0.37	± 0.59	± 0.20	± 3.8	± 3.9	-	± 0.83	± 2.7	± 0.64	± 1.1	± 0.25	± 1.4	± 0.65

\* Reference Value, not Certified.

\*\* Total Carbon (Inorganic plus Organic).

Method Detection Limits (MDLs).

	Ag (µg/g)	Al (%)	As (µg/g)	Ba (µg/g)	Be (µg/g)	Cd (µg/g)	Co (µg/g)	Cr (µg/g)	Cu (µg/g)	Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)
Method Detection Limit	0.007	0.01	0.2	1	0.1	0.02	0.3	1	1.7	0.01	0.001	3	0.5	0.2	0.04	0.04	10	2

Percent Spike Recovery.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Tl	V***	Zn
Mean	92.9	102.0	98.6	102.9	93.5	93.3	98.5	98.5	98.3	95.1	93.2	100.3	96.5	96.9	96.5	96.9	116.7	97.8
Standard Deviation	2.5	2.8	5.7	4.7	1.8	1.4	5.3	4.9	2.3	4.7	5.8	1.6	0.4	3.2	3.1	4.9	2.5	3.7
(n =)	4	2	4	4	4	4	4	2	2	2	9	2	2	4	4	4	2	2

\*\*\*Final concentrations are corrected for percent spike recovery.

Estimate of Precision as Percent Relative Standard Deviation (RSD) of Lab Duplicates.

	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Tl	V	Zn
02-N05-01-MET-S	0.0	1.1	0.0	0.6	0.0	0.0	0.6	0.9	0.5	0.4	5.1	0.9	0.2	1.1	0.0	1.2	1.0	1.0
02-5(10)-01-MET-S	10.9	1.6	2.5	0.0	0.0	0.0	1.2	1.1	4.3	1.9	3.4	0.0	0.8	1.0	0.0	0.0	0.0	0.6

RSD = (standard deviation / mean) X 100

**Cruise Report for the  
2000 Summer  
Minerals  
Management Service  
Field Survey**

Arctic Nearshore  
Impact Monitoring in  
the Development Area  
(ANIMIDA)

Report to  
Minerals Management Service

April 30, 2001

Arthur D. Little, Inc.  
Acorn Park  
Cambridge, Massachusetts  
02140-2390 U.S.A.

Reference 72105

**Proprietary Information**

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of the proposal or quotation.

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Table 1: 2000 MMS ANIMIDA Stations Sampled

**List of Attachments**

- Attachment 1: 2000 Chart of the ANIMIDA Study Area
- Attachment 2: 2000 Station Logs
- Attachment 3: 2000 Collection Permit

## 1.0 Introduction

As part of the Minerals Management Service (MMS) program entitled “Arctic Nearshore Impact Monitoring in the Development Area”(ANIMIDA), the second summer season field survey of the program was conducted from August 12 to August 28, 2000. The scientific crew, on board the MMS Vessel 1273, collected samples for chemical and other analyses from the program study area. This cruise report summarizes the activities and samples collected during the 2000 summer field survey.

During the 2000 ANIMIDA summer sampling survey, the following components were successfully completed:

- Collected sediment samples at 42 stations: 15 historic Beaufort Sea Monitoring Program (BSMP) stations, 16 Northstar stations, 6 Liberty stations, and 5 Northstar Pipeline route stations
- Collected a total of 44 surface sediment samples (0 to 1 cm) for hydrocarbon and metals chemistry (triplicates at 2 stations)
- Collected 10 bivalve/amphipod samples
- Collected 5 source sediment/peat samples (4 river stations)
- Collected current and turbidity profiles along 6 transect lines around Northstar (10 total profiles)
- Collected 30 suspended sediment samples at 10 stations (corresponding to current and turbidity profile stations)
- Collected fish samples in three areas: Northstar, Liberty, and Cross Island (background)
- Delivered field samples to analytical laboratories for appropriate analyses

## 2.0 Schedule

The 2000 cruise was conducted from August 15 to August 28, 2000, and coincided with a period of expected favorable ice conditions in the program study area. Members of the field team arrived in Prudhoe Bay, Alaska between August 15 and 18, 2000. Initial “check-out” of the MMS Vessel 1273 was performed between August 12 and 15 by ship’s captain Mark Mertz (TEG Ocean Services). Field sampling personnel from Arthur D. Little, Inc. (ADL), Florida Institute of Technology (FIT), and Applied Marine Sciences (AMS) participated in the survey. The scientific team and ship’s captain

conducted the work on an 18 hour-a-day basis depending on favorable operating conditions.

### **3.0 Cruise Operations and Samples Collected**

The MMS Vessel 1273 served as the survey platform for the summer 2000 field work. The MMS Vessel 1273 was delivered to Prudhoe Bay, Alaska by MMS prior to the survey and launched after inspection by MMS and ADL representatives. The MMS Vessel 1273 was also used to deploy current meters for the MMS University of Alaska CMI program after the ANIMIDA survey. The ANIMIDA field survey was performed in four phases largely controlled by mobilization and logistical considerations. A complete list of the sampling stations that were targeted and sampled in the study area is included in Table 1. Table 1 also provides the station type, latitude and longitude, depth, date and time of sampling, and the type of chemical analysis for each sample. Attachment 1, the chart of the ANIMIDA study area, shows the locations of the 2000 sampling stations. Additional daily survey and sampling station information is included in the 2000 Station Logs (Attachment 2). The following narrative summarizes each phase of the field survey.

#### **Phase 1: Mobilization**

##### **August 12**

Ship's Captain (Mark Mertz) arrives Deadhorse, AK, inspects MMS Vessel 1273, and takes custody of the vessel after inspection.

##### **August 12 - 15**

Vessel 1273 shakedown in Prudhoe Bay, including implementation of necessary repairs/modifications (Mark Mertz). August 15 - ANIMIDA field team (John Brown – ADL, Jordan Gold – AMS, Bob Trocine – FIT, and Rob Rember – FIT) arrive in Deadhorse, AK – PBOC (ARCO).

##### **August 16**

Mobilization of Vessel 1273 by ANIMIDA field team.

#### **Phase 2: Northstar Area Sampling**

##### **August 17**

Field team completes first survey leg to the northwest of Northstar. Jordan Gold remains onshore to prep nets for fishing the following day. Additionally, Jordan Gold contacts Fred Bue from Alaska Department of Fish and Game (ADF&G) to get permission to use a gill net, as the fyke net could not be deployed in the deeper waters around Northstar. Field team encounters heavy ice to NW of Northstar Island at stations 5B & 5E and then samples 10 Northstar stations.

##### **August 18**

Gill net is deployed at three locations around Northstar during the day. No fish are caught at any location. Between sets, the field team samples 6 stations in the vicinity of Northstar Island. Jack Huntress – ADL and John Trefry – FIT arrive at PBOC.



### **August 19**

Field team completes the sampling of stations around Northstar including those along the pipeline route. Jordan Gold remains onshore to work on fish permits and Bob Trocine works at West Dock Seawater Treatment Plant (STP) to filter water samples.

### **Phase 3: Liberty Area Sampling**

#### **August 20 – 22**

Having received permission to anchor the 1273 overnight in the lee of Endicott, the field team fuels the 1273 and heads for the Liberty Prospect area. The next three days involve sampling eastern BSMP and Liberty stations during the day and driving back to PBOC at night. Captain Mark Mertz remains on the boat at night to keep watch. Field team is shuttled back and forth from shore with the Zodiac.

On August 22 the final sediment sampling station is completed (station 5D near Stump Island). The field team visits Stump Island and finds several tar “patties” (5 to 20 cm in diameter) on the Gywydr Bay side of the island. Two tar patties are collected for possible analysis.

During this time arrangements are finalized for a helicopter flight to the Colville River for sediment sampling.

### **Phase 4: Turbidity/Suspended Sediment, Fish and Source Sampling**

#### **August 23**

The MMS Vessel 1273 spends the day around Northstar performing turbidity tows, fishing, and water (suspended sediment) sampling. In all, ten transect lines (turbidity tows) are completed covering the four sides of the island (see Attachment 1). After two preliminary tows it is apparent (due to turbidity changes with depth) that it will be necessary to perform a shallow tow along a transect line and then go back along the same line with the instrument at a greater depth. Water samples are taken at four locations around Northstar, corresponding to the turbidity tows, for suspended sediment analysis.

In between transects, Jordan Gold sets a longline (50 hooks spaced evenly over ~70feet) and gill net. Both are retrieved without fish at the end of the day and then reset.

#### **August 24**

BP/ARCO helicopter takes team to two locations on the Colville River for sediment and water sampling. Peat is not found at either location. John Trefry comments that the bank at the southern Colville sampling location has eroded significantly since last year. On return, the team samples Kugaruk River sediment at the end of the access road, where it is also possible to obtain a sample of peat.

Team splits up in afternoon. FIT personnel work at the lab at the STP to filter water samples; other team members, including Michael Stewman – BP/ARCO, head out to Northstar to retrieve gill net and longline. No fish are caught.

John Brown – ADL departs from Deadhorse late in the morning.

### **August 25**

John Trefry – FIT, Jack Huntress – ADL, and Rob Rember – FIT leave PBOC to sample the Sagavanirktok River near mile marker 401 on the Dalton Highway. FIT personnel head back to STP to finish filtering and begin demobilization.

Field team takes trawl to Northstar and completes one 30-minute trawl around western side of island approximately 0.3NM from shore. The following fauna are captured in the first trawl: isopods, snailfish, snails, shrimp, sculpin, anemone, amphipods, baby arctic cod, brachiopods, and kelp. The sculpin, although a target species, is released due to its small size. All of the other specimens captured are also released alive. Field team heads back to West Dock to discuss options.

John Trefry – FIT departs from Deadhorse in morning.

### **August 26**

It is decided that baby arctic cod (<3") in sum could be used for analysis, so field team heads back to Northstar to trawl for cod. When captured, cod are broken up into three groups: rinsed, unrinsed, and formalin-preserved. Each sample contains 10 to 15 cod. The same trawl and sampling procedure is followed at Cross Island.

Kathleen Gannon from University of Alaska Fairbanks arrives on night shuttle.

### **August 27**

Sampling team, including Kathleen Gannon – UAF, heads to Liberty to follow trawling procedures performed at Northstar and Cross Island. Cod are obtained with two trawls and are preserved. One large sculpin is caught and preserved for organic analysis.

Upon return to West Dock, equipment, supplies, and samples are prepared for shipment from Deadhorse, AK.

Rob Rember and Bob Trocine – FIT depart Deadhorse in afternoon.

### **August 28**

Jack Huntress – ADL and Kathleen Gannon – UAF depart Deadhorse in morning.

Jordan Gold – AMS prepares gear for shipment and departs the morning of the 29<sup>th</sup> from Deadhorse.

Mark Mertz – TEG remains to captain boat for University of Alaska CMI program.

## **Source Sample Collection**

As noted previously, several source samples were collected as part of the summer survey. The source samples collected included water for suspended particulate analysis, and sediment for organic and inorganic analysis, from the Sagavanirktok, Kuparuk, and Colville Rivers. A peat sample was obtained from the bank of the Kuparuk River. Six samples of Prudhoe Bay field oils were also taken (provided by the BP/ARCO oil lab at PBOC) as potential source samples for hydrocarbons.

## **4.0 Sampling Procedures**

Standard sampling procedures were followed at each sampling station according to the Field Logistics and Sampling Plan for the 2000 Minerals Management Service Field Survey (ADL, 2000).

Typical sampling procedures included: deployment of amphipod traps (as required); conductivity, temperature, and depth (CTD) and current measurements with the CTD/Doppler current meter (at suspended sediment stations); and surface sediment grab sample collection using a modified Van-Veen Grab (for sediments and bivalves – as appropriate).

Photodocumentation, station logs, and field notes were recorded during the field survey. The station logs for each sampling station are included in Attachment 2. Each station log includes a description of the sampling location, observations, number and type(s) of samples collected, and comments.

## **5.0 Technical Issues**

The most significant technical difficulty during this survey was capturing fish suitable for chemical and biological analysis. Initially it was realized that a fyke net would not be suitable for use around Northstar Island. Fred Bue of the ADF&G was contacted to extend the collection permit for gill net and longline use. After several daily sets and some overnight attempts, it was clear that the gill net was not going to capture the fish necessary. Similarly, the longline did not produce any results.

After trying these passive methods, it was apparent that a more active pursuit of fish needed to be employed. Jordan Gold contacted the ADF&G once more to get permission to use an otter trawl. Although the otter trawl did not capture many of the target species, it was more successful. It is recommended that future fishing operations apply similar methods, or be modified to establish areas where fyke nets can be deployed.

## 6.0 References

Arthur D. Little, Inc. 2000. *2000 Field Sampling and Logistics Plan for the Minerals Management Service ANIMIDA Field Survey*. Prepared for Minerals Management Service. August.

Table 1: 2000 MMS Animida Stations Sampled

Station ID	Station Type	Sample Type	Latitude	Longitude	Water Depth (ft)	Date	Time	Analysis/Replicates										Comments
								Organics	Metals	GS/TOC	13C & Methyl Hg	Tissue	Suspended Sediment	ODB	Doppler Current	CTD	QC	
3A	BSMP	Sed.-Grab/Tissue	70°16.988	147°05.470	22	8/20/2000	1615-1715	1	1	1	1	1	3	1	1	1	NA	(Astarte)
3B	BSMP	Sed. Grab	70°17.917	147°02.549	15	8/20/2000	1735-1745	1	1	1	1	NA	NA	1	NA	NA	NA	
4A	BSMP	Sed.-Grab/Tissue	70°18.460	147°40.289	16	8/21/2000	1010-1030	1	1	1	1	10	NA	1	NA	NA	NA	(Annonyx/Fish)
4B	BSMP	Sed. Grab	70°21.034	147°40.007	23	8/21/2000	1705-1750	1	1	1	1	NA	3	1	1	1	NA	
4C	BSMP	Sed. Grab	70°26.144	147°42.957	30	8/21/2000	1840-1850	1	1	1	1	NA	NA	1	NA	NA	NA	
5(0)	BSMP	Sed.-Grab/Tissue	70°22.210	147°47.744	18	8/22/2000	0915-1230	1	1	1	1	1	1	1	1	1	NA	(Annonyx)
5(1)	BSMP	Sed. Grab	70°25.024	148°03.569	21	8/22/2000	1255-1256	1	1	1	1	NA	NA	1	NA	NA	NA	
5(10)	BSMP	Sed. Grab	70°27.323	148°29.980	26	8/22/2000	1420-1430	1	1	1	1	1	NA	1	NA	NA	NA	attempted biota sampling
5(5)	BSMP	Sed. Grab	70°26.106	147°18.127	23	8/22/2000	1340-1347	1	1	1	1	NA	NA	1	NA	NA	NA	
5A	BSMP	Sed. Grab	70°29.704	148°46.103	39	8/18/2000	1713-1722	1	1	1	1	NA	NA	1	NA	NA	NA	
5B	BSMP	Sed. Grab	70°34.890	148°55.040	47	8/17/2000	1120-1140	1	1	1	1	1	NA	1	NA	NA	NA	"water spiking range finder"
5D	BSMP	Sed. Grab	70°24.488	148°33.605	7	8/22/2000	1459-1505	1	1	1	1	NA	NA	1	NA	NA	NA	
5E	BSMP	Sed. Grab	70°38.392	149°16.577	63	8/17/2000	1250-1305	1	1	1	1	NA	NA	1	NA	NA	NA	
5F	BSMP	Sed.-Grab/Tissue	70°26.486	148°49.550	6	8/19/1900	1330-1430	1	1	1	1	1	NA	1	NA	NA	NA	(Cyrtocharia)
5H	BSMP	Sed.-Grab/Tissue	70°22.210	147°47.744	23	8/22/2000	1020-1110	1	1	1	1	1	NA	1	NA	NA	NA	(Astarte)
L01	Liberty	Sed. Grab	70°18.930	147°27.130	23	8/21/2000	1505-1512	1	1	1	1	NA	NA	1	NA	NA	NA	
L04	Liberty	Sed. Grab	70°17.032	147°39.897	17	8/20/2000	1400-1415	1	1	1	1	1	NA	1	NA	NA	NA	attempted biota sampling
L06	Liberty	Sed. Grab	70°16.881	147°33.978	23	8/21/2000	1055-1105	1	1	1	1	NA	NA	1	NA	NA	NA	
L07	Liberty	Sed. Grab	70°16.789	147°31.966	22	8/21/2000	1120-1130	1	1	1	1	NA	NA	1	NA	NA	NA	
L08	Liberty	Sed.-Grab/Tissue	70°16.701	147°30.298	21	8/21/2000	1140-1325	3	3	3	3	1	5	3	1	1	NA	(Astarte)
L09	Liberty	Sed.-Grab/Tissue	70°16.568	147°27.130	22	8/21/2000	1350-1420	1	1	1	1	1	NA	1	NA	NA	NA	(Astarte)
N01	Northstar	Sed. Grab	70°31.644	148°41.411	43	8/17/2000	1600-1615	1	1	1	1	NA	NA	1	NA	NA	1	
N02	Northstar	Sed. Grab	70°30.525	148°41.411	46	8/17/2000	1540-1550	1	1	1	1	NA	NA	1	NA	NA	NA	
N03	Northstar	Sed.-Grab/Tissue	70°30.005	148°41.575	43	8/17/2000	1520-1530	1	1	1	1	1	NA	1	NA	NA	NA	(Annonyx)
N04	Northstar	Sed. Grab	70°29.674	148°48.148	34	8/18/2000	1740-1750	2	2	2	2	NA	NA	2	NA	NA	NA	
N05	Northstar	Sed. Grab	70°29.662	148°44.699	41	8/18/2000	1605-1615	1	1	1	1	NA	3	1	1	1	NA	attempted biota sampling
N06	Northstar	Sed. Grab	70°29.537	148°43.194	37	8/17/2000	1837-1846	1	1	1	1	NA	NA	1	NA	NA	NA	
N07	Northstar	Sed. Grab	70°29.544	148°40.140	40	8/17/2000	1740-1750	1	1	1	1	NA	NA	1	NA	NA	NA	
N08	Northstar	Sed. Grab	70°29.407	148°38.429	38	8/18/2000	1305-1345	1	1	1	1	NA	3	1	1	1	NA	
N09	Northstar	Sed. Grab	70°29.323	148°35.214	35	8/18/2000	1900-1910	1	1	1	1	NA	NA	1	NA	NA	NA	
N10	Northstar	Sed. Grab	70°28.997	148°41.742	37	8/17/2000	1810-1817	1	1	1	1	NA	NA	1	NA	NA	NA	
N11	Northstar	Sed. Grab	70°28.424	148°41.904	30	8/18/2000	1430-1535	1	1	1	1	NA	NA	1	NA	NA	NA	attempted biota sampling
N12	Northstar	Sed.-Grab/Tissue	70°27.321	148°42.078	21	8/19/2000	1010-1020	1	1	1	1	1	NA	1	NA	NA	NA	(Annonyx)
N13	Northstar	Sed.-Grab/Tissue	70°27.004	148°43.552	15	8/19/2000	1030-1150	3	3	3	3	1	5	3	1	1	NA	(Annonyx)
N14	Northstar	Sed. Grab	70°25.978	148°40.459	12	8/19/2000	1540-1615	1	1	1	1	NA	2	1	1	1	NA	
N15	Northstar	Sed. Grab	70°26.710	148°44.570	8	8/19/2000	1205-1230	1	1	1	1	NA	2	1	1	1	NA	
N16	Northstar	Sed. Grab	70°29.910	148°42.558	41	8/17/2000	1850-1901	1	1	1	1	NA	NA	1	NA	NA	NA	
N17	Northstar	Sed. Grab	70°29.829	148°40.379	42	8/17/2000	1648-1735	1	1	1	1	NA	NA	1	NA	NA	NA	
N18	Northstar	Sed.-Grab/Tissue	70°29.082	148°42.151	37	8/17/2000	1825-1832	1	1	1	1	NA	NA	1	NA	NA	NA	(Annonyx)
N19	Northstar	Sed. Grab	70°29.097	148°40.554	37	8/17/2000	1755-1805	1	1	1	1	NA	NA	1	NA	NA	NA	attempted biota sampling
N20	Northstar	Sed. Grab	70°27.951	148°41.687	25	8/18/2000	1517-1525	2	2	2	2	NA	NA	2	NA	NA	NA	
N21	Northstar	Sed. Grab	70°26.819	148°40.587	18	8/19/2000	1654-1730	1	1	1	1	NA	3	1	1	1	NA	
N22	Northstar	Sed. Grab	70°29.340	148°41.868	28	8/23/2000	1425-1435	1	1	1	NS	NA	NA	1	NA	NA	NA	gravel from pipeline "cover"
N23	Northstar	Sed. Grab	70°29.340	148°41.868	36	8/23/2000	1435-1445	1	1	1	1	NA	NA	1	NA	NA	NA	15 feet off pipeline
SAG-01	Source	Sed. Grab	70°01.680	148°33.770	NA	8/25/2000	0800-0810	1	1	NS	NS	NA	1	1	NA	NA	NA	Sagavanirktok River @ ~0.5 mi. S of Mile 401
KUP-02	Source	Peat	70°17.700	148°53.370	NA	8/24/2000	1255-1305	1	1	NS	NS	NA	1	1	NA	NA	NA	Kuparuk River ~2 mi. S. of bridge crossing
KUP-01	Source	Sed.	70°17.700	148°59.370	NA	8/24/2000	1255-1305	1	1	NS	NS	NA	1	1	NA	NA	NA	Kuparuk River at bridge crossing
COL-01	Source	Sed.	70°15.960	150°49.290	NA	8/24/2000	1100-1110	1	1	NS	NS	NA	1	1	NA	NA	NA	Colville River N. of Nuiqsut
COL-02	Source	Sed.	70°11.360	150°52.120	NA	8/24/2000	1130-1140	1	1	NS	NS	NA	1	1	NA	NA	NA	Colville River S. of Nuiqsut (sed. and peat)
L00	Liberty	Tissue	~70°23.424	~147°46.907	~22	8/27/2000	1430-1500	1	NS	NS	NS	3	NA	NS	NA	NA	NA	Otter trawl
B00	BSMP	Tissue	~70°26.144	~148°03.569	~20	8/26/2000	1730-1800	1	NS	NS	NS	3	NA	NS	NA	NA	NA	Otter trawl
N00	Northstar	Tissue/Sed.	~70°36.674	~148°30.212	~35	8/26/2000	13110-1340	1	NS	NS	NS	3	NA	NS	NA	NA	NA	Otter trawl - sed. from net

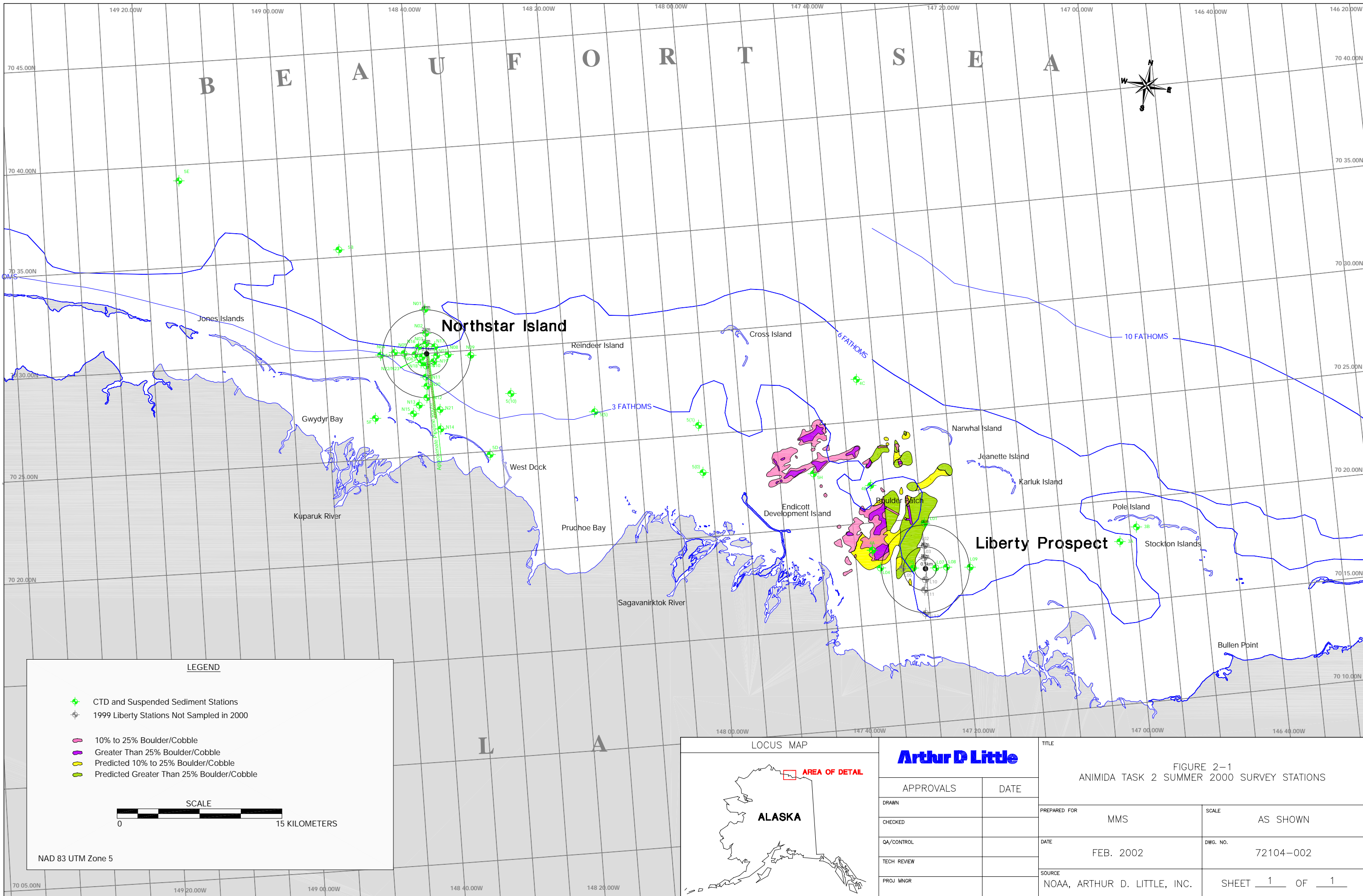
Notes:

NA = Not applicable

NS = Not sampled

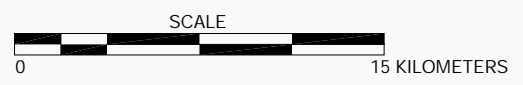
Trawl sample locations are approximate

**Attachment 1: 2000 Chart of the ANIMIDA Study Area**



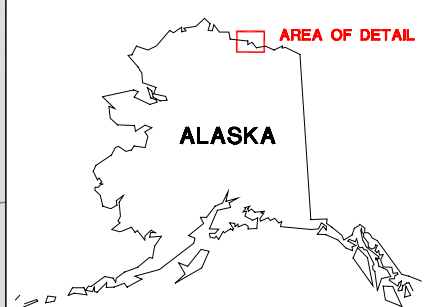
**LEGEND**

- CTD and Suspended Sediment Stations
- 1999 Liberty Stations Not Sampled in 2000
- 10% to 25% Boulder/Cobble
- Greater Than 25% Boulder/Cobble
- Predicted 10% to 25% Boulder/Cobble
- Predicted Greater Than 25% Boulder/Cobble



NAD 83 UTM Zone 5

**LOCUS MAP**



**Arthur D Little**

APPROVALS	DATE
DRAWN	
CHECKED	
QA/CONTROL	
TECH REVIEW	
PROJ MNGR	

TITLE		FIGURE 2-1 ANIMIDA TASK 2 SUMMER 2000 SURVEY STATIONS	
PREPARED FOR	MMS	SCALE	AS SHOWN
DATE	FEB. 2002	DWG. NO.	72104-002
SOURCE	NOAA, ARTHUR D. LITTLE, INC.	SHEET	1 OF 1

**Attachment 2: 2000 Station Logs**

Cruise No. 2000-083  
 Date: 08/01/00

Station Type: Station  
 Station Name: 1150  
 Date: 08/01/00  
 Time: 06:00  
 Location: 1150  
 Latitude: 33.00  
 Longitude: 115.00  
 Depth: 100  
 Depth Unit: M  
 Trawl: 100  
 Trawl Type: OTB  
 Trawl Duration: 10  
 Trawl Unit: M  
 Trawl Depth: 100  
 Trawl Depth Unit: M  
 Trawl Status: OK  
 Trawl Problem: None  
 Trawl Description: None

Species Collected:

Species	Abundance	Quantity	ADC	Remarks

Number of Animals: 0  
 Number of Fish: 0  
 Number of Crustaceans: 0  
 Number of Mollusks: 0  
 Number of Polychaetes: 0  
 Number of Sponges: 0  
 Number of Other: 0

Number of Stations: 1  
 Number of Trawls: 1  
 Number of Casts: 1  
 Number of Samples: 1  
 Number of Photos: 0  
 Number of Videos: 0  
 Number of Audio: 0  
 Number of Other: 0

Number of Species: 0  
 Number of Fish: 0  
 Number of Crustaceans: 0  
 Number of Mollusks: 0  
 Number of Polychaetes: 0  
 Number of Sponges: 0  
 Number of Other: 0

Number of Stations: 1  
 Number of Trawls: 1  
 Number of Casts: 1  
 Number of Samples: 1  
 Number of Photos: 0  
 Number of Videos: 0  
 Number of Audio: 0  
 Number of Other: 0



**Arthur D Little****Station Log**Station ID 3ADate 8/20/00Client MMSTime 1615 - 1715Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number 3A**Station Type**BSMP Northstar/Liberty/AlternateLatitude 70° 16.958'Longitude 147° 05.470'**Field Observations and Measurements**Wind Speed 15 kt Wind Direction NE Seas/Ice ~2 ft. seas, no iceWater Depth 22 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) ~20 ft. Doppler Current  Turbidity 

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**Surface Sediments: Van Veen Grab  No. of Replicates 1 (+ ~19 for: clams)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>DDBC(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Clay w/ ~1-2 cm overlying sand.**Suspended Sediments:**Surface 1m Mid-Water 3m Bottom 5m Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte  Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Gill net in @ 1615 Gill net in @ 1815 No fish some kelp pieces.**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

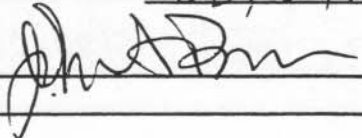
Overall Comments:

~20 grabs yielded 250 ml jar of large (2-3 cm) Astarte. 3 macoma (2cm) also found (not collected)

Field Personnel:

JB, BI, RR, JH, JG, MM

Signature:

Date: 8/20/00

Arthur D Little

# Station Log

Station ID 3B  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8/20/00  
 Time 1735-1745

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location  
 Station Number 3B  
 Latitude 70° 17.917

Station Type  
BSMP Northstar/Liberty/Alternate  
 Longitude 147° 02.549

### Field Observations and Measurements

Wind Speed 5 KTS Wind Direction ENE Seas/Ice 1-2 ft. seas no ice  
 Water Depth 15 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/		/	ODB(G)

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Mud on surface w/ many amphipod? Tubes.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Calmer in the lee of Pale Is.

Field Personnel: JB, BT, RR, JH, JE, MM

Signature: [Signature] Date: 8/20/00

**Arthur D Little****Station Log**Station ID 4ADate 8/21/2000Client MMSTime 1010 - 1030Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number 70°18'46.0" 4A**Station Type**BSMP/Northstar/Liberty/AlternateLatitude 70°18'46.0"Longitude 147°40'28.9"**Field Observations and Measurements**Wind Speed 12KT Wind Direction NNE Seas/Ice 2-3 ft. no iceWater Depth 16 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**Surface Sediments: Van Veen Grab  No. of Replicates 1 (2 grabs, 1st not good)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand  Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: stiff clay mixed w/ coarse sand particles & small gravel only ~ 4 cm penetration**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod 1 Char \_\_\_\_\_ Cisco 3 Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Amphipod trap in @ 1010, Gill net in @ 1020**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Amphipod trap in @ 1550 enough for small sample ~ 20ml  
Gill net in @ 1555 but caught in prop.  
10 Cisco and 7 Dollyarden in gill net. 2 Cisco Released because  
they were "mangled" by the gill net.

Field Personnel:

JB, JJ, JH, RR, JE, MM

Signature:

Arthur D Little

Date:

8/21/2000

Arthur D Little

# Station Log

Station ID 4A  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8-21-00  
 Time 1630

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location 4A  
 Station Number \_\_\_\_\_  
 Latitude 70° 18.460

Longitude 17° 40.289

Station Type  
 BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 10 knots Wind Direction NE Seas/Ice 2 foot no ice  
 Water Depth 16 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 3

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_  
 Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco 8 Dolly Varelar 1 Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
 Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments: Livers for organics

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Eight Cisco labeled C1-C8 and one Dolly labeled D01 had livers taken for organic analysis sample IDs are as follows  
00-4A-C1-PHC-T-F .... 00-4A-C8-PHC-T-F  
and 00-4A-D01-PHC-T-F

Field Personnel: JB, JT, JH, MM, BT, RR

Signature: [Signatures] Date: 8-21-00

**Arthur D Little**

# Station Log

Station ID 4B

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8/21/00  
Time 1705-1750

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 4B  
Latitude 70° 21.034

### Station Type

BSMP/Northstar/Liberty/Alternate

Longitude 147° 40.007

### Field Observations and Measurements

Wind Speed 12 kts Wind Direction ENE Seas/Ice 2 ft.  
Water Depth 23 ft. Conductivity, Temperature, Depth (CTD)   
CTD Depth(s) ~ 22 ft. Doppler Current  Turbidity   
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

**Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(i)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: mud w/ clay underneath, Dead Astarte shells & some pebbles.

### Suspended Sediments:

Surface 1m Mid-Water 3m Bottom 6m Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)

**Amphipods** Annonyx \_\_\_\_\_  
**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

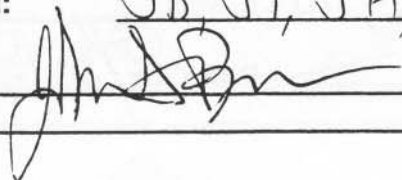
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, JT, JH, RR, JG, MM

Signature:



Date:

8/21/2000

Arthur D Little

# Station Log

Station ID 4C  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8/21/00  
 Time 1840-1850

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 4C  
 Latitude 70° 26.144

Longitude 147° 42.957

### Station Type

BSMB/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 10 kt. Wind Direction NNE Seas/Ice 1 ft.  
 Water Depth 30 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

**Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<input checked="" type="checkbox"/> (1)	<input checked="" type="checkbox"/> (1)	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODBC(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: 1-2 cm fine mud overlying "pea sized" gravel. Shallow grab ~ 6 cm

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)

**Amphipods** Annonyx \_\_\_\_\_

**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

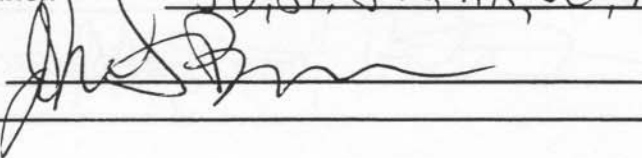
Overall Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel:

IB, JT, JH, RR, JG, MM

Signature:



Date:

8/21/00

Arthur D Little

# Station Log

Station ID 5(0)

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8/22/00

Time 0915-1230

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 5(0)

Latitude 70° 22.210  
70° 22.768

Longitude 147° 47.744  
148° 00.380

### Station Type

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 12-15kts Wind Direction ENE Seas/Ice 2 ft.

Water Depth 18 ft Conductivity, Temperature, Depth (CTD)

CTD Depth(s)  ~17 ft. Doppler Current  Turbidity

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: 1205-1230

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>008(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine sand w/ 2-3 mm surface of mud

### Suspended Sediments:

Surface 1m Mid-Water 3m Bottom 5m Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments: Amphipod traps in @ 0915 (2 Traps) Traps in @ 1205 ~ 100 mL Anonyx

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: good Amphipod sample!

Field Personnel: JB, RR, BT, JH, MM

Signature: [Signature] Date: 8/22/00

Arthur D Little

# Station Log

Station ID 5(1)

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8/22/00

Time 1255-1256

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 5(1)

Latitude 70° 25.024

Longitude 148° 03.569'

### Station Type

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 12-15 kt Wind Direction ENE Seas/Ice 22 ft. no ice

Water Depth 21 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1			ODS(1)

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine sand mixed w/ mud

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

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Field Personnel:

JB, JH, BT, RB, MM

Signature:

[Handwritten Signature]

Date:

8/22/00



Arthur D Little

# Station Log

Station ID 5(5)

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8/22/00  
Time 1340-1347

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location 5(5)  
Station Number 5(5)

Station Type  
BSMP/Northstar/Liberty/Alternate

Latitude 70° 26' 10.6" N  
70° 26' 10.6" N JSB  
Longitude 148° 18' 12.7" W

### Field Observations and Measurements

Wind Speed 12-15 Kts. Wind Direction ENE Seas/Ice ~2 ft. no ice  
Water Depth 23 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: still cold & gray ~33 °F

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>✓(1)</u>	<u>✓(1)</u>	<u>✓(1)</u>	<u>✓(1)</u>		<u>1</u>	<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine sand w/ mud mixed in.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx  
Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Only 2 more sed stations for the survey!

Field Personnel: JB, JH, BT, RR, MM

Signature: [Signature] Date: 8/22/00

Arthur D Little

# Station Log

Station ID 5(10)  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8/22/00  
 Time 1420-1430

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location  
 Station Number 5(10)  
 Latitude 70° 27.323'

Station Type  
BSMP Northstar/Liberty/Alternate  
 Longitude 148° 29.980'

### Field Observations and Measurements

Wind Speed 12-15 kts. Wind Direction ENE Seas/Ice 2-3 ft. no ice  
 Water Depth 26 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: fine sand w/ some mud mixed in.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_  
 Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
 Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments: Amphipod traps (2) in @ 1420 traps in @ ~1600 2 amphipods - no sam.

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

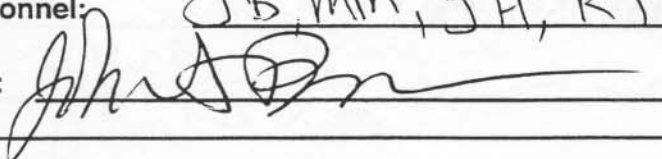
Overall Comments:

After Amphipod Traps we have finished.  
also 1 shrimp in the traps.

Field Personnel:

JB, MM, JH, RT, RR

Signature:



Date:

8/22/00

**Arthur D Little****Station Log**Station ID 5AClient MMSProject 2000 ANIMIDACase No. 68533Date 8/18/00Time 17:27 173-1722516° Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**Sampling Location**Station Number 5ALatitude 70° 29.704Longitude 148° 46.103**Station Type**BSMP Northstar/Liberty/AlternateJB 8/18/00**Field Observations and Measurements**Wind Speed 5-8 kt. Wind Direction W Seas/Ice light chop - < 5% ice bergsWater Depth 39 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(i)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Possible candidate for core in future ~5-6 cm mud. overlying clay.**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Good mud in grab

Field Personnel:

JB, BT, JE, KR, MM

Signature:

[Signature]

Date:

8/18/00

Arthur D Little

# Station Log

Station ID 5B

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8/17/00

Time 1120-1140

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 5B

Latitude 70° 34.890'

Longitude 148° 55.040'

### Station Type

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed None Wind Direction NA Seas/Ice Calm 30-40% ice cover

Water Depth 4749 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) BB 91700 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u> ✓	<u>1</u> ✓	<u>1</u> ✓	<u>1</u> ✓			<u>ODB (1)</u>

(3 samples from 1 grab)

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine sand mixed w/ coarse sand ~ 1mm clay flecks on surface

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis) Too much ice to Deploy Amphipod Traps.

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: R. Bomber & B. Trough collected 2, 2-L H<sub>2</sub>O samples from the Zojiak ~ 25' from vessel (upwind) for Task 7 water "spiking range finder"

Field Personnel:

TB, BT, RR, M. Mertz

Signature: [Signature]

Date: 8/17/2000

Arthur D Little

# Station Log

Station ID 5D

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8/22/00  
Time 1459-1505

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 5D  
Latitude 70°24.488

### Station Type

BSMP/Northstar/Liberty/Alternate

Longitude 148° 33.605'

### Field Observations and Measurements

Wind Speed 10-12 kt. Wind Direction ENE Seas/Ice 1 ft. no ice  
Water Depth 7 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: in the lee of STP/west dock

### Samples Collected

**Surface Sediments:** Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1		1	ODB(1)

### Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: mud of some fine sand and black particles (peat??)

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Biota: (circle species collected for analysis)

**Amphipods** Annonyx \_\_\_\_\_  
**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

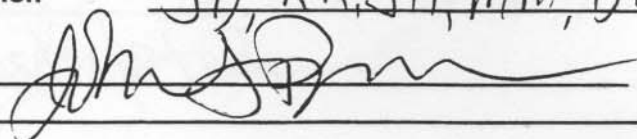
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Last sediment station of the survey !!!

### Field Personnel:

JB, RR, JH, MM, BT

### Signature:



### Date:

8/22/00

Arthur D Little

# Station Log

Station ID 5E

Date 8/17/2000  
Time 1250 - 1305

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number 5E  
Latitude 70° 38.932'

Longitude 149° 16.557'

### Station Type

BSMB/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 5-7 kt. Wind Direction SW Seas/Ice Calm ~ 30% large ice bergs  
Water Depth 63 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

**Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes  No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No  Black streaks in under

Comments: fine-med sand overlying gray clay - Many ~50-100 Copepods in grab

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis) Too much ice for Amphipods.

**Amphipods** Annonyx \_\_\_\_\_

**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

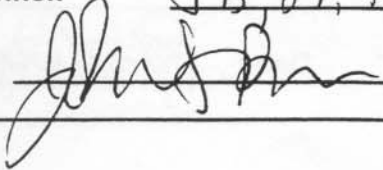
Overall Comments:

Drizzle & Rain, wind picking up.

Field Personnel:

JB, BT, RR, mm

Signature:



Date:

8/17/2000

**Arthur D Little****Station Log**Station ID 5FClient MMSProject 2000 ANIMIDACase No. 68533Date 8/19/2000Time ~1330-1430**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number 5FLatitude 70°26.486Longitude 148°49.550'**Station Type**BSMP Northstar/Liberty/Alternate**Field Observations and Measurements**Wind Speed 2-3 kt. Wind Direction NE Seas/Ice calm/noneWater Depth 6 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates (1)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>			<u>1</u>	<u>0DB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: fine sand mixed w/mud some amphipod tubes.**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria  Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: ~35 grabs yielded ~175 mL of cyrtodaria clams**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, JT, RR, JH, MM

Signature:

John A. Brown

Date:

8/19/2000

**Arthur D Little**

# Station Log

Station ID

5H

Date

8/22/00

Client

MMS

Time

1020-1110

Project

2000 ANIMIDA

Case No.

68533

**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**

Station Number

5H

**Station Type**

BSMP Northstar/Liberty/Alternate

Latitude 70° 22.210'

Longitude 147° 47.744'

**Field Observations and Measurements**

Wind Speed

15 kts

Wind Direction

ENE

Seas/Ice

2-3 ft. seas ice on horizon

Water Depth

23 ft.

Conductivity, Temperature, Depth (CTD)

CTD Depth(s)

Doppler Current

Turbidity

**Acoustics:**

Air

Water

Other

Comments:

**Samples Collected****Surface Sediments:**Van Veen Grab 

No. of Replicates

1

(30 for clams)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1		1	ODB(1)

Sediment Texture (check all that apply):

>50% silt/clay Fine 

Coarse Sand

Gravel 

Shell Hatch

Mixed

Indications of Anoxia: Yes

No

H<sub>2</sub>S Odor: Yes

No

Comments: Fine sand, w/ mud and gravel mixed in clam shells.

**Suspended Sediments:**

Surface

Mid-Water

Bottom

Other

Comments:

**Biota:**

(circle species collected for analysis)

**Amphipods**

Annonyx

**Fish:**

Sculpin

Safron Cod

Arctic Cod

Char

Cisco

Flounder

Whitefish

**Clams**Astarte 

Cyrtodaria

Macoma

Portlandia

Comments:

~30 grabs yielded ~175 mL Astarte 1cm - 2cm.

**Quality Control Samples**

Field Blank

Equipment Blank

Other

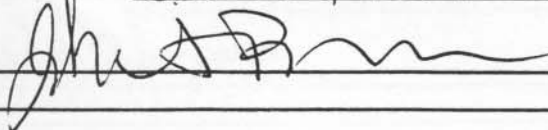
Overall Comments:

Cold and windy !! ~33°F

Field Personnel:

BBT, JH, RR, MM

Signature:



Date:

8/22/00



**Arthur D Little****Station Log**Station ID L01Client MMSProject 2000 ANIMIDACase No. 68533Date 8/21/00Time 1505-1512**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**Sampling Location L01

Station Type

BSMP/Northstar/Liberty/Alternate

Station Number L01Latitude 70° 18.930Longitude 147° 27.130**Field Observations and Measurements**Wind Speed 10 kts Wind Direction ENE Seas/Ice 2-3 ft. no iceWater Depth 23 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**Surface Sediments: Van Veen Grab 1 No. of Replicates 1 *1st grab washed out, 2nd OK*

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Mixed sed fine mud on surface (2cm) gravel & mud/clay underneath.**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

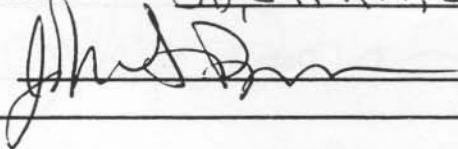
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, JT, RR, JH, JG, MM

Signature:



Date:

8/21/00

**Arthur D Little****Station Log**
 Station ID L04  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

 Date 8/20/00  
 Time 1400-1415
**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**
 Sampling Location  
 Station Number L04  
 Latitude 70°17.032
Longitude 147°39.897
 Station Type  
 BSMP/Northstar Liberty Alternate
**Field Observations and Measurements**
 Wind Speed 15 KTS Wind Direction NE Seas/Ice 2-4ft. No ice  
 Water Depth 17 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**
 Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODS(1)</u>

Sediment Texture (check all that apply):

 >50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 
Comments: mud/sand mix**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Amphipod traps (2) in @ 1400 Retrieved @ 1955 No amphipods.**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

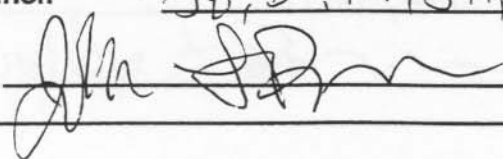
Overall Comments:

only ~ 15 amphipods in traps and ~ 12 Isopods  
not enough for a sample.  
Heading to Endicott for  
night Anchorage!!

Field Personnel:

JB, BT, RP, JH, JG, mm

Signature:



Date:

8/20/00

Arthur D Little

# Station Log

Station ID L06

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8/21/2000

Time 1055-1105

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number L06

Latitude 70°16.881

Longitude 147°33.978

### Station Type

BSMP/Northstar Liberty Alternate

### Field Observations and Measurements

Wind Speed 10-12 Kts Wind Direction NNE Seas/Ice 2-3 ft. seas no ice

Water Depth 23 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1		1	ODBL

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: mud and clay fine black organic particles on surface post??

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

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Field Personnel: JB, JJ, RB, JH, JG,

Signature: [Signature] Date: 8/21/00

**Arthur D Little****Station Log**Station ID L07Date 8/21/00Client MMSTime 1130-1130Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number L07**Station Type**

BSMP/Northstar/Liberty/Alternate

Latitude 70° 16.789Longitude 147° 31.966**Field Observations and Measurements**Wind Speed 12 Kts Wind Direction NNE Seas/Ice 2-3 ft. no iceWater Depth 22 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_Comments: still ~33 °F but no snow. Cold & gray.**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODBC</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: clay/mud/some fine sand - black particles on surface red??**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

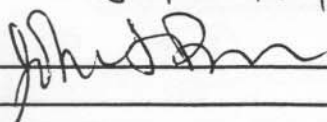
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, JT, JH, RR, JG, MM

Signature:

Date: 8/21/00

**Arthur D Little****Station Log**Station ID L08Client MMSProject 2000 ANIMIDACase No. 68533Date 8/21/00Time 1140-1325**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number L08Latitude 70° 16.701Longitude 147° 30.298**Station Type**BSMP/Northstar/Liberty/Alternate**Field Observations and Measurements**Wind Speed 12-14 kt. Wind Direction NNE Seas/Ice 2-3 ft. no iceWater Depth 21 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) ~20 ft. Doppler Current  Turbidity **Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 3 (~20 grabs for clams)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>		<u>3</u>	<u>ODB(3)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: mud/fine sand/gravel**Suspended Sediments:**Surface 1m (3) Mid-Water 3m Bottom 5m Other \_\_\_\_\_Comments: Triplicate @ 1m depth.**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte  Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Amphipod Traps in @ 1140 Amphipod Traps in @ 1430 ~20 Annonyx (no sample taken)**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: ~20 grabs yielded ~200 mL Astarte clams  
2-3cm in diameter.Field Personnel: JB, JT, JH, RR, JG, MMSignature: [Signature]Date: 8/21/00

**Arthur D Little****Station Log**Station ID LO9Date 8/21/00Client MMSTime 1350 - 1420Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number LO9**Station Type**BSMP/Northstar Liberty AlternateLatitude 70° 16.568Longitude 147° 27.130**Field Observations and Measurements**Wind Speed 12 kts Wind Direction NNE Seas/Ice 2-3 ft. no iceWater Depth 23 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_Comments: Cold 33°F, cloudy, gray 4-5 mi visibility.**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 1 (~10 for clams)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Fine Sand, some surface "flock" patches.**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte  Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: ~10 grabs yielded ~200 mL of 2-3 cm diameter Astarte.**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Eodiak w/ J. Trefry & R. Rember deployed to collect 2L water sample from surface @ 1350Field Personnel: JB, JT, RR, JH, JG, MMSignature: John J. PurumDate: 8/21/2000

**Arthur D Little****Station Log**Station ID NO1Client MMSProject 2000 ANIMIDACase No. 68533Date 8/17/00Time 1600-1615**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number NO1Latitude 70° 31.644Longitude 148° 41.411**Station Type**BSMR/Northstar/Liberty/Alternate**Field Observations and Measurements**Wind Speed 5-7 Kt. Wind Direction SE Seas/Ice ~10% ice Light chop.Water Depth 43 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Some large bergs in area.**Samples Collected**Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Fine Sand**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)Amphipods Annonyx

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**Field Blank \_\_\_\_\_ Equipment Blank  (1) Other \_\_\_\_\_Overall Comments: One Equip. Blank for metals & Organics.DE water rinsed through grab after Decon.Field Personnel: JB, BT, RR, MMSignature: [Signature]Date: 8/17/2000

**Arthur D Little****Station Log**
 Station ID N02  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

 Date 8/17/00  
 Time 1540 - 1550
**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**
 Station Number N02  
 Latitude 70° 30.525
Longitude 148° 41.411**Station Type**BSMP/Northstar/Liberty/Alternate**Field Observations and Measurements**
 Wind Speed 5-7kt. Wind Direction SW Seas/Ice <5% bergs light chop.  
 Water Depth 46 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**
**Surface Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/		/	ODBC( )

Sediment Texture (check all that apply):

 >50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_
Comments: Compact clay w/ overlying fine fleck**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

1 amphipod observed in grab.

Field Personnel:

JB, BT, RR, MM

Signature:

[Signature]

Date:

8/17/00



**Arthur D Little**

# Station Log

Station ID N03Client MMSProject 2000 ANIMIDACase No. 68533Date 8/17/2000Time 1520-1530**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N03Latitude 70° 30.005Longitude 148° 41.575**Station Type**

BSMP/Northstar/Liberty/Alternate

**Field Observations and Measurements**Wind Speed 5-7kt Wind Direction SE Seas/Ice >5% bergs, light chop.Water Depth 43 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<input checked="" type="checkbox"/> (1)	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: ? Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: gray clay w/ light layer 1-2cm of brown floc on surface**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis) Amphipod trap in @ 1520 Retrieved @ 1915**Amphipods** Anonyx **Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Small sample ~ 7-10 gm**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

37 small (1 inch) shrimp discarded  
Used 2 Amphipod Traps baited w/ sardines

Field Personnel:

JB, BT, RR, MM

Signature:

Date: 8/17/2000

**Arthur D Little****Station Log**
 Station ID N04  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

 Date 8/18/2000  
 Time 1740 - 1750
**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**
 Station Number N04  
 Latitude 70° 29.674
**Station Type**  
 BSMR/Northstar/Liberty/Alternate
Longitude 148° 48.148**Field Observations and Measurements**
 Wind Speed 5-7 kts Wind Direction W Seas/Ice Light chop 2-4% ice  
 Water Depth 34' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**
**Surface Sediments:** Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB (1)</u>

Sediment Texture (check all that apply):

 >50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

 Comments: 1<sup>st</sup> grab washed out. soft mud underlying clay in 2<sup>nd</sup> grab
**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

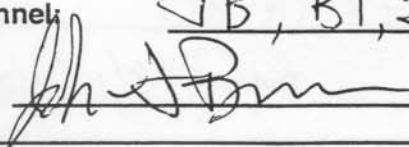
Overall Comments:

Red/orange "layer" (1 mm thick) in the mud/clay  
under the surface - photo taken.

Field Personnel:

JB, BT, JG, RR, MM

Signature:



Date:

8/18/00

**Arthur D Little**

# Station Log

Station ID N05Client MMSProject 2000 ANIMIDACase No. 68533Date 8/18/2000Time 1605-1650**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N05Latitude 70 29.622Longitude 148 44.699**Station Type**BSMP Northstar Liberty/Alternate**Field Observations and Measurements**Wind Speed 8-10 kt. Wind Direction W Seas/Ice 1 ft. waves ~4% ice bergsWater Depth 41 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) ~36 ft. Doppler Current  Turbidity 

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

**Suspended Sediments:**Surface 1m Mid-Water 5m Bottom 10m Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Set gill net 200' @ 1605. Net under ice berg when out of ice checked net @ 1650 no fish. ~1810 Net on board no fish only 2-3 isopods.

Field Personnel: JB, BI, JG, BR, MMSignature: [Signature]Date: 8/18/2000

Arthur D Little

# Station Log

Station ID N06

Date 8/17/2000

Client MMS

Time 1837-1846

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N06

### Station Type

BSMP Northstar Liberty/Altern

Latitude \_\_\_\_\_

Longitude \_\_\_\_\_

### Field Observations and Measurements

Wind Speed 7 Kts Wind Direction S Seas/Ice light chop. < 1% ice bergs

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Drizzle light fog

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
						<u>ODBC(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Hard clay w/ fine sand mix

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

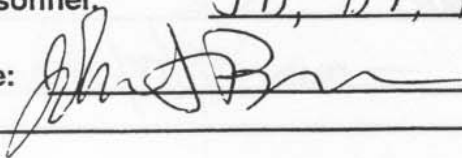
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, BI, RR, MM

Signature:



Date:

8/17/2000

Arthur D Little

# Station Log

Station ID NO7

Date 8/17/00

Client MMS

Time 1740-1750

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number NO7

### Station Type

BSMP Northstar Liberty/Alternate

Latitude 70°29.544

Longitude 148°40.140

### Field Observations and Measurements

Wind Speed 5 kt. Wind Direction SSE Seas/Ice light chop no ice within 0.5 mi.

Water Depth 40 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Grab full right to doors. Side w/ least disturbed surface sampled

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel: JB, BT, RR, MIM

Signature: [Signature]

Date: 8/17/2000

Arthur D Little

# Station Log

Station ID N08  
Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8/15/00

Time 1305 - 1345

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N08

Latitude 70° 29.407'

Longitude 148° 38.429'

### Station Type

BSMP (Northstar) Liberty/Alternate

### Field Observations and Measurements

Wind Speed 15-20 mph Wind Direction W Seas/Ice 2-3 ft. waves. Some large bergs ~1%

Water Depth 38 ft. Conductivity, Temperature, Depth (CTD)

CTD Depth(s) 34 ft. Doppler Current  Turbidity

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Heavy ice ~ 1mi to the N and NW.

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
						ODB (1) (only 2 vials)

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Very fine sand w/ ~2-4 mm mud on surface

### Suspended Sediments:

Surface  Mid-Water  Bottom  Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BT, JG<sup>Jordan</sup>, RR, MM

Signature: [Signature] Date: 8/18/2000

**Arthur D Little**

# Station Log

Station ID

N09

Date

8/18/2000

Time

1908 - 1910

Client

MMS

Project

2000 ANIMIDA

Case No.

68533

**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**

Station Number

N09

**Station Type**

BSMP (Northstar) Liberty/Alternate

Latitude 70° 29.323

Longitude 148° 35.214

**Field Observations and Measurements**Wind Speed NONE Wind Direction NA Seas/Ice calm 10-20% BerqsWater Depth 35 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:**Van Veen Grab No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODBC(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay 7 Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Fine Sand ~1mm flak on surface - Shallow grab ~6cm deep**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Heading to West Dock !!

Field Personnel:

JB, BT, JG, RR, MM

Signature:



Date:

8/18/00

**Arthur D Little****Station Log**
 Station ID N10  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

 Date 8/17/00  
 Time 1810 - 1817
**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**
 Station Number N10  
 Latitude 70° 28.997'
Longitude 148° 41.742**Station Type**BSMP/ Northstar /Liberty/Alternat**Field Observations and Measurements**
 Wind Speed 7.10 kt Wind Direction S Seas/Ice light chop, no ice  
 Water Depth 37 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_
Comments: Drizzle and gray**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: soft clay w/ surface "fleck" some black streaks in clay**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: TB, BT, RR, mmSignature: [Signature]Date: 8/17/2000



**Arthur D Little**

# Station Log

Station ID N11Date 8/18/00Client MMSTime 1430 - 1535Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N11**Station Type**BSMP Northstar Liberty/AlternateLatitude 70° 28' 42.4"Longitude 148° 41.904'**Field Observations and Measurements**Wind Speed 15 kt Wind Direction W Seas/Ice 2 ft. waves ~1% bergsWater Depth 30 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: clay and mud w/ some fine sand**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Anonyx**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: 2 Traps Deployed @ 1445**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

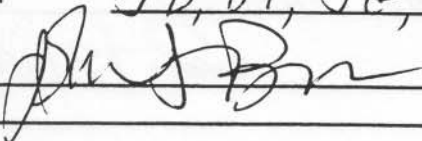
Overall Comments:

Deployed Amphipod traps (2) and gill net ~200 ft at 1445. 1535 gill net on board No fish several 6-8 Isopods.

Field Personnel:

JB, BI, JG, RR, MM

Signature:



Date:

8/18/2000

**Arthur D Little****Station Log**
 Station ID N12  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533
Date 8/19/2000Time 1010 - 1020**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N12Latitude 70.27.321Longitude 145° 42.078**Station Type**

BSMP/Northstar/Liberty/Altern

**Field Observations and Measurements**Wind Speed 1-2 kt. Wind Direction NE Seas/Ice Calm Rare small bergsWater Depth 21 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>OPB (2)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: ~2 cm mud overlying "pea size gravel"**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: 9 Amphipod traps @ 1010 retrieval @ 1735 2 traps yielded ~70 ml Annonyx**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

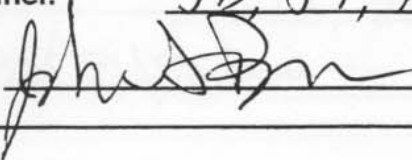
Overall Comments:

Baited Amphipod traps w/ sardines in mustard sauce

Field Personnel:

JB, JT, RR, JH, <sup>ack, untres</sup> MM

Signature:



Date:

8/19/2000

**Arthur D Little**

# Station Log

Station ID N13Date 8/19/2000Client MMSTime 1030 - 1150Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N13**Station Type**

BSMP/Northstar/Liberty/Alternate

Latitude 70° 27.004Longitude 148° 43.552**Field Observations and Measurements**Wind Speed 0-2 kt Wind Direction NE Seas/Ice calm no ice within 1/2 mileWater Depth 15 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) ~ 14 ft. Doppler Current  Turbidity **Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 3

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>		<u>3</u>	<u>ODB(3)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: 2-3 cm mud overlying gravel 1-2 cm**Suspended Sediments:**Surface 3 (triplicate) Mid-Water 1 Bottom 1 Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Anonyx**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Amphipod Trap in @ 1150 Retrieved @ 1745**Quality Control Samples**Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

1 Field blank - deck exposure for ~ 10 mins. collected.

Deployed 1 amphipod trap - yielded ~ 175 mL Anonyx sp. amphipod  
Baited w/ sardines in mustard sauce  
Home to west dock.

Field Personnel: JB, JT, JH, RR, MMSignature: [Signature]Date: 8/19/2000

**Arthur D Little****Station Log**Station ID N14Client MMSProject 2000 ANIMIDACase No. 68533Date 8/19/00Time 1540-1615**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N14Latitude 70°25.978**Station Type**BSMP/ Northstar Liberty/AlternateLongitude 148° 40.459'**Field Observations and Measurements**Wind Speed 6 Kts Wind Direction NE Seas/Ice light chop none within 1/2 mi.Water Depth 12 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) \_\_\_\_\_ Doppler Current  Turbidity **Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates 2 grabs (1st over full, 2nd OK)

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Deep mud filled grab. ~16 cm deep.**Suspended Sediments:**Surface  (1m) Mid-Water \_\_\_\_\_ Bottom  (2.5m) Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Additional (3rd) grab taken by B. Rember to collect core sample for age dating (~15cm core depth)

Field Personnel:

JB, JT, JH, RR, MM

Signature:

Date:

8/19/2000

Arthur D Little

# Station Log

Station ID N15

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8/19/2000

Time 1205 - 1230

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N15

Latitude 70° 26.710

Longitude 148° 44.570

### Station Type

BSMP Northstar Liberty/Alternate

### Field Observations and Measurements

Wind Speed 1-2 kts Wind Direction NE Seas/Ice calm seas, No ice in sight ~ 1/4 mi. (foggy)

Water Depth 8 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Light drizzle and light fog

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

### Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine Sand

### Suspended Sediments:

Surface 1m Mid-Water ~2m Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: at anchor.

### Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Lunch after station

Field Personnel: JB, JT, JH, RB, MM

Signature: [Signature] Date: 8/19/00

Arthur D Little

# Station Log

Station ID N16

Date 8/17/2000  
Time 1850-1901

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N16  
Latitude 70° 29.910'

Longitude 148° 42.558

### Station Type

BSMP/Northstar Liberty/Alternate

### Field Observations and Measurements

Wind Speed 7kt. Wind Direction S Seas/Ice light chop - no ice  
Water Depth 41 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

**Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Hard clay w soft mud on surface

### Suspended Sediments

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)

**Amphipods** Annonyx \_\_\_\_\_

**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Heading to NO3 to pick up Amphipod Traps. Then  
back to West Dock.

Field Personnel: TB BT, RR, MM

Signature: [Signature]

Date: 8/17/2000

Arthur D Little

# Station Log

Station ID N17

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8/17/00

Time 1648 - 1735

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N17

Latitude 70° 29.829'

Longitude 148° 40.379'

### Station Type

BSMP Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 5 kt Wind Direction SSE Seas/Ice <1% bergs. Light chop

Water Depth 42 ft. Conductivity, Temperature, Depth (CTD)

CTD Depth(s) ~40 ft. Doppler Current  Turbidity

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes  No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Hard clay w/ some fine sand mixed in. ~0.5cm surface "flock". Underlying clay appeared w/ black streaks.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, Bi, RR, MM

Signature:

Date:

8/17/2000

Arthur D Little

# Station Log

Station ID N18

Date 8/17/2000

Time 1825-1832

Client MMS

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N18

Latitude 70° 29.082

Longitude 148° 42.151'

### Station Type

BSMP Northstar Liberty/Alternate

### Field Observations and Measurements

Wind Speed 7-10 kt Wind Direction S Seas/Ice Light chop in ice

Water Depth 37 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Drizzle

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Hard clay w/ some fine sand.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BI, RR, mm

Signature: [Signature]

Date: 8/17/2000



Arthur D Little

# Station Log

Station ID N18  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8-23-00  
 Time 1450

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N18  
 Latitude 70° 29.052'

### Station Type

BSMP/Northstar/Liberty/Alternate

Longitude 148° 42.151'

### Field Observations and Measurements

Wind Speed 13-15 knots Wind Direction NE Seas/Ice 2 foot seas no ice  
 Water Depth 36' Conductivity, Temperature, Depth (CTD) X  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab X No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
						<u>ODBC(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay X Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx X

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments: 2 traps set @ 0945 and retrieved at 1450

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Only samples taken for U of A Anchorage

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Field Personnel: JH, JT, RR, JG, MM

Signature: [Signature] | [Signature] Date: 8-23-00

Arthur D Little

# Station Log

Station ID N19

Date 8/17/2000

Client MMS

Time 1755-1805

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N19

### Station Type

BSMP Northstar/Liberty/Alternate

Latitude 70° 29.097'

Longitude 148° 40.554'

### Field Observations and Measurements

Wind Speed 5 kt. Wind Direction SSE Seas/Ice no ice

Water Depth 37 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODB (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: clay and some fine sand mixed in, surface "flock" - full grab.

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, BT, RR, MM

Signature:

Date:

8/17/2000

**Arthur D Little**

# Station Log

Station ID N19Date 8/18/2000Client MMSTime 1140 - 1405Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N19Latitude 70° 29.052'Longitude 148° 40.321'**Station Type**BSMP/ Northstar /Liberty/Alternate**Field Observations and Measurements**Wind Speed 25 mph Wind Direction W Seas/Ice 2-3 ft. wavesWater Depth 38 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Gill net in @ 1145**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Used 200 ft. gill net deployed on bottom, 4 meter height  
2" mesh size (stretched). Net checked @ 1245 BB 1215 - no fish  
~ 20 Isopods. 1405 - Recovered gill net, was dragged by iceberg.  
No fish - only isopods.

Field Personnel: JB, BT, JE, RR, MMSignature: [Signature]Date: 8/18/2000

Arthur D Little

# Station Log

Station ID N20  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8/18/2000  
 Time 1517 - 1525

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location Station Number N20 Longitude 148° 41.687 Station Type BSMP Northstar Liberty/Alternate  
 Latitude 70° 27.951 *BB error 8/18/00*

### Field Observations and Measurements

Wind Speed 12-15 kt Wind Direction W<sup>r</sup> Seas/Ice 2 ft. waves - some bergs ~1%  
 Water Depth 25 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab 1 No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>i</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODBG</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: 1<sup>st</sup> grab washed out. ~2cm mud overlying gravel (0.5 cm diam - 1cm)

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx \_\_\_\_\_  
 Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
 Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: gravel in 1<sup>st</sup> grab caused wash-out.  
2<sup>nd</sup> grab was good w/ gravel & overlying mud.

Field Personnel: JB, BT, JG, RR, mm

Signature: [Signature] Date: 8/18/2000

**Arthur D Little****Station Log**Station ID N21Date 8/19/2000Client MMSTime 1654-1730Project 2000 ANIMIDACase No. 68533**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N21**Station Type**BSMP Northstar Liberty/AlternateLatitude 70° 26.819'Longitude 148° 40.587'**Field Observations and Measurements**Wind Speed 5 kt. Wind Direction NE Seas/Ice Light chopWater Depth 18 ft. Conductivity, Temperature, Depth (CTD) CTD Depth(s) ~17 ft. Doppler Current  Turbidity **Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected****Surface Sediments:** Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1		1	ODB(i)

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments:

**Suspended Sediments:**Surface 1m Mid-Water 3m Bottom 4.5m Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

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Field Personnel: JB, JT, JH, RR, MMSignature: [Signature]Date: 8/19/2000

[Signature]

[Signature]

**Arthur D Little****Station Log**
 Station ID N22  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

 Date 8/23/00  
 Time 1425
**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**
 Station Number N22  
 Latitude 70° 29.340
**Station Type**BSMP/Northstar/Liberty/AlternateLongitude 148° 41.868**Field Observations and Measurements**
 Wind Speed 13-15 kts Wind Direction NE Seas/Ice 2 foot seas no ice  
 Water Depth 28' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 CTD Depth(s) 28' Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Samples Collected**
**Surface Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>			<u>ODB(i)</u>

Sediment Texture (check all that apply):

 >50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

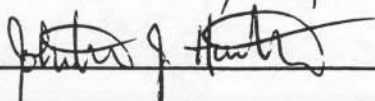
Overall Comments:

On pipeline cover from Northstar to land  
only a trace of fine grained material but taken  
as an example of what is covering pipe.

Field Personnel:

JH, JT, RR, JG, MM

Signature:

Date: 8-23-00

Arthur D Little

# Station Log

Station ID N23

Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 9-23-00

Time 1435

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number N23

Latitude 70° 29.340

Longitude 148° 41.865

### Station Type

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 13-15 knots Wind ~~Direction~~ NE Seas/Ice 2 foot seas no ice

Water Depth 36' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>1</u>	<u>ODBCi</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments:

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Position 15' off N23 to SW (downwind)  
achieved by letting out anchor line

Field Personnel: JH, JT, RR, JG, MM

Signature: [Signatures] Date: 9-23-00

**Arthur D Little**

# Station Log

Station ID NW1

Date 8-23-00

Client MMS

Time 1145

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number NW1

### Station Type

BSMP/~~Northstar~~ Liberty/Alternate

Latitude 70° 29.445

Longitude 148° 142.349

### Field Observations and Measurements

Wind Speed 10-15 knots Wind Direction NE Seas/Ice 2 foot seas no ice

Water Depth 34' Conductivity, Temperature, Depth (CTD) X

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface X 1m Mid-Water X 4m Bottom 10m Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

First water station as part of Task 5 near N18

Field Personnel:

JH, JT, RR, JG, MM

Signature:

[Signature]

Date:

8-23-00



Arthur D Little

Station Log

Station ID NWZ

Date 8-23-00

Client MMS

Time 1240

Project 2000 ANIMIDA

Case No. 68533

Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location

Station Number NWZ

Station Type

BSMP/~~Northstar~~/Liberty/Alternate

Latitude 70° 29.366

Longitude 148° 42.107

Field Observations and Measurements

Wind Speed 10-15 knots Wind Direction NE

Seas/Ice 2 foot seas no ice

Water Depth 33'

Conductivity, Temperature, Depth (CTD) X

CTD Depth(s) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_

Water \_\_\_\_\_

Other \_\_\_\_\_

Comments:

Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

Suspended Sediments:

Surface 1m Mid-Water 4m Bottom 10m Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Sample taken on south side of island on line 4

Field Personnel: JH, JT, RR, JG, MM

Signature: [Signature] Date: 8-23-00

Arthur D Little

# Station Log

Station ID NW3  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8-23-00  
 Time 1705

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number NW3  
 Latitude 70° 29.594

Longitude 148° 42.001

### Station Type

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 10-15 knots Wind Direction NE Seas/Ice 2 foot seas no ice  
 Water Depth 34' Conductivity, Temperature, Depth (CTD) X  
 CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
 Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface 1m Mid-Water 4m Bottom 10m Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_  
 Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
 Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel:

JH, JT, RR, MM, JG

Signature:

[Handwritten Signature]

Date:

8-23-00

Arthur D Little

# Station Log

Station ID NW4  
 Client MMS  
 Project 2000 ANIMIDA  
 Case No. 68533

Date 8-23-00  
 Time 1800

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number NW4  
 Latitude 70° 29.469

Longitude 148° 41.558

### Station Type

BSMP/Northstar Liberty/Alternate

### Field Observations and Measurements

Wind Speed 15 knots Wind Direction NE Seas/Ice 2 foot seas no ice

Water Depth 36 feet Conductivity, Temperature, Depth (CTD) X

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface 1m Mid-Water 4m Bottom 10m Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: JH, JT, JO, MM, ER

Signature: [Signature] Date: 8-23-00

Arthur D Little

# Station Log

Station ID COL-01  
Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8-24-00

Time 1100

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number COL-01 (North)

Latitude 70° 12.96

Longitude 150° 49.29

Station Type Coleville River

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 10 knots Wind Direction NE Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Coleville River North station

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>	<u>X</u>	<u>JJH</u>	<u>X</u>			<u>ODBLD</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine X Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes JJH No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface X Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

No peat found  
very little silt/mud on banks. mainly fine sand

Field Personnel:

JH, JT, RR

Signature:



Date: 8-24-00

**Arthur D Little****Station Log**Station ID COL-02Client MMSProject 2000 ANIMIDACase No. 68533Date 8-24-06Time 1130**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number COL-02 (south)Latitude 70° 11.36Longitude 150° 52.12Station Type Coleville River  
BSMP/Northstar/Liberty/Alternate**Field Observations and Measurements**Wind Speed 10 knots Wind Direction NE Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Coleville River ~~North~~ <sup>South</sup> Station**Samples Collected**Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>	<u>X</u>	<u>JH</u>	<u>X</u>			<u>ODR (1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine X Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

**Suspended Sediments:**Surface X Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: unable to sample west side of river due to steep bank.  
Helicopter would have had to land on tundra  
Decision was made to land on east bank however  
no part was able to be obtainedField Personnel: JH, JT, RRSignature: [Signature]Date: 8/24/06

Arthur D Little

# Station Log

Station ID KUP-01

Date 8-24-00

Client MMS

Time 1255

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number KUP-01

Station Type Kuparuk River

Latitude 70° 17.70

Longitude 148° 59.37

BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 10 knots Wind Direction NE Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Kuparuk River at end of access road

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>	<u>X</u>	<u>JH</u>	<u>X</u>			<u>ODR(1)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine X Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

### Suspended Sediments:

Surface X Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Anonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

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Field Personnel: JH, JT, RR

Signature: Johnston J Huntress

Date: 8-24-00

**Arthur D Little****Station Log**Station ID KUP-02Client MMSProject 2000 ANIMIDACase No. 68533Date 8-24-00Time 1255**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number KUP-02Latitude 70° 17.70Longitude 148° 59.37Station Type Kuparuk River  
BSMP/Northstar/Liberty/Alternate**Field Observations and Measurements**Wind Speed 10 knots Wind Direction NE Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_Comments: Kuparuk River at end of Access Road**Samples Collected****Surface Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>	<u>X</u>	<u>JH</u>	<u>X</u>			<u>δDB (1)</u>

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: PEAT**Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel: JH, JT, RRSignature: Johnston / HunterDate: 8-24-00

Arthur D Little

# Station Log

Station ID SAG-01  
Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8-25-00  
Time 0800

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

### Sampling Location

Station Number SAG-01

Latitude 70° 01.68

Longitude 148° 33 77

Station Type Sage River  
BSMP/Northstar/Liberty/Alternate

### Field Observations and Measurements

Wind Speed 5-10 knots Wind Direction NE Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Sample taken at end of access road from mile marker 401

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
X	X	<del>SSH</del>	X			ODBCI

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine X Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Bank is steep and eroded, small pockets of fine grained sediment here and there

### Suspended Sediments:

Surface X Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Water is flowing well, John makes comment that river is higher than last year

Field Personnel: JH, JT, RR

Signature: [Signature] Date: 8-24-00



Arthur D Little

# Station Log

Station ID B00

Client MMS

Project 2000 ANIMIDA

Case No. 68533

Date 8-26-00

Time 1800

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Arctic cod from area around Cross Island

#### Sampling Location

Station Number B00

Latitude NA

#### Station Type

BSMP/Northstar/Liberty/Alternate

Longitude NA

#### Field Observations and Measurements

Wind Speed 10-12 knots Wind Direction NE Seas/Ice 1-2 foot seas few icebergs

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Samples Collected

~~Surface Sediments~~ Van Veen Grab \_\_\_\_\_ No. of Replicates 3

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>						<u>P450</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

#### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod X Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments: Fish taken from 2 trawls (~30min each) from around Cross Island

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

DI water bottle freezing during fish processing  
Sample IDs 00-B00-01-PHC-T-F 15 fish from net  
00-B00-02-PHC-T-F 15 fish rinsed w/DI  
Taken by JG → 00-B00-02-PHC-T-F 15 fish information  
01 replicate taken straight from net, no salt water rinsing

Field Personnel:

JH, JG, MM, RR

Signature:

Johnston / Hunter

Date: 8-26-00

Arthur D Little

# Station Log

Station ID L00  
Client MMS  
Project 2000 ANIMIDA  
Case No. 68533

Date 8-27-00  
Time 1500

**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**  
Liberty Fish samples, see notes for trawl start-stop points  
Sampling Location \_\_\_\_\_ Station Type \_\_\_\_\_  
Station Number L00 Longitude NA  
Latitude NA BSMP/Northstar Liberty Alternat \_\_\_\_\_

**Field Observations and Measurements**  
Wind Speed 10 knots Wind Direction ENE Seas/Ice 2 ft seas, couple of iceberg  
Water Depth 22 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_  
**Acoustics:** Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: visibility is low due to fog banks

**Samples Collected**  
~~Surface Sediment~~ Van Veen Grab \_\_\_\_\_ No. of Replicates 3  

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<input checked="" type="checkbox"/>						<u>P450</u>

Sediment Texture (check all that apply):  
>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fish taken from 3, 40 min trawls around proposed Liberty Prospect

**Suspended Sediments:**  
Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_  
Comments: \_\_\_\_\_

**Biota:** (circle species collected for analysis)  
**Amphipods** Annonyx \_\_\_\_\_  
**Fish:** Sculpin 2 Safron Cod \_\_\_\_\_ Arctic Cod 1 Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_  
**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_  
Comments: \_\_\_\_\_

**Quality Control Samples**  
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Three trawls produced only two Arctic cod, and two sculpin for analysis.  
1 sculpin 00-L00-01-P450-T-F BTLK for biomarker  
1 sculpin 00-L00-02-PHC-T-F whole sculpin for organics  
Zym. cod 00-L00-03-PHC-T-F Zym. cod for organics

Field Personnel: JH, MM, JG, KG

Signature: [Signature] Date: 8-27-00

**Arthur D Little****Station Log**Station ID N00Client MMSProject 2000 ANIMIDACase No. 68533Date 8-26-00Time 1340**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)****Sampling Location**Station Number N00Latitude NALongitude NA**Station Type**BSMP Northstar Liberty/Alternate**Field Observations and Measurements**Wind Speed 7-10 knots Wind Direction NNE Seas/Ice 1ft seas few icebergsWater Depth ~35'

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_

**Acoustics:** Air \_\_\_\_\_

Water \_\_\_\_\_

Other \_\_\_\_\_

Comments:

**Samples Collected**~~Sample Substrate~~

Van Veen Grab \_\_\_\_\_

No. of Replicates 3

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>						<u>P450</u>

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

**Suspended Sediments:**

Surface \_\_\_\_\_

Mid-Water \_\_\_\_\_

Bottom \_\_\_\_\_

Other \_\_\_\_\_

Comments:

**Biota:** (circle species collected for analysis)**Amphipods** Annonyx \_\_\_\_\_**Fish:** Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod X Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_**Clams** Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_Comments: Approx. 30 fish in otter trawl along with mud and bottom organisms**Quality Control Samples**

Field Blank \_\_\_\_\_

Equipment Blank \_\_\_\_\_

Other \_\_\_\_\_

Overall Comments:

Fish from around NorthstarSample IDs 00-N00-01-PHC-T-F 10 fish unrinsed00-N00-02-PHC-T-F 15 fish rinsed w/ D.Etaken by JG → 00-N00-03-P450-T-F 15 fish in formalin01 replicate taken straight from net - no saltwater rinsing

Field Personnel:

JH, JG, MM, RR

Signature:

John H. Little / HumbressDate: 8-26-00

Arthur D Little

# Station Log

Station ID N00

Date 8-26-00

Client MMS

Time 1340

Project 2000 ANIMIDA

Case No. 68533

## Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

From trawl around Northstar Island

### Sampling Location

Station Number N00

### Station Type

BSMP/Northstar/Liberty/Alternate

Latitude NA

Longitude NA

### Field Observations and Measurements

Wind Speed 7-10 knots Wind Direction NNE Seas/Ice 1 ft<sup>+</sup> seas few icebergs

Water Depth ~35' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

CTD Depth(s) \_\_\_\_\_ Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_

Acoustics: Air \_\_\_\_\_ Water \_\_\_\_\_ Other \_\_\_\_\_

Comments: Trawl was made from south around west and up to north

### Samples Collected

Surface Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>X</u>						

Sediment Texture (check all that apply):

>50% silt/clay X Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No X H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Sediment from a 0.2 nautical miles radius with trawl

### Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

Biota: (circle species collected for analysis)

Amphipods Annonyx \_\_\_\_\_

Fish: Sculpin \_\_\_\_\_ Safron Cod \_\_\_\_\_ Arctic Cod \_\_\_\_\_ Char \_\_\_\_\_ Cisco \_\_\_\_\_ Flounder \_\_\_\_\_ Whitefish \_\_\_\_\_

Clams Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_ Macoma \_\_\_\_\_ Portlandia \_\_\_\_\_

Comments:

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Trawl stayed ~ 0.2 NM from Northstar Island

00-N00-01-PHC-S

Field Personnel: JH, JE, MM, RR

Signature: [Signatures]

Date: 8-26-00

Attachment 3: 2000 Collection Permit

FRESHWATER PERMIT

This permit is issued to the State of Alaska, Department of Fish and Game, for the purpose of collecting and preserving the following in the State of Alaska during the calendar year 2000. It is issued under the authority of AS 16.05.010 and AS 16.05.020.

with a view to the preservation of the same for the purpose of scientific study and to the benefit of the State of Alaska. The specimens to be collected shall be preserved in accordance with the provisions of the permit. It is further provided that the permit shall be subject to the provisions of the permit and to the provisions of the permit.

It is further provided that the permit shall be subject to the provisions of the permit and to the provisions of the permit.

The permit is issued under the authority of AS 16.05.010 and AS 16.05.020.

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STATE OF ALASKA  
DEPARTMENT OF FISH AND GAME  
JUNEAU, ALASKA

Permit No. CF-00-044Expires 12/31/00

### FISH RESOURCE PERMIT

This permit authorizes John Brown, Arthur D. Little, Inc.  
(person, agency or organization)  
at 20 Acorn Park, Cambridge, MA 02440, to conduct the following activities from August 9, to September 15,  
2000, in accordance with AS 16.05.930 and AS 16.05.340(b)

under contract to the Department of Interior, Minerals Management Service, permittee will collect 50 each of the following finfish: Safron cod, Arctic cod, cisco, Dolly Varden, broad whitefish, four horned sculpin, and Arctic flounder. The fish will be collected from the Jones Island (east) to the Stockton Islands (west) of the nearshore Beaufort Sea. The fish will be captured with Fyke net or rod and reel. If the Fyke net is not successful, a gill net may be used (See page 2). Fish that are surplus to the sampling needs will be released unharmed at the capture site.

**PURPOSE:** To determine the potential exposure of the target fish to petroleum hydrocarbons and other persistent organic pollutants (POPs - pesticides and PCBs) through immunological techniques (e.g. CYP1A). These measurements will serve as baseline contaminant data and will be used to evaluate potential changes related to the Northstar and Liberty Island developments.

**FINAL DISPOSITION:** After the tissues of interest have been removed in the field, the remainder of the organisms (if any) will be discarded (i.e., in some cases the whole organism may be preserved).

**AUTHORIZED PERSONNEL:** John Brown, Jordan Gold, Bob Trocine, Rob Rember, Craig Smith, Mark Mertz, John Trefry.

**PERMIT CONDITIONS:** The following ADF&G employee must be notified prior to collection activities: Fred Bue (907-443-5167), Division of Commercial Fisheries, Nome office; or Russ Holder (907-459-7288), DCF, Fairbanks office.


(Continued on the next page)

**REPORT DUE January 31, 2001.** The report shall include species; numbers; dates and locations of collection and disposition; sex, age and breeding condition; lengths and weights of fish; what was achieved; other information as required. (See page 2).

#### GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS

1. This permit must be carried by the person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No re delegation of authority may be allowed under this permit unless specifically noted.
2. Specimens taken under authority hereof may not be sold or bartered. Subpermittees shall not retain possession of live animals or specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until detailed reports, as specified above, have been received by the Department.
5. UNLESS SPECIFICALLY STATED HEREIN THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens; or the taking of specimens in areas otherwise closed to fishing without appropriate licenses required by State regulations; or during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.

  
Division of Commercial Fisheries

  
Deputy Director, Division of Commercial Fisheries  
Alaska Department of Fish and Game

**NOTE:**

A copy of this permit must accompany the collected specimens and collection activities and be available if a Department of Fish and Game or Department of Public Safety employee wishes to examine it. Specimens may not be transferred or released.

If a gill net must be used it must be properly marked and physically attended at all times. The gill net must be checked at least every 30 minutes to minimize the mortality of untargeted species. Fish not required for the sample should carefully be released unharmed at the capture site.

**REPORTING:** A report of the number of each specimen collected, dates, specific location (latitude and longitude or other general description), and type of gear used is required at the end of the calendar year.

**ADDITIONAL PERMITS MAY BE REQUIRED.** Halibut may not be collected or retained under the authority of this permit. Please contact the International Pacific Halibut Commission at (206) 634-1838, P.O. Box 95009, Seattle, WA 98145-2009 to obtain permission for halibut collection.

Collected fish, shellfish, or aquatic plant specimens may not be sold, bartered, or used as food, and may be used only for the purposes specified in the permit.

Permits will indicate the number of specimens that may be taken, by species and life stage. Sampling or collecting activities must stop when the maximum allowable number of specimens is obtained. All live fish, shellfish, and aquatic plants collected in excess of the number specified on the permit must be released immediately and unharmed at the capture location, unless otherwise specified in the permit.

All fish traps, nets or similar capture devices must be labeled with the collector's name and permit number. A valid sport fishing license must be in the possession of each person collecting fish with a hook and line or clams with a shovel.

Use of explosives or chemicals, especially poisons other than chemical baits or lures for collecting purposes is prohibited. Any chemical anesthetics used must be approved for human consumption by the Food and Drug Administration if fish treated with such chemicals are susceptible to human consumption within 14 days after exposure.

Marking or tagging of fish is closely regulated by the state and must not conflict with other programs. Specific approval is required for any marking or tagging project. The number of each species to be marked and location and type of mark or tag to be used must be specified.

Use of electroshocking devices will be closely regulated because such devices can cause substantial injury to fish. In general, electroshocking will not be allowed if large rainbow trout or any species of fish in spawning condition are present.

**NO PERSON MAY TRANSPORT, POSSESS, EXPORT FROM THE STATE, OR RELEASE INTO THE WATERS OF THE STATE, ANY LIVE FISH UNLESS THE PERSON HOLDS A VALID FISH TRANSPORT PERMIT (FTP), AND THE PERSON IS IN COMPLIANCE WITH ALL CONDITIONS OF THE PERMIT AND THE PROVISIONS OF 5 AAC 41. A FISH TRANSPORT PERMIT MAY BE ISSUED BY THE COMMISSIONER. PLEASE CONTACT MS. JERI MUSETH AT (907) 465-6149 FOR ADDITIONAL INFORMATION PERTAINING TO 5 AAC 41.005.** A Fish Transport Permit (FTP) must be obtained prior to any exportation of non-preserved specimens. Please contact Ms. Jeri Museth, (907) 465-6149.

*The Alaska Department of Fish and Game requires copies of any reports or analyzes derived from collection activities under the authority of this permit. A completion report detailing the results and findings of any data analysis for the project, if not submitted with the collection report, must be submitted to the department within six months of the expiration of the permit. Data from such reports are considered public information.*



# **Cruise Report for the Summer 2002 Minerals Management Service Field Survey**

**Arctic Nearshore Impact Monitoring in the Development Area  
(ANIMIDA)**

**Report to**

**Minerals Management Service, Anchorage, Alaska**

**October 23, 2002**

Report by

John S. Brown  
Battelle  
255 Bear Hill Road  
Waltham, MA 02415

for

Environmental Chemistry and Forensics  
ICF Consulting (formerly Arthur D. Little, Inc.)  
Acorn Park  
Cambridge, MA 02140-2390



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Table 1: 2002 MMS ANIMIDA Stations Sampled

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Figure 1: Summer 2002 Sampling Stations

Figure 2: Schematic of the Mussel Cage and SPMD Mooring String

**List of Attachments**

Attachment 1: 2002 Station Logs

Attachment 2: 2002 Collection Permit and Fish Transfer Permit

## 1.0 Introduction

As part of the Minerals Management Service (MMS) program entitled “Arctic Nearshore Impact Monitoring in the Development Area” (ANIMIDA), the fourth summer-season field survey of the program was conducted from July 27, 2002 to August 22, 2002. The scientific crew, on board the MMS Vessel 1273, collected samples for chemical analyses, and deployed and retrieved moorings, from the program study area. This cruise report summarizes the activities and samples collected during the 2002 summer field survey.

The following components were successfully completed during the 2002 ANIMIDA summer sampling survey.:

- Collected sediment samples at 43 offshore stations: 15 historic Beaufort Sea Monitoring Program (BSMP) stations, 22 Northstar and Northstar pipeline stations, and 6 Liberty stations
- Collected a total of 48 surface sediment samples (0 to 1 cm) for hydrocarbon and metals chemistry (triplicates at 2 stations)
- Deployed and retrieved 6 moorings, 3 adjacent to Northstar and 3 in a reference location, each with paired mussel cages and semi-permeable membrane devices (SPMDs)
- Collected 13 bivalve/amphipod samples
- Collected 11 source sediment/peat samples (5 river stations)
- Collected 34 suspended sediment samples and current and turbidity profiles at 11 stations (corresponding to two onshore - offshore transects at Northstar and Liberty)
- Delivered field samples to analytical laboratories for appropriate analyses

## 2.0 Schedule

The summer 2002 cruise was conducted from July 27 to August 22, 2002, and coincided with a period of expected favorable ice conditions in the program study area. Members of the field team arrived in Prudhoe Bay, Alaska between July 25 and 29. Initial “check-out” of the MMS Vessel 1273 was performed on July 25 and 26 by ship’s captain Mark Mertz (TEG Ocean Services). Field sampling personnel from Battelle, Florida Institute of Technology (FIT), and Kinnetic Laboratories (KLI) participated in the survey. The scientific team and ship’s captain conducted the work on a 12- to 20-hour-a-day basis, depending on favorable operating conditions.

### **3.0 Cruise Operations and Samples Collected**

The MMS Vessel 1273 served as the survey platform for the summer 2002 field work. The MMS Vessel 1273 was delivered to Prudhoe Bay, Alaska by MMS prior to the survey and launched after inspection by MMS and TEG representatives. The MMS Vessel 1273 was also used to retrieve current meters for the MMS University of Alaska Coastal Marine Institute (CMI) program at the end of the ANIMIDA survey. The ANIMIDA field survey was performed in three phases, largely controlled by mobilization and logistical considerations. A complete list of the sampling stations that were targeted and sampled in the study area is included in Table 1. Table 1 also provides the station type, latitude and longitude, depth, date and time of sampling, and the type of chemical analysis for each sample. Figure 1, the chart of the ANIMIDA study area, shows the locations of the 2002 sampling stations. Additional daily survey and sampling station information is included in the 2002 Station Logs (Attachment 1). The following narrative summarizes each phase of the field survey.

#### **Phase 1: Mobilization and Mooring Deployment**

##### **July 25**

Ship's Captain (Mark Mertz) arrives Deadhorse, AK, inspects MMS Vessel 1273, and takes custody of the vessel after inspection.

##### **July 26 - 27**

Vessel 1273 maintenance and shakedown in Prudhoe Bay, including implementation of necessary repairs/modifications (Mark Mertz) and mobilization of field gear on the vessel. July 26 - ANIMIDA field team (John Brown – Battelle, Bob Trocine – FIT) arrive in Deadhorse, AK – Endicott Facility.

##### **July 28**

Deployment of a cluster of three subsurface moorings ~1.5 Km west of Northstar Island. Each mooring includes a mussel cage with ~40 mussels total in 2 Nitex envelopes, and 5 SPMDs in a deployment cage. A schematic of the mooring string is shown in Figure 2.

##### **July 29**

Deployment of a cluster of three subsurface reference moorings ~4 Km southwest of Pole Island. Each mooring includes a mussel cage with ~40 mussels total in 2 Nitex envelopes and 5 SPMDs in a deployment cage (Figure 2). The remaining mussels (~55) are taken as pre-deployment mussel reference samples. Sediment and bivalves are collected at eastern stations 3A and 3B. John Trefry (FIT) arrives Deadhorse, AK – Endicott Facility.

## **Phase 2: Liberty and Northstar Area Sampling**

### **July 30 – August 1**

Field team completes sediment, biota, and water sampling at Liberty Prospect area stations and BSMP stations in the eastern study area. The vessel is anchored nightly in the lee of Endicott Island. The weather conditions are generally favorable, but heavy ice is encountered from North Steffanson Sound to Cross Island. Deb Woodall (FIT) arrives Deadhorse, AK - Endicott Facility (August 1).

### **August 2 – 5**

Field team completes sediment, biota and water sampling at Northstar area stations and BSMP stations in the western study area. Amphipod collections are successful, possibly due to the abundance of ice in the area. The vessel is anchored or docked at West Dock during this period. Once again, the weather conditions are generally favorable (moderate winds, fog, and cool temperatures), but heavy ice is encountered as close as 1 Km from shore (depending on wind direction).

### **August 6**

Gusty winds do not allow offshore sampling; the vessel is re-fueled and re-supplied at West Dock. Source sediment and peat samples are collected from the Kuparuk River south of the Spine Road river crossing. Alex Mansfield (Battelle) arrives Deadhorse, AK – Endicott Facility.

### **August 7**

Source sediment and peat samples are collected from the Northstar Island “Borrow Pit” in the Kuparuk River delta. Transport to the “Borrow Pit” is via a Phillips Petroleum helicopter, from the Kuparuk Heliport. Sediment samples are collected at final Northstar and BSMP stations in the Gwydyr Bay/Stump Island Area.

### **August 8**

J. Brown, J. Trefry, R. Trocine, and D. Woodall depart Deadhorse with some of the sampling gear and samples. M. Mertz and A. Mansfield remain to complete source sampling and mooring retrieval.

## **Phase 3: Mooring Retrieval and Source Sampling**

### **August 9 – 14**

River source sampling is completed at the Canning River, Colville River, and Sagavanirktok River (Sag River). The Canning River sediment sample is collected after transport to the river via floatplane (Golden Plover Air – Jim Helmricks). A suspended sediment sample (for inorganics only) and a biogenic sheen/sediment from a nearby tundra pond are also collected. Source sediment and peat samples are collected from the Colville River via a Phillips Petroleum helicopter, from the Kuparuk Heliport. The Sag River sediment and peat are collected via haul road access south of Deadhorse.

### **August 15 – 17**

Bad weather (winds to 35 knots) does not allow offshore sampling. Heavy rains and high water flows in the rivers threaten river crossings and West Dock. The vessel inflatable is washed away due to high water (August 15). University of Alaska Fairbanks (UAF) current meter mooring retrieval crew arrives – Prudhoe Bay Operations Center (PBOC) (August 16). Access road to Endicott washes out just east of Sag River bridge (August 16). Bad weather on August 17; field team is stranded on Endicott.

### **August 18 – 20**

Weather calms somewhat; the inflatable is retrieved from Niakuk shoals in good condition. Proceed to Northstar and recover three Northstar moorings. All moorings are in good condition, and the mussel cages and SPMDs are intact. All the mussels are alive and exhibit extensive abyssal thread growth. Gary Lawley (KLI) arrives Deadhorse, AK – PBOC (August 18).

All four UAF current meters are retrieved in light snow and light winds on August 19. Divers are necessary at all retrievals, as acoustic releases do not function. One instrument is damaged (crushed into the bottom by ice), but data logger is intact.

Overcast and windy on August 20; retrieve the three Pole Island reference moorings. The mussel cages and SPMDs are intact and in good condition. A total of 2 dead mussels are found in Moorings 3M2 and 3M3; all other mussels are alive and exhibit extensive abyssal thread growth. Amphipods are also collected at station 4A. An unsuccessful search effort is made for the KLI current meter mooring that was deployed offshore of the Sag River delta in May 2002. The mooring pinger/release does not respond to queries. UAF crew departs Deadhorse.

### **August 21 - 22**

Gear and samples are mobilized for shipment. A. Mansfield departs Deadhorse with samples. Another search is made for the KLI mooring in a larger search area. The mooring still cannot be located. The search is suspended under the assumption that the mooring was destroyed or dragged far afield by ice.

The Vessel 1273 is pulled from the water at West Dock on August 22. The remaining field team members (Mertz and Lawley) depart Deadhorse.

### **Source Sample Collection**

As noted previously, several source samples were collected as part of the summer survey. The source samples collected included sediment and peat for organic and inorganic analysis from the Sagavanirktok, Kuparuk, Canning, and Colville Rivers. In addition, a water sample was collected for suspended sediment (inorganics only) from the Canning

River, and a sheen sample from an adjacent tundra pond (possibly biogenic in origin) was also collected as a potential source sample for hydrocarbons.

#### **4.0 Sampling Procedures**

Standard sampling procedures were followed at each sampling station, according to the Summer 2002 Field Logistics and Sampling Plan for the Minerals Management Service ANIMIDA Program (MMS, 2002).

Typical sampling procedures included:

- deployment of amphipod traps (as required)
- conductivity, temperature, and depth (CTD) measurements
- current measurements with the CTD/Doppler current meter
- water sample collection (at suspended sediment stations)
- surface sediment grab sample collection using a modified Van-Veen grab (for sediments and bivalves – as appropriate)
- retrieval of amphipod traps

Photodocumentation, station logs, and field notes were recorded during the field survey. The station logs for each sampling station are included in Attachment 1. Each station log includes a description of the sampling location, observations, number and type(s) of samples collected, and comments.

#### **5.0 Technical Issues**

The most significant technical difficulty during this survey was obtaining the mussels for the mussel cage/SPMD mooring deployment. Since the deployment of mussels required the collection and transport of mussels from one part of the state to the other, a Collection Permit and a Fish Transport Permit were required by Alaska Department of Fish & Game (ADF&G) (Attachment 2). During the permit application process, it was determined by ADF&G that a population of mussels in Port Chatham, AK (Kenai Peninsula) was the only feasible source of mussels for the program. A separate collection trip to Port Chatham (via floatplane) was arranged to meet this requirement of the permit. On July 26, 2002, approximately 300 mussels (~4 to 5 cm in length) were collected from the Port Chatham shoreline by G. Lawley of KLI (Latitude 59° 12.940 N, Longitude 151° 45.414 W). The mussel collection was planned to coincide closely with the mooring deployments to limit stress and potential mortality of the mussels. The mussels were stored on ice and shipped by airfreight to Deadhorse within 24 hours of collection. The mussels were in very good condition upon arrival in Deadhorse, and were slowly acclimatized with Beaufort Sea water (collected from the end of West Dock) over the next 24 hours. Only two mussels died prior to deployment and their good condition both before and after deployment is indicative of the overall technical success of the mussel cage/SPMD effort.

## **6.0 References**

Minerals Management Service. 2002. Summer 2002 Field Sampling and Logistics Plan. July.

Table 1: 2002 MMS Animida Stations

Station ID	Station Type	Sample Type	Latitude	Longitude	Depth (ft)	Date	Time	Analysis/Samples					Comments
								Sediment			Tissue	Suspended Sed/ Current/CTD	
								Organics	Metals	GS/TOC			
3A	BSMP	Sed.-Grab/Tissue	70°16.933	147°05.489	20	07/29/02	1915	1	1	1	1	NA	(Astarte)
3B	BSMP	Sed. Grab	70°17.918	147°02.508	13	07/29/02	1830	1	1	1	NA	NA	
4A	BSMP	Sed.-Grab/Tissue	70°18.444	147°40.229	15	7/31 & 8/20/02	1000	1	1	1	2	3	(Anonyx collected on 7/31 and 8/20)
4B	BSMP	Sed. Grab	70°21.021	147°40.012	21	07/31/02	1335	1	1	1	NA	3	
4C	BSMP	Sed. Grab	70°26.085	147°42.961	27	07/31/02	1518	1	1	1	NA	3	
5(0)	BSMP	Sed.-Grab/Tissue	70°22.735	148°00.363	18	08/01/02	0915	1	1	1	1	NA	(Anonyx)
5(1)	BSMP	Sed. Grab	70°25.027	148°03.510	19.5	08/01/02	1234	1	1	1	NA	3	
5(10)	BSMP	Sed. Grab	70°27.312	148°30.026	25.5	08/01/02	1512	1	1	1	NA	NA	
5(5)	BSMP	Sed. Grab	70°26.095	147°18.125	22	08/01/02	1645	1	1	1	NA	3	
5A	BSMP	Sed. Grab	70°29.680	148°46.053	37.5	08/03/02	1532	1	1	1	NA	NA	
5B	BSMP	Sed. Grab	70°34.884	148°55.005	44	08/03/02	1333	1	1	1	NA	3	
5D	BSMP	Sed. Grab	70°24.489	148°33.598	8	08/07/02	1500	3	3	3	NA	NA	
5E	BSMP	Sed. Grab	70°38.347	149°16.376	61	08/04/02	1307	1	1	1	NA	3	
5F	BSMP	Sed.-Grab/Tissue	70°26.497	148°49.555	7.2	08/07/02	1153	1	1	1	1	NA	(Cyrtodaria)
5H	BSMP	Sed.-Grab/Tissue	70°22.221	147°47.792	23	08/01/02	1017	1	1	1	1	NA	(Astarte)
L01	Liberty	Sed. Grab	70°18.933	147°27.082	20	07/31/02	1230	1	1	1	NA	NA	
L04	Liberty	Sed. Grab	70°17.068	147°40.040	17	07/30/02	1718	1	1	1	NA	NA	
L06	Liberty	Sed. Grab	70°16.923	147°34.064	22	07/30/02	1303	1	1	1	NA	NA	(Attempted Anonyx collection)
L07	Liberty	Sed. Grab	70°16.784	147°31.990	21	07/30/02	1335	1	1	1	NA	NA	
L08	Liberty	Sed.-Grab/Tissue	70°16.700	147°30.223	20	07/30/02	1351	2	2	2	2	NA	(Astarte) Grab rep 02 for analysis, hold rep 01
L09	Liberty	Sed.-Grab/Tissue	70°16.586	147°27.152	21	07/30/02	1552	1	1	1	1	NA	(Astarte)
N01	Northstar	Sed. Grab	70°31.657	148°41.443	41	08/03/02	1101	1	1	1	NA	3	
N02	Northstar	Sed. Grab	70°30.512	148°41.376	44	08/03/02	1218	1	1	1	NA	NA	
N03	Northstar	Sed.-Grab/Tissue	70°30.005	148°41.477	43	8/5 & 8/10/2002	1122	3	3	3	1	NA	(Anonyx collected on 8/10)
N04	Northstar	Sed. Grab	70°29.676	148°48.092	33	8/3 & 8/11/2002	1516	1	1	1	1	NA	(Anonyx collected on 8/11)
N05	Northstar	Sed. Grab	70°29.631	148°44.704	38.5	08/03/02	1548	1	1	1	NA	NA	
N06	Northstar	Sed. Grab	70°29.526	148°43.230	38.5	08/02/02	1558	1	1	1	NA	NA	
N07	Northstar	Sed. Grab	70°29.573	148°40.084	40	08/05/02	1319	1	1	1	NA	NA	
N08	Northstar	Sed. Grab	70°29.424	148°38.322	39	08/05/02	1335	1	1	1	NA	NA	
N09	Northstar	Sed. Grab	70°29.343	148°35.180	35	08/05/02	1352	1	1	1	NA	NA	
N10	Northstar	Sed. Grab	70°28.997	148°41.780	34	08/02/02	1130	1	1	1	NA	3	
N11	Northstar	Sed. Grab	70°28.421	148°41.912	26	08/02/02	1508	1	1	1	NA	NA	
N12	Northstar	Sed.-Grab/Tissue	70°27.319	148°42.037	18.5	8/2 & 8/3/2002	1300	1	1	1	1	3	(Anonyx collected on 8/3)
N13	Northstar	Sed.-Grab/Tissue	70°26.982	148°43.594	14	08/04/02	1015	3	3	3	1	NA	(Anonyx)
N14	Northstar	Sed. Grab	70°26.006	148°40.429	12	08/07/02	1405	1	1	1	NA	NA	
N15	Northstar	Sed. Grab	70°26.707	148°44.618	8	08/07/02	1105	1	1	1	NA	NA	
N16	Northstar	Sed. Grab	70°29.902	148°42.395	42.5	08/05/02	1055	1	1	1	NA	NA	
N17	Northstar	Sed. Grab	70°29.833	148°40.345	42.5	08/05/02	1245	1	1	1	NA	NA	
N18	Northstar	Sed.-Grab/Tissue	70°29.080	148°42.228	34	08/02/02	1613	1	1	1	1	NA	(Anonyx)
N19	Northstar	Sed. Grab	70°29.088	148°40.557	36	08/02/02	1531	1	1	1	NA	NA	
N20	Northstar	Sed. Grab	70°27.957	148°41.687	25	08/02/02	1455	1	1	1	NA	NA	
N21	Northstar	Sed. Grab	70°26.806	148°41.738	21	08/02/02	1419	1	1	1	NA	3	
N22	Northstar	Sed. Grab	70°29.340	148°41.868	28	NA	NA	NA	NA	NA	NA	NA	Not Sampled
N23	Northstar	Sed. Grab	70°29.330	148°41.864	37	08/05/02	1426	1	1	1	NA	1	~150 feet South of Northstar
3M1	Reference	Mussel/SPMD	70°16.982	147°08.880	25	7/29 - 8/20/2002	1620	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
3M2	Reference	Mussel/SPMD	70°16.835	147°09.409	25	7/29 - 8/20/2002	1648	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
3M3	Reference	Mussel/SPMD	70°16.922	147°09.398	25	7/29 - 8/20/2002	1715	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
NM1	Northstar	Mussel/SPMD	70°29.597	148°44.199	38	7/28 - 8/18/2002	2045	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
NM2	Northstar	Mussel/SPMD	70°29.687	148°44.868	38	7/28 - 8/18/2002	2112	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
NM3	Northstar	Mussel/SPMD	70°29.618	148°44.315	39	7/28 - 8/18/2002	2200	NA	NA	NA	6	NA	1 Mussel Cage (n=40) and 5 SPMDs
SAG-01	Source	Sed/Peat	70°01.680	148°33.770	NA	08/14/02	1130	2	NA	1	NA	NA	Sagavanirktok River @ ~0.5 mi. S of Mile 401
KUP-01	Source	Sed/Peat	70°17.700	148°53.370	NA	08/06/02	1010	2	1	NA	NA	NA	Kuparuk River S. of E bridge crossing
KUP-03	Source	Sed.	70°22.910	148°51.550	NA	08/07/02	0815	2	2	NA	NA	NA	Kuparuk River "Borrow Pit" sediment
COL-01	Source	Sed/Peat	70°15.960	150°49.290	NA	08/13/02	1030	2	NA	NA	NA	NA	1 sediment and 1 peat sample
CAN-01	Source	Sed.	70°07.199	145°53.099	NA	08/09/02	1415	1	1	1	NA	1	Canning River sediment and water
CAN-02	Source	Peat	70°07.199	145°53.099	NA	08/09/02	1415	1	NA	NA	NA	NA	Canning River Peat
CAN-03	Source	Sed/Sheen	70°07.199	145°53.099	NA	08/09/02	1415	1	NA	NA	NA	NA	Canning River pond sheen

Notes:  
NA = Not applicable



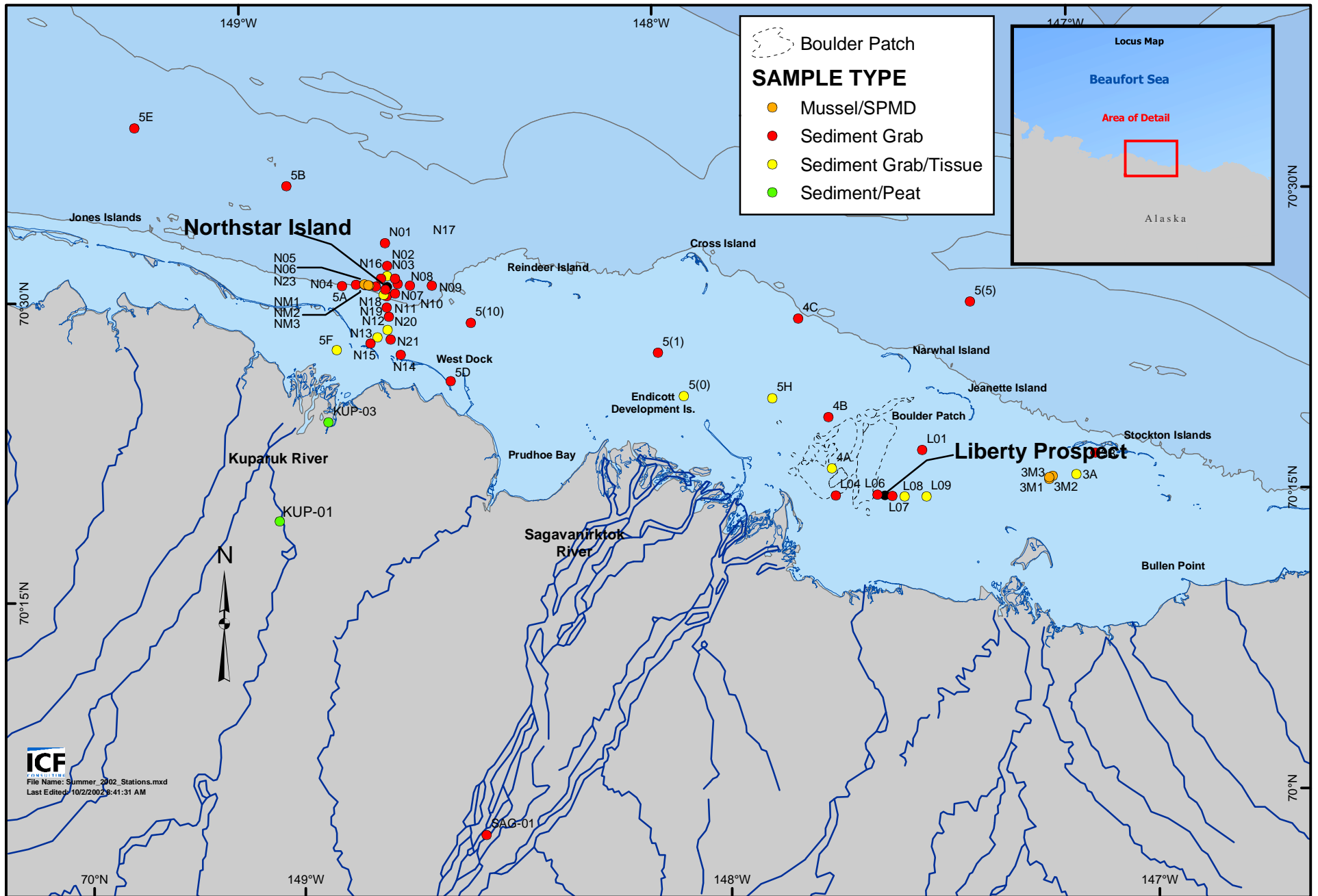


Figure 1 - Summer 2002 Sampling Stations

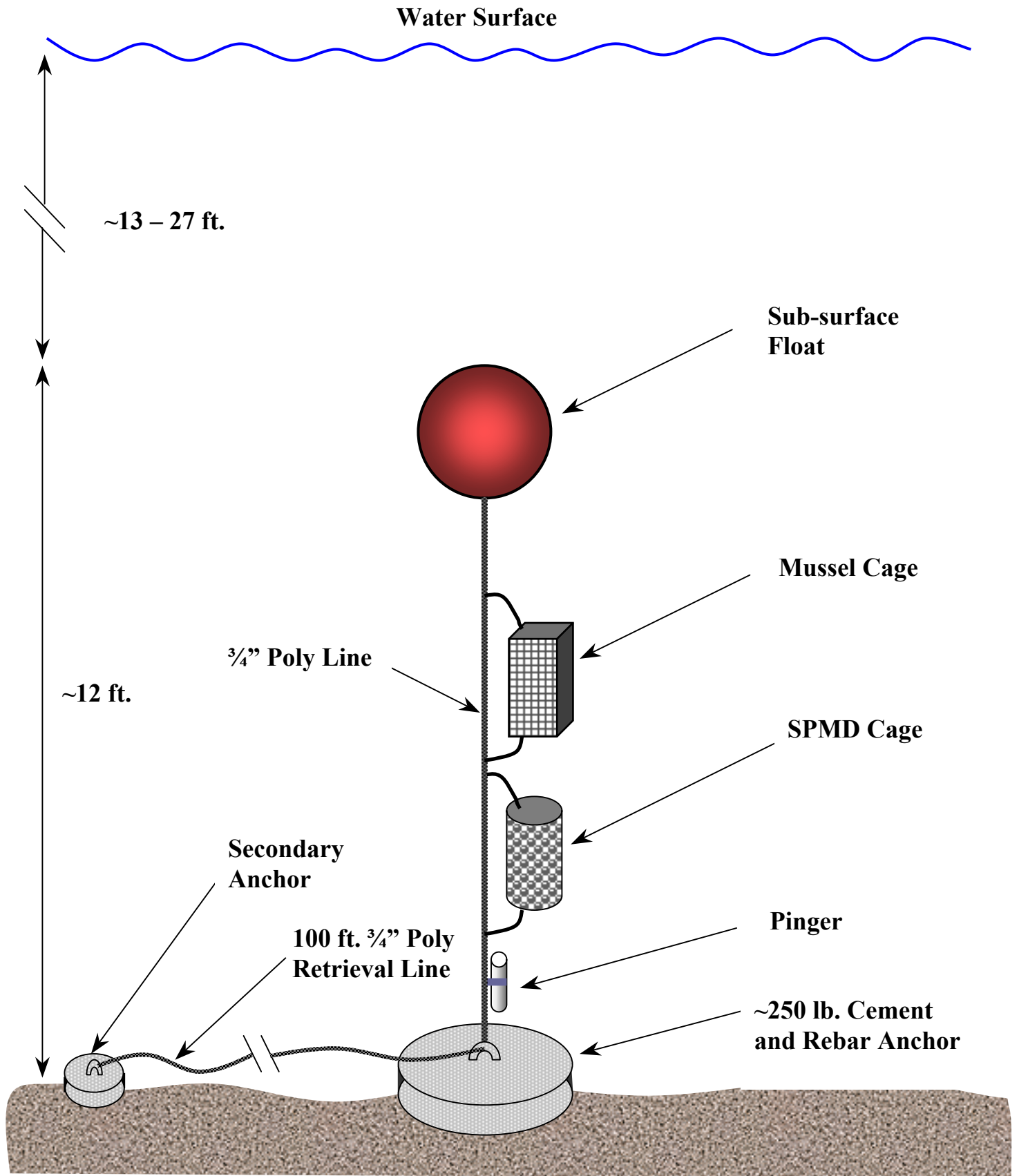


Figure 2. Schematic of the Mussel Cage and SPMD Mooring String

**Attachment 1: 2002 Station Logs**

# MMS

## Summer 2002 Station Log

Station ID 3A

Client MMS

Project 2002 ANIMIDA

Project No.

Date: 7/29/02Time: 1915 - 2015

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 3ALatitude 70°16.933Longitude 147°05.489

Station Type (circle one)

 BSMP  Northstar  Liberty  Other**Field Observations and Measurements**Wind Speed 5 Kts. Wind Direction NE Seas/Ice Light chopWater Depth 20 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected**Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Fine silt ~ 2-3 cm then stiff clay.**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs ~ 20 Astarte  Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: 3/4 of 250 mL jar w/ large (2-3 cm) Astarte clams**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: heading back to Endicott for the night.Field Personnel: JB, BT, mmSignature: [Signature] Date: 7/29/02

# MMS

## Summer 2002 Station Log

Station ID 3BDate: 7/29/02  
Time: 1830-1855Client: MMS  
Project: 2002 ANIMIDA  
Project No.:

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 3B  
Latitude 70° 17.918Longitude 147° 02.508Station Type (circle one)  
BSMP Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed 5-10 kt Wind Direction NE Seas/Ice Light chop < 5% ice  
Water Depth 13 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_Comments: Sunny but chilly ~36°F**Samples Collected**Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

many Amphipod tubes at surface and at depth in grab.**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Nice evening!! Large ice floes on N side of Rte Is.

Field Personnel:

JB, BT, mm.

Signature:

Date:

7/29/02

# MMS

## Summer 2002 Station Log

Station ID 4A  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 7/31/02  
 Time: 1000-1135

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 4ALatitude 70° 18.44470° 18.224457Longitude 147° 40.229147° 40.353 - sediment position @ Anchor

#### Station Type (circle one)

BSMP Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 20 kt.Wind Direction ESeas/Ice 2 ft chop Reve small bergWater Depth 15 ft.Conductivity, Temperature, Depth (CTD) Doppler Current Turbidity 

Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay 

Fine \_\_\_\_\_

Coarse Sand \_\_\_\_\_

Gravel \_\_\_\_\_

Shell Hatch \_\_\_\_\_

Mixed 

Indications of Anoxia: Yes \_\_\_\_\_

No H<sub>2</sub>S Odor: Yes \_\_\_\_\_No Comments: Grab ~ 1/3 full some gravel, but fine silt w/ sand/clay underneath

#### Water/Suspended Sediments:

Surface 1Mid-Water 1Bottom 1

Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed 1 @ 1000Traps Retrieved @ 1800Anonyx Sample 1

Clams: Number of Grabs \_\_\_\_\_

Astarte \_\_\_\_\_

Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_

Caged Mussels \_\_\_\_\_

SPMD \_\_\_\_\_

Comments: ~ 10-15 gram Anonyx in 1 Trap 20 or 30 Isopods Released just enough for a sample.

#### Quality Control Samples

Field Blank \_\_\_\_\_

Equipment Blank \_\_\_\_\_

Other \_\_\_\_\_

Overall Comments:

worked out the "kinks" of the water sampling. 3 Grab attempts necessary. Stiff clay w/ cobbles mixed in.1805 Heading to Endicott for dinner.

Field Personnel:

J.B. John Treby (JT), BT, Deb Woodall (DW)Signature: [Signature]Date: 7/31/02

# MMS

## Summer 2002 Station Log

Station ID 4A  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 8/20/02  
 Time: 09:00

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 4A  
 Latitude 70° 18.457'

Longitude 140° 40.090'

Station Typ (circle one)  
 BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 15-20kts Wind Direction SW Seas/Ice ~2' NO ICE  
 Water Depth 17' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed 0900 Traps Retrieved 1400 Anonyx Sample 1 sample

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_

1/2 Jar of ANONYX from 2 Traps, ~25 isopods  
caught in traps (released)  
02-4A-02-PHC-T (raped) collected 7/31/02

Field Personnel:

A. Mansfield, M. Mertz, G. Lowley

Signature: [Signature]

Date: 8/20/02

# MMS

## Summer 2002 Station Log

Station ID 4BClient MMS  
Project 2002 ANIMIDA  
Project No.Date: 7/31/02Time: 1335 - 1425

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 4BLatitude 70° 21.021Longitude 147° 40.012Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 20 kt. Wind Direction E Seas/Ice 2-3 ft. waves open water, heavy iceWater Depth 21 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_ ~ 1 mi to NE

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (VAE)</u>

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Fine Sand w/ some silt - gravel found deeper in grab - ~ 1/3 full.

#### Water/Suspended Sediments:

Surface 1 Mid-Water 1 Bottom 1 Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Heading for 4C - towards the heavy ice.Field Personnel: JB, JT, BT, MM, DWSignature: [Signature]Date: 7/31/02  
TSB



# MMS

## Summer 2002 Station Log

Station ID 4CClient MMS  
Project 2002 ANIMIDA  
Project No.Date: 7/31/02Time: 1518-1615

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location 4CStation Number 70°26Latitude 70°26.085Longitude 147°42.961Station Type (circle one)  
 BSMI /  Northstar /  Liberty /  Other

### Field Observations and Measurements

Wind Speed 15 Kts Wind Direction E Seas/Ice 90% ice ripples in leadsWater Depth 27 Ft. Conductivity, Temperature, Depth (CTD) Doppler Current  Turbidity  Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

### Samples Collected

Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Fine Sand grab ~ 1/3 full some silt mixed in

### Water/Suspended Sediments:

Surface 1 Mid-Water 1 Bottom 1 Other \_\_\_\_\_

Comments: \_\_\_\_\_

### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: In small lead to station 0.05 NM to S of station. Very thick ice - quick walk on the ice - Transit back to 4A to pick up the Amphipod trap.Field Personnel: JB, JT, BT, MM, DWSignature: [Signature]Date: 7/31/02

# MMS

## Summer 2002 Station Log

Station ID 5(0)  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/1/02  
Time: 0915-0935

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location BB  
Station Number 70°22.735 5(0)  
Latitude 70°22.735 Longitude 148°00.363  
Station Type (circle one) BSME/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed calm Wind Direction NA Seas/Ice calm flat No ice  
Water Depth 18 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_  
Comments: Starting to drizzle

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed   
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine sand w/ some mud and pebbles underneath

#### Water/Suspended Sediments

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed 0915 (2 traps) Traps Retrieved 1404 Anonyx Sample 1

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: Traps baited w/ sardines w/ mustard sauce. ~75 mL of Anonyx in 2 Traps.

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel: J.R., J.T., M.M., D.W.

Signature: [Signature]

Date: 8/01/02

# MMS

## Summer 2002 Station Log

Station ID

5 (1)

Date:

8/1/02

Time:

1234 - 1341

Client

MMS

Project

2002 ANIMIDA

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number

5(1)

Latitude

70° 25.027

Longitude

148° 03.510

148°

Station Type (circle one)

BSMP/ Northstar/ Liberty/ Other

#### Field Observations and Measurements

Wind Speed

calm

Wind Direction

NA

Seas/Ice

Flat calm

Water Depth

19.5

Conductivity, Temperature, Depth (CTD)

✓

Doppler Current

✓

Turbidity

✓

Instrument Tow

Comments:

#### Samples Collected

##### Sediments:

Van Veen Grab

✓

No. of Replicates

1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1			

Sediment Texture (check all that apply):

&gt;50% silt/clay

Fine

✓

Coarse Sand

Gravel

Shell Hatch

Mixed

Indications of Anoxia:

Yes

No

H<sub>2</sub>S Odor: Yes

No

Comments:

Fine sand

#### Water/Suspended Sediments:

Surface

1

Mid-Water

3.0m

Bottom

5m

Other

Comments:

#### Biota:

Amphipods: Traps Deployed

Traps Retrieved

Anonyx Sample

Clams:

Number of Grabs

Astarte

Cyrtodaria

Mussels/SPMD:

Deployed/Retrieved

Caged Mussels

SPMD

Comments:

#### Quality Control Samples

Field Blank

Equipment Blank

Other

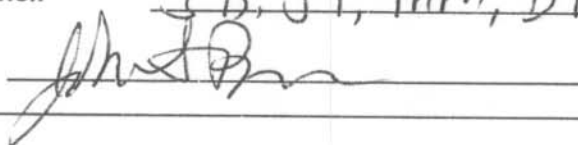
Overall Comments:

Hydraulic Sheen noted on deck

Field Personnel:

JB, JT, MM, DW

Signature:



Date:

8/01/02

# MMS

## Summer 2002 Station Log

Station ID 5(5)  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 8/01/02  
 Time: 1512-1608

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 5(5)  
 Latitude 70° 26.095'

Station Type (circle one)  
 BSMP/Northstar/Liberty/Other

Longitude 148° 18.125'

#### Field Observations and Measurements

Wind Speed 5 kts Wind Direction NW Seas/Ice Ripples - no ice  
 Water Depth 22 ft Conductivity, Temperature, Depth (CTD)   
 Doppler Current  Turbidity  Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1(UAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine mud

#### Water/Suspended Sediments:

Surface  Mid-Water 3m Bottom 5m Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Deck exposure blank collected during Grab deployment.

Field Personnel: JB, JT, MM, DW

Signature: [Signature]

Date: 8/1/02

# MMS

## Summer 2002 Station Log

Station ID 5(10)  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 8/1/02  
 Time: 1645-1655

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 5(10)  
 Latitude 70° 27.312

Longitude 148° 30.026

Station Type (circle one)  
 BSMB/ Northstar/ Liberty/ Other

#### Field Observations and Measurements

Wind Speed 45 kts. Wind Direction NE Seas/Ice Ripples No ice  
 Water Depth 25.5 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: fine sand some silt mixed in

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Heading Back to West Dock for Anchorage.

Field Personnel: JB, JT, MM, DW

Signature: [Signature]

Date: 8/1/02

# MMS

## Summer 2002 Station Log

Station ID 5AClient MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/3/02Time: 1532-1542

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 5ALatitude 70° 29.680Longitude 148° 46.053**Station Type** (circle one) BSMP  Northstar  Liberty  Other**Field Observations and Measurements**Wind Speed 8 Kts Wind Direction W Seas/Ice Ripples ~10% iceWater Depth 37.5 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments: \_\_\_\_\_

Fine soft silt (~3cm) over coarse sand (dark sand)**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, JT, MM, DWSignature: [Signature]Date: 8/3/02

# MMS

## Summer 2002 Station Log

Station ID 5BClient MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/3/02Time: 1333 - 1425

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 5BLatitude 70° 34.884Longitude 148° 55.005Station Type (circle one)  
BSMP Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed 10 kt Wind Direction SW Seas/Ice Ripples - 60% iceWater Depth ✓ 44 ft Conductivity, Temperature, Depth (CTD) ✓Doppler Current ✓ Turbidity ✓ Instrument Tow \_\_\_\_\_Comments: Sunny w/ some fog - lots of ice**Samples Collected**Sediments: Van Veen Grab ✓ No. of Replicates 7

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine ✓ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No ✓ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No ✓

Comments:

Fine sand w/ ~2mm silt on surface (Anemone in grab)**Water/Suspended Sediments:**Surface ✓ Mid-Water 3m Bottom 6m Other \_\_\_\_\_

Comments:

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel:

JB, JT, MM, DWSignature: [Signature]Date: 8/3/02

# MMS

## Summer 2002 Station Log

Station ID 5DClient MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/7/02  
Time: 1500-1517

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 5DStation Type (circle one)  
BSMI/Northstar/Liberty/OtherLatitude 8 ft. 70°24.489 Longitude 148 33.598**Field Observations and Measurements**Wind Speed 15 kt Wind Direction W Seas/Ice 2 ft. no ice  
Water Depth 8 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:** Van Veen Grab  No. of Replicates 5

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Sandy silt. w/ some detritus on surface.Triplicate grabs at anchor 1<sup>st</sup> 2 grabs under penetration last 3 ~ 1/3 full "OK"**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Replicate 3 (02-5D-03-PHC-0) had peat and detritus (black) under surface "flock" let out ~10 ft. of anchor line between replicates.  
Last sid station !!Field Personnel: JB, AM, MM, DWSignature: [Signature]Date: 8/7/02



# MMS

## Summer 2002 Station Log

Station ID 5E  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/4/02  
Time: 1307-1415

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 5E  
Latitude 70° 38.347

Longitude 149° 16.376

Station Type (circle one)  
BSMP Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 20 kt. Wind Direction W Seas/Ice 2-4 ft. Stray berg.  
Water Depth 61 ft. Conductivity, Temperature, Depth (CTD)   
Doppler Current  Turbidity  Instrument Tow \_\_\_\_\_

Comments: Foggy & windy ~ 400 F

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

#### Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine sand w/ 1-2 mm surface "flock"

#### Water/Suspended Sediments:

Surface  Mid-Water 2m Bottom 4m Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BT, MM, DW

Signature: [Signature]

Date: 8/4/02

# MMS

## Summer 2002 Station Log

Station ID 5F

Client MMS

Project 2002 ANIMIDA

Project No.

Date: 8/7/02Time: 1153-1320

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 5FLatitude 70°26.497Longitude 148°49.555

Station Type (circle one)

 BSM  Northstar  Liberty  Other

#### Field Observations and Measurements

Wind Speed 10 kts. Wind Direction WSeas/Ice 1 ft. chop. No ice in Gwydir BayWater Depth 7.2 ft.

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Fine & sand mix over clay

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs ~24 Astarte \_\_\_\_\_ Cyrtodaria 

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: ~140 mL of Cyrtodaria collected (~10 per grab)

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank 1 Other \_\_\_\_\_Overall Comments: Equipment Blank: DP H<sub>2</sub>O Rinse of Grab & Scoop.Field Personnel: JB, AM, MM, DWSignature: [Signature]Date: 8/7/02

# MMS

## Summer 2002 Station Log

Station ID 5HDate: 8/01/02Client MMS  
Project 2002 ANIMIDATime: 1017-1140

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 5HStation Type (circle one)  
BSMP/Northstar/Liberty/OtherLatitude 70° 22. 221Longitude 147° 47. 792**Field Observations and Measurements**Wind Speed Calm Wind Direction NA. Seas/Ice Calm - stray berg - Flat.Water Depth 23 Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: Brief Rain Shower**Samples Collected****Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1(VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

Fine sand mixed with silt. (some gravel)**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs ~32 Astarte 1 sample Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_Comments: ~175 mL of Astarte of ~2-3cm size (Ave. 1 per grab)**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

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Field Personnel: JB, JT, MM, DWSignature: [Signature]Date: 8/1/02

# MMS

## Summer 2002 Station Log

Station ID L01  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 7/31/02  
Time: 1230-1240

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number L01  
Latitude 70° 18.933

Longitude 147° 27.082

Station Type (circle one)  
BSMP/Northstar Liberty/Other

#### Field Observations and Measurements

Wind Speed 18 kts Wind Direction E Seas/Ice 1 ft chop heavy ice to NE ~ 1 mi but in open water.  
Water Depth 20 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_  
Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine sand w/ some silt grab only ~ 1/3 full but stiff sand.

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, JT, BT, MM, DW

Signature: [Signature]

Date: 7/31/02

# MMS

## Summer 2002 Station Log

Station ID L04Client MMS  
Project 2002 ANIMIDA  
Project No.Date: 7/30/02  
Time: 1718-1730

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location L04  
Station Number L04  
Latitude 70° 17.000Longitude 147° 40.040Station Type (circle one)  
BSMP/Northstar/Liberty/Other

### Field Observations and Measurements

Wind Speed 15 kts Wind Direction NE Seas/Ice 2 ft. seas < 5% ice 1 mi NE  
Water Depth 17 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (NAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments: \_\_\_\_\_

### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Heading back to Endicott  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, BT, MMSignature: [Signature] Date: 7/30/02

# MMS

## Summer 2002 Station Log

Station ID LOG  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 7/30/02  
 Time: 1303-1320

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number LOG  
 Latitude 70°16.923

Longitude 147°34.064

Station Type (circle one)  
 BSMP/Northstar Liberty Other

#### Field Observations and Measurements

Wind Speed 10 kt Wind Direction NE Seas/Ice stray bergs - little ice light chop  
 Water Depth 22 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>			<u>(UAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: grab ~ 1/2 full but good surface - underlying clay - stiff

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed 1 @ 1303 Traps Retrieved 1700 Anonyx Sample No

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: Non Anonyx in Trap. (used sardines w/ mustard sauce.)

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_

Field Personnel: JB, BT, MM

Signature: [Signature]

Date: 7/30/02

# MMS

## Summer 2002 Station Log

Station ID LO7Client MMS  
Project 2002 ANIMIDA

Project No.

Date: 7/30/02Time: 1335-1342

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number LO7Latitude 70° 16.784Longitude 147° 31.990Station Type (circle one)  
BSMP/Northstar Liberty/Other**Field Observations and Measurements**Wind Speed 10-12 kt. Wind Direction NESeas/Ice 1-2 ft. chop. Ice to NE ~1mi but clearWater Depth 21 ft.

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: fine silt w/ underlying clay - grab ~ 1/2 full**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, BT, MM.Signature: [Signature]Date: 7/30/02

# MMS

## Summer 2002 Station Log

Station ID L08Client MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 7/30/02Time: 1351-1454

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number L08Latitude 70° 16.70070° 16.701Longitude 147° 30.223 - Rep 1147° 30.342 - Rep 2Station Type (circle one)  
BSMP/Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed 10-12 kt Wind Direction NE Seas/Ice 10% ice Light chop.Water Depth 20

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_

Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>			

Sediment Texture (check all that apply):

>50% silt/clay Rep 2 Fine  Rep 1 Coarse Sand  Rep 2 Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes  Rep 1 No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Replicate 1 had Fine and coarse sand w/ some fine material  
Replicate 2 had Fine silt w/ clay and some fine sand**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs 15\* Astarte  Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: ~10 grabs at Rep 1 position yielded ~30 Astarte shells all empty some black.  
moved to East to new position - very different substrate with live clams.**Quality Control Samples**Field Blank  JSB Equipment Blank  Grab Rinse Other \_\_\_\_\_Overall Comments: \*15 grabs yielded ~200 mL of 2-3 cm Astarte at the  
second position of L08. Sediment Replicate 2 was also  
collected here02-L08-01-PHC-5 collected as Rep 102-L08-02-PHC-5 collected from Rep 2 location.Field Personnel: TB, BT, MMSignature: [Signature]Date: 7/30/02



# MMS

## Summer 2002 Station Log

Station ID L09  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 7/30/02  
Time: 1552-1625

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number L09  
Latitude 70° 16.586

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

Longitude 147° 27.152

#### Field Observations and Measurements

Wind Speed ~~21 kts~~ 538 Wind Direction NE Seas/Ice Ripples 20% ice  
Water Depth 21 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: fine sand w/ silt/clay

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs 6 Astarte  Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: ~200 mL 2-3 cm Astarte

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Heading back to pick up Amphipod Traps at LOG.

Field Personnel: JB, BT, mm

Signature: [Signature]

Date: 7/30/02

# MMS

## Summer 2002 Station Log

Station ID N01  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/3/02  
Time: 1101-1201

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location  
Station Number N01  
Latitude 70°31.657

Longitude 148°41.443

Station Type (circle one)  
BSMP Northstar / Liberty / Other

#### Field Observations and Measurements

Wind Speed 10 kts Wind Direction SW Seas/Ice Ripples ~ 30% ice  
Water Depth 41 ft Conductivity, Temperature, Depth (CTD)   
Doppler Current  Turbidity  Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: \_\_\_\_\_

Fine sand w/ ~2 mm floc/silt on surface.

#### Water/Suspended Sediments:

Surface  Mid-Water 3 m Bottom 6.5 m Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, JT, MM, DW

Signature: [Signature]

Date: 8/3/02

# MMS

## Summer 2002 Station Log

Station ID NO2Client MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/3/02Time: 1218-1228

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number NO2Latitude 70° 30.512Longitude 148° 41.376**Field Observations and Measurements**Wind Speed calm Wind Direction NA Seas/Ice ripples 40% ice bergsWater Depth 44 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: Fog at surface blue sky above.**Samples Collected****Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (JAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: ~2cm Fine Silt w/ clay underneath**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_

Field Personnel: JB, JT, mm, DWSignature: [Signature]Date: 8/3/02

# MMS

## Summer 2002 Station Log

Station ID N03  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/5/02  
Time: 1122-1205

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N03  
Latitude 70°30.005

Longitude 148°41.477

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 15 kts Wind Direction W Seas/Ice 2-3 ft. Heavy ice 250m North  
Water Depth 43 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments:

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 3

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments:

~3cm silt/mud over stiff black gray mud

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed 2 @ 1122 Traps Retrieved None - lost Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

cannot see Amphipod traps. Zodiac line caught in screw and cut off.

could not find amphipod trap bay searched site twice.

Field Personnel:

Signature: [Signature]

Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID N03Date: 8/10/02Time: 10:50 - 14:10

Client MMS

Project 2002 ANIMIDA

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N03Latitude 70° 29.972' NLongitude 148° 41.430' W

Station Type (circle one)

BSMP/Northstar Liberty/Other

#### Field Observations and Measurements

Wind Speed 4.5 knots Wind Direction WSeas/Ice calm ~15% ice coverWater Depth 40'

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed 1050 Traps Retrieved 14:10 Anonyx Sample 

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

2 ANONYX Traps Deployed on 1 Line. One Trap contained ~95% of collected sample. Both had Sardines in waterSample ID 02-N03-01-PHC-AN

Field Personnel:

Alex Mansfield, Mark MertzSignature: [Signature]Date: 8/10/02

# MMS

## Summer 2002 Station Log

Station ID N04  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/3/02  
Time: 1516-1524

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N04  
Latitude 70° 29.676

Longitude 148° 48.092

Station Type (circle one)  
BSMP (Northstar) Liberty/Other

#### Field Observations and Measurements

Wind Speed 8 KB Wind Direction W Seas/Ice Ripples 25% ice bergs  
Water Depth 33 Ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (U4F)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine silt

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, JT, MM, DW

Signature: [Signature]

Date: 8/3/02

# MMS

## Summer 2002 Station Log

Station ID N04

Client MMS

Project 2002 ANIMIDA

Project No.

Date: 8/11/02Time: 10:30 - 13:15

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N04Latitude 70° 29.683'Longitude 148° 47.650'

Station Type (circle one)

BSMP/Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed 10 KTS NWind Direction NSeas/Ice Chop ~5% iceWater Depth 32'

Conductivity, Temperature, Depth (CTD)

Doppler Current

Turbidity

Instrument Tow

Comments:

**Samples Collected****Sediments:**

Van Veen Grab

No. of Replicates

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay

Fine

Coarse Sand

Gravel

Shell Hatch

Mixed

Indications of Anoxia: Yes

No

H<sub>2</sub>S Odor: Yes

No

Comments:

**Water/Suspended Sediments:**

Surface

Mid-Water

Bottom

Other

Comments:

**Biota:**Amphipods: Traps Deployed 10:30Traps Retrieved 13:15Anonyx Sample 

Clams: Number of Grabs

Astarte

Cyrtodaria

Mussels/SPMD:

Deployed/Retrieved

Caged Mussels

SPMD

Comments:

**Quality Control Samples**

Field Blank

Equipment Blank

Other

Overall Comments:

2 Anonyx Traps deployed on 1 line. ~ equal sample from each. Sediment in water. Jar ~ 3/8 fullSample ID 02-N04-01-PHC-AN

Field Personnel:

Alex Mansfield, Mark Mertz

Signature:

Alex M - G. Cal

Date:

8/11/02

# MMS

## Summer 2002 Station Log

Station ID N05

Client MMS

Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/3/02Time: 1548-1557

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N05Latitude 70° 29.631Longitude 148° 44.704

Station Type (circle one)

BSMP Northstar Liberty/Other

#### Field Observations and Measurements

Wind Speed 10 Kts Wind Direction WSeas/Ice Light chop. < 10% iceWater Depth 38.5

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments: \_\_\_\_\_

Fine silt ~ 3 cm over stiff clay (black)

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, JT, MM, DWSignature: [Signature]Date: 8/3/02



# MMS

## Summer 2002 Station Log

Station ID N06  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/2/02  
Time: 1558-1607

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N06  
Latitude 70° 29.526

Longitude 148° 43.230

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed calm Wind Direction NA Seas/Ice Ripples - ice thick ~ 1/2 mi North  
Water Depth 38.5 Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_  
Comments: \_\_\_\_\_ (clear at station)

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: fine soft silt ~ 1cm over stiff fine sand/clay mix

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BT, mm, DW

Signature: [Signature]

Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N07  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/5/02  
Time: 1319-1327

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location  
Station Number N07  
Latitude 70° 29.573

Longitude 148° 40.084

Station Type (circle one)  
BSMP/Northstar Liberty/Other

### Field Observations and Measurements

Wind Speed 12 KTS Wind Direction W Seas/Ice 2-3 ft. no ice @ station  
Water Depth 40 Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_  
Comments: \_\_\_\_\_ Large flow ~ 1 m. IV.

### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

### Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: fine silt some fine sand mixed in @ ~ 1 cm.

### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JJ, JT, MM, DW

Signature: [Signature] Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID <sup>EB</sup> ~~N08~~ N08  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/5/02  
Time: 1335-1343

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location  
Station Number N08  
Latitude 70° 29.424

Longitude 148° 38.322

Station Type (circle one)  
BSMP/ Northstar Liberty/Other

#### Field Observations and Measurements

Wind Speed 12 kt. Wind Direction W Seas/Ice 2-3 ft. no ice, bergs to N  
Water Depth 39 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_  
Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

#### Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine silt mixed with fine sand under 1-2 cm

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, JT, mm, DW

Signature: [Signature] Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID N09Date: 8/5/02  
Time: 1352-1401Client: MMS  
Project: 2002 ANIMIDA  
Project No.:

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N09  
Latitude 70°29.342Longitude 148°35.180Station Type (circle one)  
BSMP/ Northstar / Liberty / Other**Field Observations and Measurements**Wind Speed 10 Kts Wind Direction W Seas/Ice Light chop. 25% ice bergs.  
Water Depth 35 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_Comments: Light Snow - cold**Samples Collected**Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: Silt w/ fine sand mixed below w/ mud.**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel: JB, JT, mm, DWSignature: [Signature]Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID N10Client MMS  
Project 2002 ANIMIDA

Project No.

Date: 8/2/02Time: 1130 - 1235

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N10Latitude 70° 28.997Longitude 148° 41.780Station Type (circle one)  
BSMP Northstar Liberty/Other**Field Observations and Measurements**Wind Speed 2-5 kt. Wind Direction ESeas/Ice Ripples Heavy ice N. of NorthstarWater Depth 34 ft.Conductivity, Temperature, Depth (CTD) Doppler Current Turbidity 

Instrument Tow

Comments: Tried to go to SB # N01 but very heavy ice ~ 2 km N. of Northstar.**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (UAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand  Gravel  Shell Hatch  Mixed Indications of Anoxia: Yes  No  H<sub>2</sub>S Odor: Yes  No 

Comments:

Fine silt very soft 1st grab over-full lowered feet 2" 2nd grab "OK"**Water/Suspended Sediments:**Surface 1 Mid-Water 1 Bottom 1 Other 

Comments:

**Biota:**Amphipods: Traps Deployed  Traps Retrieved  Anonyx Sample Clams: Number of Grabs  Astarte  Cyrtodaria Mussels/SPMD: Deployed/Retrieved  Caged Mussels  SPMD 

Comments:

**Quality Control Samples**Field Blank  Equipment Blank  Other 

Overall Comments:

Soft silt - Taken at Anchor  
Sunny - nice day!

Field Personnel:

JB, BT, MM, DW

Signature:

Date:

8/2/02

# MMS

## Summer 2002 Station Log

Station ID N11Date: 8/2/02Client MMS  
Project 2002 ANIMIDATime: 1508-1518

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N11Station Type (circle one)  
BSMP/Northstar/Liberty/OtherLatitude 70° 28.421Longitude 148° 41.912**Field Observations and Measurements**Wind Speed Calm Wind Direction NA Seas/Ice Ripples No IceWater Depth 26ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: Still Sunny and Warm (~50°F!!)**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

Very fine sand mixed w/ silt.**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

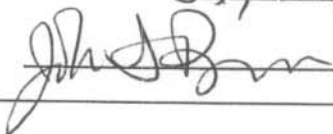
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel:

JB, BT, mm, DW

Signature:

Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N12Date: 8/2/02Time: 1300-1405Client MMS  
Project 2002 ANIMIDA  
Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N12Latitude 70° 27.319Longitude 148° 42.037Station Type (circle one)  
BSMP  Northstar / Liberty / Other**Field Observations and Measurements**Wind Speed Calm Wind Direction NA Seas/Ice Flat - No iceWater Depth 18.5 FT Conductivity, Temperature, Depth (CTD) Doppler Current  Turbidity  Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments: \_\_\_\_\_

Fine silt ~ 3-4 mm over stiff clay**Water/Suspended Sediments:**Surface  Mid-Water 2 m Bottom 5 m Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, BT, MM, DWSignature: [Signature]Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N12Client MMS  
Project 2002 ANIMIDA  
Project No.Date: 8/3/02  
Time: 1015 - 1620

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N12  
Latitude 70°27'32"Longitude 148°42.114Station Type (circle one)  
BSMP (Northstar) / Liberty / Other**Field Observations and Measurements**Wind Speed 10 Kts Wind Direction SW Seas/Ice No ice / Ripples  
Water Depth 18 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**Amphipods: Traps Deployed 2 @ 1015 Traps Retrieved @ 1620 Anonyx Sample 1

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: ~500ml Anonyx in 2 traps - 225 ml collected - Remainder Released.**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, JT, MM, DWSignature: [Signature]Date: 8/3/02



# MMS

## Summer 2002 Station Log

Station ID <sup>JB</sup> N013 N13  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 8/4/02Time: 1015 - 1705

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N13Latitude 70° 26.98270° 27.016Longitude 148° 43.594 - Amphipods148° 43.561 - Sediment SampleStation Type (circle one)  
BSMP/Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed 20 Kts Wind Direction W Seas/Ice 2-3 ft. Seas stray bergWater Depth 14 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

~ 3cm of fine silt clay over gravel/sand mix grab @ 1657**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**Amphipods: Traps Deployed 2 @ 1015 Traps Retrieved 1639 Anonyx Sample 1

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: Baited w/ sardines w/ mustard sauce.**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_

Heading back to West Dock.

Field Personnel: \_\_\_\_\_

JB, BT, MM, DW

Signature: \_\_\_\_\_

Date: 8/4/02

# MMS

## Summer 2002 Station Log

Station ID N14Date: 8/7/02Time: 1405-1417

Client MMS

Project 2002 ANIMIDA

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N14Latitude 70°26.006Longitude 148°40.429

Station Type (circle one)

BSMP/Northstar/Liberty/Other

**Field Observations and Measurements**Wind Speed 12-15k. Wind Direction WSeas/Ice 2 ft. large (400m) berg ~ 100 m. awayWater Depth 12 ft.

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: Fine silt - soft - grab full almost to doors.**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, Am, mm, DWSignature: [Signature]Date: 8/7/02

# MMS

## Summer 2002 Station Log

Station ID N15Client MMS  
Project 2002 ANIMIDADate: 8/7/02Time: 1105-1115

Project No. \_\_\_\_\_

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N15Latitude 70°26.707Longitude 148°44.618Station Type (circle one)  
BSMP Northstar Liberty/Other**Field Observations and Measurements**Wind Speed 12 kts. Wind Direction WSW Seas/Ice 2-2 ft. Chop. bergs ~ 1/4 mi N.Water Depth 8 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
/	/	/	/			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand  Gravel  Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

1st grab washed out. 2nd grab Fine sand w/ some silt on surface, gravel/sand below**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, Alex Mansfield (Am), mm, DWSignature: [Signature]Date: 8/7/02

# MMS

## Summer 2002 Station Log

Station ID

N16

Client

MMS

Project

2002 ANIMIDA

Project No.

Date: 8/5/02

Time: 1053-1105

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N16Latitude 70° 29.902Longitude 148° 42.395

Station Type (circle one)

BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 15 kts Wind Direction WSeas/Ice 2-3 ft. No ice - stray berg.Water Depth 42.5

Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_

Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: ice ~ 1/2 mi to north.

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>i (VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No ? H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No Comments: 1st grab we had drifted off station - 2nd grab soft mud w/ clay at ~5cm deep.

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: gray/black clay under the surface mud layer.Snow Flurries!!Field Personnel: JB, JT, MM, DWSignature: [Signature]Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID N17  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 8/5/02  
 Time: 1245-1305

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N17  
 Latitude 70° 29.833' 35" N Longitude 148° 40.345' W  
~~70° 29.833' 70° 29.833'~~

Station Type (circle one)  
 BSMP/ Northstar / Liberty / Other

#### Field Observations and Measurements

Wind Speed 12 Kts Wind Direction W Seas/Ice 2-3 ft. ice heavy ~1/2 mi. North  
 Water Depth 7 42.5 Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_ (open at bottom)

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes  No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: 1.2m fine silt over sticky black clay

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_

Field Personnel: JB, JT, MM, DW

Signature: [Signature]

Date: 8/5/02

# MMS

## Summer 2002 Station Log

Station ID <sup>JB</sup> ~~N18~~ N18Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/2/02

Time: 1613 - ~~1621~~ 1631**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**Sampling Location ~~N018~~ N18  
Station Number ~~N018~~ 333Station Type (circle one)  
BSMP/Northstar/Liberty/OtherLatitude 70° 29.080  
70° 29.082Longitude 148° 42.228 - Amphipod Trap  
148° 42.100 - Sediment Grab**Field Observations and Measurements**Wind Speed 5-10 kt. Wind Direction ~E Seas/Ice 1/2 ft. chop - Calm on Retrieval  
Water Depth 34 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_ of traps and  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_ sediment.

Comments:

**Samples Collected****Sediments:** Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
1	1	1	1			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments:

~ 1cm silt w/ Fine sand/clay underneath

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

**Biota:****Amphipods:** Traps Deployed 2 @ 1020 Traps Retrieved 1625 Anonyx Sample 1**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_Comments: 2 Traps deployed - ~ 225 mL Anonyx collected ~ 50 mL Released  
Traps baited w/ "Regular sardines"**Quality Control Samples**

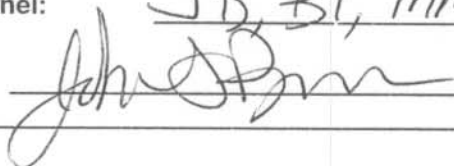
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, BT, MM, DW

Signature:



Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N19  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/2/02  
Time: 1531-1541

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N19  
Latitude 70°29.088

Longitude 148°40.557

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed Calm Wind Direction NA Seas/Ice Ripples No ice within 1 mile  
Water Depth 36 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: Sunny & nice

#### Samples Collected

##### Sediments:

Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No

Comments: Fine silt "pudding" ~ 3cm w/ stiff fine sand underneath

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

#### Quality Control Samples

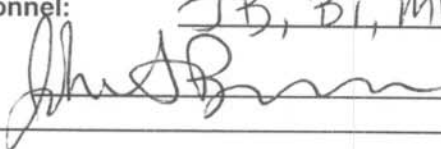
Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Field Personnel:

JB, BI, MM, DW

Signature:



Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N20  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/2/02  
Time: 1455-1503

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N20  
Latitude 70° 27.957

Station Type (circle one)  
BSMP/ Northstar / Liberty / Other

Longitude 148° 41.738

#### Field Observations and Measurements

Wind Speed Calm Wind Direction NA Seas/Ice Ripples. No ice  
Water Depth 21 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab  No. of Replicates 2

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: Fine Sand in 2<sup>nd</sup> grab. 1<sup>st</sup> grab washed out w/ gravel/mud

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BT, MM, DW.

Signature: [Signature]

Date: 8/2/02



# MMS

## Summer 2002 Station Log

Station ID N21Client MMS  
Project 2002 ANIMIDA  
Project No. \_\_\_\_\_Date: 8/2/02  
Time: 1419-1430

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number N21  
Latitude 70°26.806Longitude 148° 40.588Station Type (circle one)  
BSMP/Northstar/ Liberty /Other**Field Observations and Measurements**Wind Speed calm Wind Direction NA Seas/Ice calm No ice  
Water Depth 17 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			<u>1 (VAF)</u>

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No 

Comments: \_\_\_\_\_

fine silt ~ 2-3mm over stiff clay w/ some sand**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: JB, BT, mm, DWSignature: [Signature]Date: 8/2/02

# MMS

## Summer 2002 Station Log

Station ID N23  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 8/5/02  
Time: 1420 - 1452

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number N23  
Latitude 70° 29.330

Longitude 148° 41.864

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 15 kts. Wind Direction W Seas/Ice No ice just S. of Northstar  
Water Depth 37 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab  No. of Replicates 1

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>			

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel  Shell Hatch \_\_\_\_\_ Mixed   
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

mixed silt/clay w/ some gravel & sand (from pipeline cover?)

#### Water/Suspended Sediments:

Surface  Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: Surface H<sub>2</sub>O collected ~ 150 ft. South of Northstar.

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Station ~ 100 m South of Northstar on pipeline route

Field Personnel:

JB, JT, MM, DW

Signature:

[Signature]

Date:

8/5/02

# MMS

## Summer 2002 Station Log

Station ID 3M1Client MMS  
Project 2002 ANIMIDA  
Project No.Date: 1020-1637Time: 7/29/02

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 3M1Latitude 70°16.982Longitude 147°08.880Station Type (circle one)  
BSMP/Northstar/Liberty Other

#### Field Observations and Measurements

Wind Speed 5-7 kts Wind Direction NE Seas/Ice Light chop -10% ice coverWater Depth 25 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (w/ 5 SPMD's)Comments: 40 mussels in cage, 5 SPMD's in device 32 kHz pingex on moorings

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Field Personnel: J. Brown, M. Meitz, B. TrocineSignature: [Signature]Date: 7/29/02

# MMS

## Summer 2002 Station Log

Station ID 3M1Date: 8/20/02Client MMS  
Project 2002 ANIMIDATime: 11:00

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 3M1Latitude 70° 16.982'Longitude 147° 08.880'**Station Type** (circle one)BSMP/Northstar/Liberty/Other Other**Field Observations and Measurements**Wind Speed 15-20knts Wind Direction SW Seas/Ice 3' + NO ICEWater Depth 25' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (2/5)Comments: All mussels look alive + OK. extensive visual threads**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

mussels in 2 jars : 02-3M1-01-PHC-T  
SPMDs in 2 cans 02-3M1-02-PHC-TField Personnel: A. Mansfield, M. Martz, G. LawleySignature: [Signature] Date: 8/20/02

# MMS

## Summer 2002 Station Log

Station ID 3m2  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 7/29/02  
Time: 1648 - 1703

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 3m2  
Latitude 70° 16.835

Longitude 147° 09.409

Station Type (circle one)  
BSMP/Northstar/Liberty/Other Other

#### Field Observations and Measurements

Wind Speed 5-10 kt. Wind Direction NE Seas/Ice 1 ft. chop < 10% ice  
Water Depth 25 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (5 SPMD's)

Comments: 40 mussels in cage, 5 SPMD's in device, 37 kHz pinger on mooring

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: JB, BT, mm

Signature: [Signature]

Date: 7/29/02

# MMS

## Summer 2002 Station Log

Station ID 3M2Client MMS  
Project 2002 ANIMIDA

Project No. \_\_\_\_\_

Date: 8/20/02Time: 11:30

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number 3M2Latitude 70° 16.835'Longitude 147° 09.409'Station Type (circle one)  
BSMP/Northstar/Liberty/Other Other**Field Observations and Measurements**Wind Speed 15-20 KNTS Wind Direction SW Seas/Ice 3' +, NO iceWater Depth 25' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved 1 Caged Mussels 1 cage SPMD 1(w/5)Comments: 1 dead mussel, all others look alive + OK, ex Tensive visual threads**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

MUSSELS in 2 Jars: 02-3M2-01-PHC-TSPMDS in 2 cans: 02-3M2-02-PHC-T

Field Personnel:

A. Mansfield, M. Mertz, G. Lawley

Signature:

A. MansfieldDate: 8/20/02

# MMS

## Summer 2002 Station Log

Station ID 3m3  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 7/29/02  
Time: 1715-1727

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number 3m3  
Latitude 70°16.922

Longitude 147°09.398

Station Type (circle one)  
BSMP/Northstar/Liberty/Other Other

#### Field Observations and Measurements

Wind Speed 5-10 kt Wind Direction NE Seas/Ice 1 ft. chop <10% ice  
Water Depth 25 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (w/ 5 SPMD's)

Comments: 40 mussels in cage, 5 SPMD's in SPMD Device, 15 kHz pinger on mooring

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Cumulative Field Blank exposed during deployment.

Field Personnel: JB, BJ, MM

Signature: [Signature]

Date: 7/29/02

<p style="font-size: 2em; font-weight: bold; margin: 0;">MMS</p> <p>8/20/02</p> <p>Date: <u>8/18/02 WINDY AM 8/20</u></p> <p>Time: <u>12:10</u></p>	<h2 style="margin: 0;">Summer 2002 Station Log</h2>	<p>Station ID <u>3M3</u></p> <p>Client <u>MMS</u></p> <p>Project <u>2002 ANIMIDA</u></p> <p>Project No. _____</p>
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**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**

<p><b>Sampling Location</b></p> <p>Station Number <u>3M3</u></p> <p>Latitude <u>70° 16.922</u></p>	<p><b>Station Type</b> (circle one)</p> <p>BSMP/Northstar/Liberty/<u>Other</u></p> <p>Longitude <u>147° 09.398</u></p>
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**Field Observations and Measurements**

Wind Speed 15-20 KNTS Wind Direction SW Seas/Ice 3' + , NO ice

Water Depth 25' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected**

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: 1 dead mussel, all others look alive + OK. extensive viscol threads

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

**Overall Comments:**

MUSSELS in 2 JARS: 02-3M3-01-PHC-T

SPMDs in 2 CANS: 02-3M3-02-PHC-T

**Field Personnel:** A. Massfeld, M. Metz, G. Lawley

**Signature:** [Signature] **Date:** 8/20/02



Deployed <b>MMS</b> Retrieved Date: <u>7/29/02 - 8/18/02</u> Time: <u>14:40</u>	<h2 style="margin:0;">Summer 2002 Station Log</h2>	Station ID <u>NM1</u> Client <u>MMS</u> Project <u>2002 ANIMIDA</u> Project No. _____
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**Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)**

**Sampling Location**

Station Number NM1  
 Latitude 70° 29.597'

**Station Type** (circle one)  
 BSMP/ Northstar / Liberty / Other

Longitude 148° 44.199'

**Field Observations and Measurements**

Wind Speed ~15 KNTS Wind Direction W Seas/Ice ~1' very little ice  
 Water Depth 38' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected**

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed Retrieved Caged Mussels 1 cage SPMD 1 (w/5)

Comments: All mussels looked Alive + OK. extensive visceral threads

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

SAMPLE IDS:  
Mussels 2 Jars: 02-NM1-01-PHC-T  
SPMDs (5 in 2 cans) 02-NM1-02-PHC-T

**Field Personnel:**

A. Mansfield, M. Metz, S. O'Riordan, S. Jewitt, E. Brown

**Signature:**

[Handwritten Signature]

**Date:**

8/18/02

# MMS

## Summer 2002 Station Log

Station ID NM1  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 7/29/02  
 Time: 2045 - 2110

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number NM1  
 Latitude 70° 29.597

Longitude 148° 44.199

Station Type (circle one)  
 BSMP Northstar / Liberty / Other

#### Field Observations and Measurements

Wind Speed 15 kts Wind Direction NE Seas/Ice Ripples ~15% ice cover  
 Water Depth 38 ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed 1 Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (w/ 5 SPMD's)  
 Comments: Booy "1N" 40 mussels (20 per Nitex envelope)

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Deck exposure SPMD in can used at all SPMD stations  
i.e. cumulative. 5 SPMD spider cages in the 1 deployment cage.  
25 kHz pinger on mooring below SPMD; mussel cage above  
SPMD ~ 8 ft from bottom. SPMD ~ 6 ft from bottom. Drag  
line at ~ 100 ft to secondary anchor.

Field Personnel: J. Brown, B. Tracine, M. Mertz

Signature: Jh Brown Date: 7/29/02



# MMS

## Summer 2002 Station Log

Station ID NM2  
 Client MMS  
 Project 2002 ANIMIDA  
 Project No.

Date: 7/29/02  
 Time: 2112-2143

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number NM2  
 Latitude 70° 29.687

Longitude 148° 44.686

Station Type (circle one)  
 BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed 15 kt Wind Direction NE Seas/Ice ~15% ice Ripples  
 Water Depth 38 ft. Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
 Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

Sediments: Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
 Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 w/ 5 SPMD

Comments: Body "21N" 40 mussels - 20 per Nitex "envelope"

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: SPMD Field blank opened during deployment (cumulative from NM1), Missing deployment the same as NM1

34 kHz pinger on moorings

Field Personnel: J. Brown, M. Nertz, B. Tracine

Signature: [Signature] Date: 7/29/02

# MMS

## Summer 2002 Station Log

Station ID NM2  
Client MMS  
Project 2002 ANIMIDA  
Project No. \_\_\_\_\_

Date: 8/18/02

Time: 15:20

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number NM2

Latitude 70° 29.687'

Longitude 148° 44.686'

Station Type (circle one)  
BSMP/ Northstar / Liberty / Other

#### Field Observations and Measurements

Wind Speed ~15 KNT Wind Direction W Seas/Ice ~1', very little ice

Water Depth 38 Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

##### Sediments:

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 (w/5)

Comments: All mussels appear alive + OK. extensive visual threads

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments:

Sample IDs:

Mussels (2 jars): 02-NM2-01-PHC-T

SPMDs (5 in 2 cans): 02-NM2-02-PHC-T

Field Personnel:

A. Mansfield, M. Mertz, S. Oakenon, S. Jewitt, E. Brown

Signature:

A. Mansfield

Date: 8/18/02

# MMS

## Summer 2002 Station Log

Station ID NM3  
Client MMS  
Project 2002 ANIMIDA  
Project No.

Date: 7/29/02  
Time: 2200-2217

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

Sampling Location NM3  
Station Number NM3  
Latitude 70°29.618

Longitude 148°44.315

Station Type (circle one)  
BSMP/Northstar/Liberty/Other

#### Field Observations and Measurements

Wind Speed ~5kt Wind Direction NE Seas/Ice Ripples ~15% ice  
Water Depth 39ft Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

>50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels 1 cage SPMD 1 w/ 5 SPMD

Comments: Box "3N" 40 mussels deployed - 20 per Wiley envelope

#### Quality Control Samples

Field Blank  Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Deck exposure SPMD can opened during deployment. (Field Blank)  
cumulative from NM1 & NM2. Mooring here same as NM1  
and NM2.

40 kHz ping on mooring

Field Personnel: J. Brown, B. Traube, M. Mertz

Signature: [Signature] Date: 7/29/02

# MMS

## Summer 2002 Station Log

Station ID NM3Date: 8/18/02Client MMSTime: 15:45Project 2002 ANIMIDA

Project No. \_\_\_\_\_

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number NM3Latitude 70° 29.618Longitude 148° 44.315'

Station Type (circle one)

BSMP/Northstar/Liberty/Other**Field Observations and Measurements**Wind Speed ~15 KNT Wind Direction W Seas/Ice ~1', vary little iceWater Depth 39' Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:**

Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:**

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved    Caged Mussels 1 cage SPMD 1 (w/5)Comments: All mussels took alive + OK. Extensive viral threads**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel:

A. Mansfield, M. Mertz, S. Oakenen, S. Jewitt, E. Brown

Signature:

A. MansfieldDate: 8/18/02

# MMS

## Summer 2002 Station Log

Station ID SAGDate: 8/14/02Client MMS  
Project 2002 ANIMIDATime: 11:30

Project No. \_\_\_\_\_

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number SAG  
Latitude See NOTE below Longitude \_\_\_\_\_Station Type (circle one)  
BSMP/Northstar/Liberty/Other Other**Field Observations and Measurements**Wind Speed ~20 KNOTS Wind Direction SW Seas/Ice NA  
Water Depth ~3-6" Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>2</u>						

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_  
Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Sample location: ~1/2-1 mile South of mile marker 401 ON Haul Rd. Road Sig N "135 AMS IS" nominal coordinates 70° 01.680' 148° 33.770'. took one fine grain H/S/T Sample in river 02-SAG01-PHC-S and one peat sample from bank 02-SAG01-PHC-PField Personnel: Alex Mansfield, Mark MetzSignature: Alex Mansfield Date: 8/14/02

# MMS

## Summer 2002 Station Log

Station ID KUP-01Date: 8/6/02

Client MMS

Time: -1000

Project 2002 ANIMIDA

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number KUP-01

Station Typ (circle one)

BSMP/Northstar/Liberty/Other OtherLatitude ~~70°17'00"~~ 70°17.700 Longitude 148°53.70

Nominal position @ Kuparuk River crossing # Spine Rd.

**Field Observations and Measurements**Wind Speed ~5-10kts Wind Direction — Seas/Ice NAWater Depth — Conductivity, Temperature, Depth (CTD) —Doppler Current — Turbidity — Instrument Tow —Comments: —**Samples Collected****Sediments:**Van Veen Grab —No. of Replicates —

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>2</u>	<u>1</u>					

Sediment Texture (check all that apply):

>50% silt/clay — Fine  Coarse Sand — Gravel — Shell Hatch — Mixed —Indications of Anoxia: Yes — No — H<sub>2</sub>S Odor: Yes — No —

Comments:

1 peat sample & 1 sediment for organics - sediment only for metals**Water/Suspended Sediments:**Surface — Mid-Water — Bottom — Other —Comments: —**Biota:**Amphipods: Traps Deployed — Traps Retrieved — Anonyx Sample —Clams: Number of Grabs — Astarte — Cyrtodaria —Mussels/SPMD: Deployed/Retrieved — Caged Mussels — SPMD —Comments: —**Quality Control Samples**Field Blank — Equipment Blank — Other —

Overall Comments:

Collected samples by hand (jar and clean scoop)  
Samples collected from the dry area of the Kuparuk River  
channel - silty/sandy deposits. Samples taken from eastern most  
channel or "braid" of the River from Access Rd. going to South  
Peat collected from large "mat" in the dry channel.

Field Personnel:

JB JT DW

Signature:



Date:

8/6/02



# MMS

## Summer 2002 Station Log

Station ID KUP-03Client MMS  
Project 2002 ANIMIDA  
Project No.Date: 8/7/02  
Time: 0800 - 0815

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number KUP-03  
Latitude 70°22' - 916Longitude 148°51.550Station Typ (circle one)  
BSMP/Northstar/Liberty/Other Other

#### Field Observations and Measurements

Wind Speed ~5 kts Wind Direction Var. Seas/Ice NA  
Water Depth NA Conductivity, Temperature, Depth (CTD) \_\_\_\_\_  
Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_Comments: Helicopter from Kuparuk Heliport - Foggy all the way to landing

#### Samples Collected

##### Sediments:

Van Veen Grab No. of Replicates

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>2</u>	<u>2</u>					

Sediment Texture (check all that apply):

&gt;50% silt/clay \_\_\_\_\_ Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_

Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_Comments: 2 seds for organics - both surface silt/sand from edge of River.  
2 Seds for metals: 1 silt/sand from edge, 1 gravel (~2L) for severe analysis - then chemisty

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments:

#### Biota:

Amphipods: Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_

Clams: Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_

Mussels/SPMD: Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments:

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Sampling at the Kuparuk Borran Pit - the source of gravel for Northstar Island. The "pit" has now completely filled in and is just a "pool" in the Kuparuk River delta - and was difficult to locate even with position coordinates. - cold foggy day -Field Personnel: JB, JT, AMSignature: [Signature] Date: 8/7/02

# MMS

## Summer 2002 Station Log

Station ID COLDate: 8/13/02

Client MMS

Time: 10:30

Project 2002 ANIMIDA

Project No.

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

#### Sampling Location

Station Number COL

Station Type (circle one)

Latitude 70° 15.960'Longitude 150° 49.290'

BSMP/Northstar/Liberty/Other

Nominal (Landing Zone)

#### Field Observations and Measurements

Wind Speed 10 Knts Wind Direction SW Seas/Ice NAWater Depth ~3-6" Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

#### Samples Collected

**Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<u>2</u>						

Sediment Texture (check all that apply):

>50% silt/clay  Fine  Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No \_\_\_\_\_ H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

#### Water/Suspended Sediments:

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

#### Biota:

**Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

#### Quality Control Samples

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Landed @ coordinate listed above, walked ~50 yds west to river. TOOK fine grain/silt sample in shallow water 02-COL-01-PHC-S. Collect Peat sample from the eroded bank 02-COL-01-PHC-PField Personnel: Alex Mansfield, Mark MartzSignature: [Signature]Date: 8/13/02

# MMS

## Summer 2002 Station Log

Station ID CANDate: 8/9/02Client MMSTime: 14:15Project 2002 ANIMIDA

Project No. \_\_\_\_\_

### Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA)

**Sampling Location**Station Number CAR (CANNING River)Station Type (circle one)  
BSMP/Northstar/Liberty/Other OtherLatitude 70° 07.199 NLongitude 145° 53.099 W**Field Observations and Measurements**Wind Speed 5-10 KNTS Wind Direction N Seas/Ice NA

Water Depth \_\_\_\_\_ Conductivity, Temperature, Depth (CTD) \_\_\_\_\_

Doppler Current \_\_\_\_\_ Turbidity \_\_\_\_\_ Instrument Tow \_\_\_\_\_

Comments: \_\_\_\_\_

**Samples Collected****Sediments:** Van Veen Grab \_\_\_\_\_ No. of Replicates \_\_\_\_\_

Organics	Metals	Grain Size	TOC	<sup>13</sup> C	Methyl Hg	Other
<input checked="" type="checkbox"/>						

Sediment Texture (check all that apply):

>50% silt/clay  Fine \_\_\_\_\_ Coarse Sand \_\_\_\_\_ Gravel \_\_\_\_\_ Shell Hatch \_\_\_\_\_ Mixed \_\_\_\_\_Indications of Anoxia: Yes \_\_\_\_\_ No  H<sub>2</sub>S Odor: Yes \_\_\_\_\_ No \_\_\_\_\_

Comments: \_\_\_\_\_

**Water/Suspended Sediments:**

Surface \_\_\_\_\_ Mid-Water \_\_\_\_\_ Bottom \_\_\_\_\_ Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Biota:****Amphipods:** Traps Deployed \_\_\_\_\_ Traps Retrieved \_\_\_\_\_ Anonyx Sample \_\_\_\_\_**Clams:** Number of Grabs \_\_\_\_\_ Astarte \_\_\_\_\_ Cyrtodaria \_\_\_\_\_**Mussels/SPMD:** Deployed/Retrieved \_\_\_\_\_ Caged Mussels \_\_\_\_\_ SPMD \_\_\_\_\_

Comments: \_\_\_\_\_

**Quality Control Samples**

Field Blank \_\_\_\_\_ Equipment Blank \_\_\_\_\_ Other \_\_\_\_\_

Overall Comments: Collected Samples by hand (Teflon Kynar coated scoop)

- 1 sample of fines taken in River 02-CAN-01-PHC-5
  - 1 sample of peat taken on the bank 02-CAN-02-PHC-5
  - 1 sample of oil sheen taken from nearby pool 02-CAN-03-PHC-5
- Also took: water, G-S, and metals for Trefry

Field Personnel: Alex Mansfield, MARK MERTZSignature: Alex Mansfield Date: 8/9/02

**Attachment 2: 2002 Collection Permit and Fish Transfer Permit**



STATE OF ALASKA  
DEPARTMENT OF FISH AND GAME  
P.O. Box 25526  
JUNEAU, ALASKA 99802-5526

Permit No. CF-02-064Expires 12/31/2002

FISH RESOURCE PERMIT  
(For Scientific/Educational Purposes)

This permit authorizes John S. Brown (whose signature is required on page 2 for permit validation)

person  
of Battelle Memorial Institute at 255 Bear Hill Rd., Waltham, MA 02451  
agency or organization address

to conduct the following activities from July 24, 2002 to August 30, 2002 in accordance with AS 16.05.930 and AS 16.05.340(b).

**Purpose:** To collect target species of shellfish and amphipods for tissue analysis of petroleum hydrocarbons in order to evaluate concentration levels of hydrocarbons in the near-shore biota of the Beaufort Sea; to examine the potential bioaccumulation of organic compounds in the water column by deploying caged mussels and SPMDs, and analyzing them for organics; to collect current profiles and suspended particulate samples to evaluate the potential effects of Northstar Production Island on the sediment transport regime in the study area.

**Location:** Nearshore Beaufort Sea: 12 to 16 stations from Stockton Islands to Jones Islands, concentrating around the Northstar Production Island and Liberty Prospect oil developments.

**Species Collected:** 300 *Astarta* clams, 600 *Cyrtodaria* clams, 500 *Anonyx* spp. amphipods.

300 blue mussels *Mytilus trossulus*, to be collected from Port Chatham on Kenai Peninsula (see Contingencies section).

**Method of Capture:** Modified Van Veen grabs and modified minnow traps.

**-Continued on Back-**

**REPORT DUE January 31, 2003.** The report shall include species, numbers, dates, and locations of collection and disposition, and if applicable, sex, age, and breeding condition, and lengths and weights of fish. The report shall also include other information as may be required under the contingencies section.

**GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS**

1. This permit must be carried by person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No re-delegation of authority may be allowed under this permit unless specifically noted.
2. No specimens taken under authority hereof may be sold or bartered. All specimens must be deposited in a public museum or a public scientific or educational institution unless otherwise stated herein. Subpermittees shall not retain possession of live animals or other specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until detailed reports, as specified above, have been received by the department.
5. UNLESS SPECIFICALLY STATED HEREIN, THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens or the taking of specimens in areas otherwise closed to hunting and fishing; without appropriate licenses required by state regulations; during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.

Division of Commercial Fisheries

Deputy Director  
Division of Commercial Fisheries

## Alaska Department of Fish and Game

CF-02-064 continued (page 2 of 2)

**Authorized Personnel:** The following personnel may participate in collecting activities under terms of this permit:  
John Brown; Alex Mansfield; John Trefry; Deb Woodall; Bob Trocine; Mark Mertz; Dick Prentki; staff members of Kinnetic Laboratories, Inc., Anchorage.

**Contingencies:**

- 1) **Bonnie Borba** (Division of Commercial Fisheries, Fairbanks (907)459-2760) must be contacted prior to you engaging in collecting activities. ADF&G Area Management Biologists have the right to specify methods for collecting, as well as limiting the collections of any species, and the number of specimens collected by time and area.
- 2) All unattended collecting gear must be labeled with the permittee's name, telephone number, and permit number.
- 3) Specimens will be sacrificed upon capture and frozen for later laboratory analysis. Unused portions of biota sampled will be archived (frozen or in formalin) for a period of one year.
- 4) Blue mussels (*Mytilus edulus/trossulus*) will be collected by hand from Port Chatham, AK (July 25 or 26, 2002), and will be transported to the Beaufort Sea (Prudhoe Bay area) for deployment in cages in nearshore waters. The caged mussels and corresponding semi permeable membrane devices (SPMDs) will be deployed from six subsurface moorings in the nearshore Beaufort Sea for a period of 3 weeks (starting on approximately July 27, 2002). Three of the moorings will be deployed in a cluster approximately 1 Km to the West of Northstar Production Island, and three of the moorings will be deployed in a reference area cluster ~4 Km South East of Pole Island. The mussels (and SPMDs) will be deployed in water depths of approximately 10 – 15 meters, and suspended ~1.5 meters from the bottom and mooring anchor, by a subsurface float. The mussel cages will be constructed of plastic coated heavy gauge steel mesh, and the mussels will be held in each cage by Nyltex screen "envelopes". There will be no surface floats on the moorings to minimize ice entanglement, and each mooring string will have an acoustic pinger and secondary anchor with a drag line, to aid in retrieval. Upon retrieval (~3 weeks from deployment) the mussels (and SPMDs) will be frozen and transported to Cambridge, MA for chemical analysis of polynuclear aromatic hydrocarbons.
- 5) Permits will indicate the number of specimens that may be taken, by species and life stage. Sampling or collecting activities must stop when the maximum allowable number of specimens is obtained. All live fish, shellfish, and aquatic plants collected in excess of the number specified on the permit must be released immediately and unharmed at the capture location, unless otherwise specified in the permit.
- 6) No fish may be transported live without a valid Fish Transport Permit (FTP) obtained from the Alaska Department of Fish and Game.
- 7) *A copy of this permit, including any amendments, must be made available at all field collection sites and project sites for inspection upon request by a representative of the department or a law enforcement officer.*
- 8) Issuance of this permit does not absolve the permittee from compliance in full with any and all other applicable federal, state, or local laws regulations, or ordinances.
- 9) **A report of collecting activities, referenced to this fish resource permit number, must be submitted to the Alaska Department of Fish and Game, Division of Commercial Fish, PO Box 25526, Juneau, AK 99802-5526, attention Jamie Barlow(465-6149; Jamie\_Barlow@fishgame.state.ak.us), within 30 days after the expiration of this permit.** This report must summarize the number of fish captured by location and by species, and the fate of those fish. A report is required whether or not collecting activities were undertaken. A report must also be sent to the Biologist(s) listed under number 1 in this Contingencies section.
- 10) **PERMIT VALIDATION requires permittee's signature agreeing to abide by permit conditions before beginning collecting activities:**

---

Signature of Permittee

cc: Gene Sandone  
Bonnie Borba  
CF Division files  
Ted Meyers

**FISH TRANSPORT PERMIT**

**Applicant**  
John S. Brown

**Organization**  
Battelle Memorial Institute

**Mailing Address**  
255 Bear Hill Road  
Waltham, MA 02451

<b>Phone</b> 781-895-4847	<b>Species</b> Blue Mussel Mytilus edulus/trossulus
------------------------------	--

**Stock Origin/Original Donor Stock**  
Port Chatham, AK

**Proposed Stocking Location**  
NA

**Project summary- Summary statement of precisely what is being proposed.** Blue mussels (*Mytilus edulus/trossulus*) will be collected by hand from Port Chatham, AK (July 25 or 26, 2002), and will be transported to the Beaufort Sea (Prudhoe Bay area) for deployment in cages in nearshore waters. The caged mussels and corresponding semi permeable membrane devices (SPMDs) will be deployed from six subsurface moorings in the nearshore Beaufort Sea for a period of 3 weeks (starting on approximately July 27, 2002). Three of the moorings will be deployed in a cluster approximately 1 Km to the West of Northstar Production Island, and three of the moorings will be deployed in a reference area cluster ~4 Km South East of Pole Island. The mussels (and SPMDs) will be deployed in water depths of approximately 10 – 15 meters, and suspended ~1.5 meters from the bottom and mooring anchor, by a subsurface float. The mussel cages will be constructed of plastic coated heavy gauge steel mesh, and the mussels will be held in each cage by Nytex screen “envelopes”. There will be no surface floats on the moorings to minimize ice entanglement, and each mooring string will have an acoustic pinger and secondary anchor with a drag line, to aid in retrieval. Upon retrieval (~3 weeks from deployment) the mussels (and SPMDs) will be frozen and transported to Cambridge, MA for chemical analysis of polynuclear aromatic hydrocarbons.

**Permit # CF-02-064**

		<u>For Department Use Only</u>	
<u>State Fish Transport Permit</u>		<b>FTP Number</b>	<b>02A-0046</b>
Consistent with facility/project plans	Yes		No
<u>Private Nonprofit Hatchery Fish Transport Permit</u>			
Consistent with PNP permit	Yes		No
Requires Permit Alteration prior to review	Yes		No
Continuation of project	Yes		No
New Project	Yes		No
<input checked="" type="checkbox"/> Other - FRP	Yes	X	No
<b>Status</b>			
Forms Complete	Yes	No	Date
Disease History Complete	Yes	No	Date
In review process	DATE	7/16/2002	7/18/02
Returned to applicant	DATE	8/01/2002	

5 AAC 41.005. PERMIT REQUIRED. (a) No person may transport, possess, export from the state, or release into the waters of the state, any live fish unless the person holds a fish transport permit issued by the Commissioner or his authorized designee. The Fish Transport Permit (FTP) is the single document, approved by the Commissioner of Alaska Department of Fish and Game (ADF&G), that allows for movements of fish and eggs on an interstate and intrastate basis.

SIGNATURE PAGE

Comments

	Signature	<u>Agree</u>	<u>Disagree</u>	<u>Date</u>	<u>Comments Provided</u>	
					Yes	No
1. Fish Health Services Pathologist - Division of Commercial Fisheries (CF)	<u><i>Theodore A. Meyer</i></u> incomplete	<input checked="" type="checkbox"/>		<u>7/18/02</u>	<input checked="" type="checkbox"/>	
2. Regional Resource Development Biologist - CF	_____					
3. Regional Supervisor - CF	<u><i>Gene Sanderson</i></u>	<input checked="" type="checkbox"/>		<u>7/22/02</u>	<input checked="" type="checkbox"/>	
4. Regional Supervisor - Division of Sport Fish	<u><i>Robert Beatty</i></u>	<input checked="" type="checkbox"/>		<u>7-31-02</u>	<input checked="" type="checkbox"/>	
5. Principal Geneticist - CF	<u><i>Lisa Lee</i></u> <i>for Jim Lee</i>	<input checked="" type="checkbox"/>		<u>7/24/02</u>	<input checked="" type="checkbox"/>	
6. Deputy Director - CF	<u><i>Deon Bruce</i></u>	<input checked="" type="checkbox"/>		<u>8/1/02</u>	<input checked="" type="checkbox"/>	
7. Commissioner	<u><i>[Signature]</i></u>	<u>Approval</u> <input checked="" type="checkbox"/>	<u>Disapproval</u>	<u>Date</u> <u>8-1-02</u>		



# Trace metals in sediments near offshore oil exploration and production sites in the Alaskan Arctic

John H. Trefry · Robert D. Rember · Robert P. Trocine · John S. Brown

**Abstract** Increased offshore development in the Alaskan Arctic has stimulated interest in assessing potential impacts to the environment before the onset of any adverse effects. Concentrations of trace metals in sediments are used in this paper to provide one sensitive indicator of anthropogenic inputs from offshore activity over the past several decades. Sediments in coastal waters of the western Beaufort Sea are patchy with respect to sediment granulometry, organic carbon content, and concentrations of trace metals. However, results for surface sediments and age-dated cores show that nearly all samples contain natural concentrations of Ag, Ba, Be, Co, Cr, Cu, Hg, Ni, Pb, Sb, Tl, V and Zn, with metal/Al ratios that have been constant for many decades. Metal concentrations for incoming river-suspended matter compare well with sediment metal values and, along with vertical distributions in sediments, show no discernible diagenetic impacts that distort the sedimentary record for metals, except for Mn, As and possibly Cd. Slightly elevated concentrations of Ba, Hg, Ag, Sb and Zn were observed in a total of eight instances or in only 0.7% of the 1,222 data points for metals in surface sediments.

**Keywords** Sediment · Trace metals · Offshore oil · Beaufort Sea, Alaska

## Introduction

As oil development in the Alaskan Arctic continues to move offshore into the coastal Beaufort Sea, a variety of studies are being carried out to identify, perhaps even predict, where subtle perturbations in the natural system may occur before the onset of deleterious environmental effects. Such assessments are best formulated from studies of spatial and temporal trends for selected indicators. Concentrations of trace metals in surface sediments and in age-dated cores, along with sediment granulometry and total organic carbon, are used in this paper to help evaluate the cumulative impacts of industrial activity in the coastal Beaufort Sea.

The first major discovery of oil near Prudhoe Bay, Alaska, (Fig. 1) in 1968 followed more than 20 years of exploration (Strohmeier 1997). To date, more than 5,000 wells have been drilled on the Northslope of Alaska and more than 13 billion barrels of oil have been carried along the ~1,300-km route of the Trans-Alaskan Pipeline System to Valdez since 1977 (Alaska Department of Natural Resources 2002). Most (>90%) of the oil recovered to date from the Alaskan Arctic has come from onshore sites (Alaska Department of Natural Resources 2002).

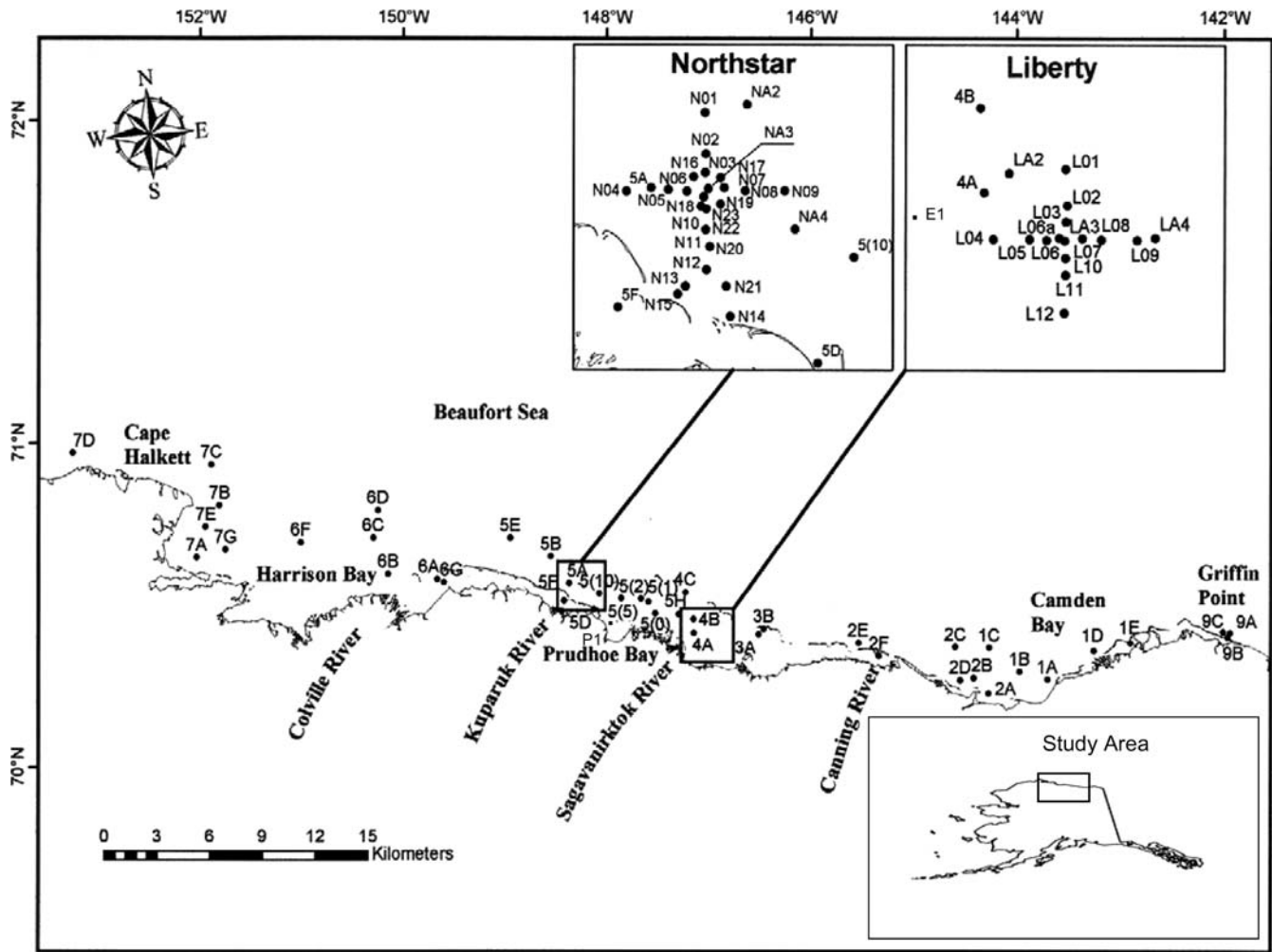
Offshore activities during the 1970s led to the discovery of the Endicott, Point McIntyre and other reservoirs. Production from the Endicott Field began in 1987, following construction of two gravel islands and an 8-km-long causeway to the mainland. To date, about 30 offshore exploratory wells have been drilled in the Beaufort Sea. During 2000, a gravel island was constructed ~10 km offshore with a subseafloor pipeline to bring the Northstar Prospect into production during 2002. The coastal Beaufort Sea continues to be a dynamic area for oil development, seasonal barge and supply boat traffic, as well as the completion of thousands of kilometers of seismic lines.

Trace metals can be useful indicators of impacts from industrial activity because they are commonly enriched in raw and finished materials used by modern industry. For example, barite ( $\text{BaSO}_4$ ) is a major component of fluids used during petroleum drilling operations, and concentrations of Ba in these fluids are often at levels of >100,000  $\mu\text{g/g}$  of solids (Trefry and others 1985) relative to typical Ba levels of 200 to 700  $\mu\text{g/g}$  in Beaufort Sea sediments (Crecelius and others 1991). Other metals from

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**Fig. 1**

Map showing study area along the western portion of the coastal Beaufort Sea with inset maps of Alaska, the oil production site at Northstar Island and the proposed future drilling site at Liberty Prospect. Diversity in schemes for station identification results from reusing the numbering system from the 1989 Beaufort Sea Monitoring Program for some stations (Boehm and others 1990; *number-letter* and *number-number*) and introducing a new station identification system for study of impacts at Northstar Island (*N*) and Liberty Prospect (*L*)

industrial activities also can be concentrated in bottom sediments where they are often sensitive indicators of cumulative inputs from a variety of anthropogenic sources.

Previous studies of trace metals in sediments from the coastal Beaufort Sea have shown that metal concentrations are highly variable, but generally at natural levels with minimal localized inputs from development (Sweeney and Naidu 1989; Snyder-Conn and others 1990; Crecelius and others 1991; Naidu and others 1997, 2001; Valette-Silver and others 1999). Snyder-Conn and others (1990) identified elevated levels of Ba, Cr, Pb and Zn in areas adjacent to one or more disposal sites for drilling effluent. Crecelius and others (1991) found elevated levels of Ba at a few sites in western Harrison Bay and Cr near the mouth of the

Canning River, with no other indications of metal contamination.

A spatial patchwork of metal concentrations, such as observed in sediments from the coastal Beaufort Sea (Crecelius and others 1991; Macdonald and Thomas 1991), can result from natural variations, anthropogenic inputs or diagenetic impacts. Identifying differences in metal concentrations that result from natural variations in grain size and mineralogy often can be carried out by normalizing (ratioing) concentrations of metals to Al or Fe (Moore 1963; Bruland and others 1974). Normalization to Al and Fe also can be used to help identify instances of metal contamination in sediments (Trefry and Presley 1976; Schropp and others 1990). Finally, the impacts of chemical diagenesis on concentrations of metals in sediments often can be identified by examining vertical profiles for metals in sediments (Ridgway and Price 1987; Shaw and others 1990; Gobeil and others 1997) or by comparing concentrations of metals in sediments with source-suspended material from rivers (Trefry and Presley 1982). All the considerations mentioned above are used in this manuscript to help resolve the complex trends observed for metals in sediments from the study area. Sediment samples for this study were collected during 1999 ( $n=44$  surface samples), 2000 ( $n=44$  surface samples) and 2001 ( $n=104$  samples from six cores) at 51 different

sites that extended from west of Prudhoe Bay (~150°W) to Pole Island (~146°W) and included intensive sampling from areas near the Northstar Island before and during construction of this offshore island for oil development (Fig. 1). Intensive sampling was also carried out in an area identified as Liberty Prospect (Fig. 1) where development may occur in the future. Concentrations of Ag, Al, As, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, V and Zn were determined for surface sediment (0–2 cm) and sediments from cores that were age-dated using vertical profiles for  $^{137}\text{Cs}$  and excess  $^{210}\text{Pb}$ .

## Study area

The geology of the region has been summarized by Payne and others (1951) and Mull and Adams (1989). In the Brooks Range (100 to 150 km south of the Beaufort Sea), shales from Triassic to Pennsylvanian age are widespread as are the Lisburne limestone and dolomite group from the Pennsylvanian and Mississippian ages. The Gubik formation (Quaternary riverine and marine sediments) underlies the coastal plain. In addition to Quaternary sediments, older Cretaceous and Tertiary sandstones, conglomerates, and siltstones are exposed in the foothills province. Sediments from these formations are carried seaward from the Brooks Range and Northslope by several rivers including the Colville River, the largest in northern Alaska with a drainage basin of ~50,000 km<sup>2</sup> and an annual sediment load of 5 to 10 million metric tons (Arnborg and others 1967; Naidu and Mowatt 1974).

The depositional environment of the inner shelf of the Beaufort Sea grades gently from the shoreline to a water depth of 30 m and is interrupted by low deltaic mudflats, sandbars, and narrow gravel and sand barrier islands. Clay-size (<2 μm) sediments make up an average of 13±9% of the sediments on the inner shelf (Crecelius and others 1991). The sand- and silt-rich sediment on the shelf is generally <5 m thick (Reimnitz and Barnes 1974). Sediment deposition is patchy (Weiss and Naidu 1986; Naidu and others 2001) and Reimnitz and Wolf (1998) suggest that the entire area is a net erosional environment during the Holocene. Coastal waters are characterized by nine to 11 months of nearly complete sea ice cover. Sea ice generally begins to form during late September to October and break-up is usually complete by the beginning of August. The presence and movement of ice along the shelf can greatly influence sediment transport, deposition, and reworking.

## Methods

Surface sediments (0–2 cm) were collected using a modified-ponar grab sampler. Sediment cores were collected using a 10-cm-diameter, 1-m-long, gravity corer. Sediments were removed from the sampler or cores using Teflon spatulas, then placed into 75-ml plastic vials and

kept cold until they were returned to the laboratory, where they were stored frozen. Sediment cores were subsectioned in 0.5-cm intervals from 0 to 5 cm and in 1.0-cm intervals at depths of >5 cm. Samples for grain size analysis were wrapped in plastic bags and stored at 4 °C. River water samples were collected directly in acid-washed, low-density polyethylene bottles and filtered through acid-washed, 0.4-μm polycarbonate membrane filters to obtain suspended sediments (Rember and Trefry 2003).

Prior to analysis for trace metals, 0.4 g of freeze-dried, homogenized sediment and a certified reference material (CRM) were totally digested in Teflon beakers using concentrated, high-purity HF-HNO<sub>3</sub>-HClO<sub>4</sub> as described in Trefry and Metz (1984). Sediment samples to be analyzed for Hg were digested separately by heating 2 to 4 g of wet sediment in acid-washed, sealed, polypropylene centrifuge tubes with 4 ml HNO<sub>3</sub> and 2 ml H<sub>2</sub>SO<sub>4</sub> following the method of Adeloju and others (1994). Filters containing 1 to 15 mg of suspended sediment were digested using the method described by Trefry and Trocine (1991). Briefly, the filters bearing suspended sediments were placed in stoppered, 15-ml Teflon test tubes and the sediments were completely decomposed and dissolved using Ultrex II HNO<sub>3</sub>, HF and HCl.

Labware used for sample preparation was acid washed with hot, 8 N HNO<sub>3</sub> and rinsed three times with distilled, deionized water (DDW). Two procedural blanks, two duplicate samples and two CRMs were prepared with each set of 40 samples. The CRM used was the marine sediment MESS-2 issued by the National Research Council of Canada (NRC).

Bottom sediment samples, CRMs, and procedural and reagent blanks were analyzed as follows: (1) Al, Cr, Cu, Fe, Mn, Ni, V and Zn by flame atomic absorption spectrometry (FAAS) using a Perkin-Elmer (PE) Model 4000 instrument, (2) Ag and As by Zeeman graphite furnace atomic absorption spectrometry (GFAAS) using a PE Model 5100 instrument, (3) Ba, Be, Cd, Co, Pb, Sb, and Tl by inductively coupled plasma-mass spectrometry (ICP-MS) using a PE Model ELAN 5000 instrument, and (4) total Hg by cold vapor atomic absorption spectrometry (CVAAS) using a Laboratory Data Control Model 1235 Mercury Monitor. The above methods are similar to methods described by the United States Environmental Protection Agency (EPA) for Series 7000 FAAS and GFAAS, Series 7470 CVAAS and Series 6010A ICP-MS (United States Environmental Protection Agency 1991). Analytical precision (coefficient of variation, CV), based on replicate analysis of 15 sediment samples, averaged ≤ 2% for Al, Ba, Co, Cu, Mn, Ni and Zn; ≤ 3% for Cd, Cr, Fe, Pb, Sb, Tl, and V; ≤ 5% for As, Be and Hg and 6% for Ag. Concentrations of Al, As, Ba, Cr, Cu, Fe, Pb and Zn in suspended sediments from rivers were determined by similar techniques, as described in Rember and Trefry (2003).

The total organic carbon (TOC) content of the sediments was determined following treatment with H<sub>3</sub>PO<sub>4</sub> to remove inorganic carbon. Then, 200 to 400 mg of carbonate-free sediment were combusted, after the addition of powdered vanadium pentoxide, at 900 °C in a Shimadzu TOC-5050A

instrument linked to a solid sampling module (SSM-5000A). A calibration curve was constructed with pure sucrose and checked at every 10 samples by analyzing the CRM MESS-2. Final concentrations of TOC were corrected to account for the increase in sediment mass following the  $H_3PO_4$  treatment; precision averaged 2.4%. Grain size was determined by the wet sieving and pipette methods of Folk (1974).

Sediment geochronology was determined using excess  $^{210}Pb$  and  $^{137}Cs$  following methods described by Kang and others (2000). Vials containing about 10 g of freeze-dried sediments were counted for 2 to 3 days until peak areas were sufficient to provide <10% counting error for total  $^{210}Pb$ . The activities of  $^{210}Pb$ ,  $^{214}Pb$ ,  $^{214}Bi$  and  $^{137}Cs$  were determined using a well-type, intrinsic germanium detector (WiGe, Princeton Gamma Tech). Detector efficiency was determined using the following: NBS 4350B, river sediment and NBS 4354, freshwater lake sediment from National Institute of Standards and Technology (NIST) and RGU-1 and RGTh-1 from the International Atomic Energy Agency. The specific activity (dpm/g) of each sediment sample was calculated from the detector efficiency, gamma intensity, geometry factor, and sample weight (Kang and others 2000). All values were decay-corrected to the date of coring. Errors are shown on the basis of 1- $\sigma$  counting statistics.

Quality assurance and quality control during this work included analysis of procedural blanks, spiked and replicate sample, as well as CRMs. Results for concentrations of metals and TOC in the CRMs agreed within the 95% confidence interval of certified concentrations.

## Results and discussion

### Normalizing sediment metal concentrations

Considerable variability was found for concentrations of all 18 metals and TOC in surface and subsurface sediments from the study area as suggested by the ranges of values in Table 1. Creclius and others (1991) showed that sediment grain size was a primary variable controlling concentrations of metals in surface sediments from the study area. Levels of silt plus clay from the present study ranged from 1 to 98.8% (Table 1). Granulometry data from the present study show no simple distribution patterns for sand, silt and clay throughout the study area. Furthermore, the fractional amounts of sand, silt and clay found at some

nearshore sites vary from year to year. Samples from the sediment cores contained a greater fraction of silt + clay (Table 1) because a concerted effort was made to sample finer-grained sediments during the coring effort.

To help resolve observed variability, sediment metal values from this study were initially normalized to concentrations of Al. Natural levels of Al and many trace metals vary collectively as a function of sediment grain size, organic carbon content and mineralogy, with higher metal levels in fine-grained aluminosilicates (clays) and lower metal levels in coarse-grained quartz sand and carbonate shell fragments. Normalization is a useful precursor to more detailed evaluation of spatial and historical trends as well as possible diagenetic effects on metal concentrations, as discussed below.

In sediments from this study, positive linear relationships are observed for Al versus percent silt+clay ( $r=0.89$ ; Fig. 2a), percent clay ( $r=0.75$ ) and TOC ( $r=0.74$ ). Aluminum concentrations also correlate well with levels of Fe ( $r=0.94$ ; Fig. 2b) throughout the study area. Aluminum and Fe are present at percent levels in the sediment, relative to concentrations in parts per million ( $\mu g/g$ ) for trace metals; and, Al and Fe are not commonly introduced to marine sediments in sizeable amounts by anthropogenic processes. Therefore, any fractional changes in concentrations of Al and Fe are expected to be small relative to possible shifts in concentrations of trace metals due to anthropogenic or diagenetic influences. Concentrations of Fe can be altered during early chemical diagenesis; however, the net effect on solid-phase concentrations of Fe is generally small (e.g., <10% change in Fe/Al ratio; Trefry and Presley 1982).

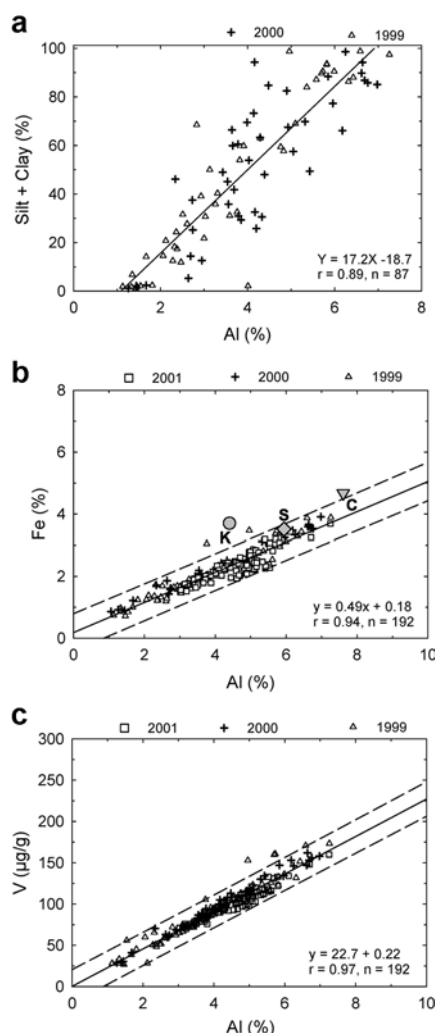
Mean concentrations of Al and Fe in suspended sediments collected during 2000 and 2001 from the Sagavanirktok and Colville Rivers that supply sediments to the study area plot within the 99% prediction interval developed for bottom sediments (Fig. 2b). Furthermore, concentrations of Al and Fe in the river-suspended sediments plot at the higher end of the continuum in Fig. 2b due to a greater fraction of clay-rich particles suspended in the rivers. Suspended sediments from the Kuparuk River had higher levels of Fe during part of the summer when concentrations of suspended solids were low ( $\sim 4$  mg/l; Rember and Trefry 2003), thereby shifting the average value in Fig. 2b above the upper prediction interval.

Under natural conditions, concentrations of selected trace metals in sediments will commonly follow a strong linear trend versus Al and/or Fe in a given depositional

**Table 1**

Summary data for metals, total organic carbon (TOC) and granulometry in sediments from the coastal Beaufort Sea

Samples		Ag ( $\mu g/g$ )	Al (%)	As ( $\mu g/g$ )	Ba ( $\mu g/g$ )	Be ( $\mu g/g$ )	Cd ( $\mu g/g$ )	Co ( $\mu g/g$ )	Cr ( $\mu g/g$ )	Cu ( $\mu g/g$ )
Surface sediment 1999 and 2000	Mean $\pm$ Std. Dev. ( $n=88$ )	0.11 $\pm$ 0.05	3.93 $\pm$ 1.63	11.1 $\pm$ 4.1	394 $\pm$ 146	1.2 $\pm$ 0.50	0.22 $\pm$ 0.12	7.3 $\pm$ 3.3	56.9 $\pm$ 23.4	18.9 $\pm$ 10.5
Sediment cores 2001	Mean $\pm$ Std. Dev. ( $n=104$ )	0.12 $\pm$ 0.05	4.48 $\pm$ 0.80	9.3 $\pm$ 3.2	460 $\pm$ 60	1.1 $\pm$ 0.2	0.26 $\pm$ 0.10	9.0 $\pm$ 2.0	64.4 $\pm$ 9.6	21.8 $\pm$ 6.5
All data	Range	0.03–0.44	1.1–7.3	4.2–28.4	155–753	0.3–2.3	0.03–0.82	2.2–18.6	12.7–104	3.6–50.2



**Fig. 2.**

Concentrations in sediment for Al versus a) silt+clay, b) Fe, and c) V. Equations are from linear regression calculations,  $r$  is the correlation coefficient and  $n$  is the number of data points. Dashed lines show 99% prediction interval. Points marked with large letters on the Fe graph are for suspended sediment from the Sagavanirktok (S), Kuparuk (K) and Colville (C) rivers

environment. For example, concentrations of V correlate well with Al ( $r=0.97$ , Fig. 2c) and Fe ( $r=0.96$ ) in all surface and subsurface sediment samples collected. The broad range in V concentrations, yet good linear fit for Al (and Fe) versus V, is consistent with mixing of relatively uniform composition, metal-rich aluminosilicate phases with metal-poor quartz sand and carbonates. Vanadium levels in natural sediments from the Beaufort Sea are predicted

to follow the trend presented in Fig. 2c. Thus, the strong relationship for Al versus V in Fig. 2c also supports a lack of anthropogenic inputs of V and no impact on V levels due to sediment diagenesis. The three points that plot slightly above the upper prediction interval in Fig. 2c exceed that limit by <10% and are consistent with the statistical boundaries of a 99% prediction interval. Creclius and others (1991) used V, in the absence of data for Al and Fe, to normalize concentrations of other trace metals in sediments from the coastal Beaufort Sea. Aluminum was chosen for normalization in the present study because it is least affected by chemical weathering and diagenesis.

Graphs for Al versus Pb, Cu, Cr and Ni (Fig. 3) also show strong ( $r>0.87$ ) linear relationships with no points that plot at more than 10% above the upper prediction interval. Correlation coefficients for Al versus Co (0.85), Sb (0.84) and Tl (0.86) also are strong with no data points that plot at >10% above the upper prediction interval. Collectively, the results support the conclusion that no discernible anthropogenic inputs of these seven metals can be identified. Available metal data for suspended sediments from source rivers (Pb, Cu, Cr, Zn; Fig. 3) show that the metal/Al ratios for river particles fit within, or very close to, the prediction intervals found for bottom sediments in the coastal Beaufort Sea. These similarities in metal/Al ratios for river source material and bottom sediment, when linked to data for sediment cores discussed below, are used to evaluate whether diagenetic impacts distort the historical record for these metals in area sediments. Concentrations of metals in the river-suspended matter plotted at the higher end of the metal/Al continuum (Fig. 3) as previously described for Al and Fe.

In contrast with the metals discussed above, concentrations at one or more locations were >10% above the upper prediction interval on the metal versus Al plots for Zn, Hg and Ba (Fig. 3). An anomalous Zn value was observed for site 5H (near Endicott Island), and anomalous values for Hg and Ba were found for sediments collected near Northstar Island (Fig. 3). Considerable industrial activity is common to both areas; however, the degree of metal enrichment averaged <25% more than the value at the upper prediction limit for a given concentration of Al. In addition to the anomalies from the 1999 to 2001 data for Ba described above, concentrations of Ba in samples collected during 1989 (Boehm and others 1990) from sites 7A and 7G in western Harrison Bay also plot above the upper limit of the 99% prediction interval (Fig. 3). Elevated Ba levels at sites 7A and 7G in Harrison Bay during

Fe (%)	Hg (µg/g)	Mn (µg/g)	Ni (µg/g)	Pb (µg/g)	Sb (µg/g)	Tl (µg/g)	V (µg/g)	Zn (µg/g)	TOC (%)	Silt+Clay (%)
2.21±0.87	0.041±0.029	317±144	24.3±10.5	9.7±4.9	0.50±0.21	0.40±0.18	92.6±40.1	70.1±31.7	0.86±0.70	46.9±30.4
2.30±0.44	0.054±0.011	294±117	31.9±6.3	10.3±2.5	0.62±0.12	0.47±0.07	99.7±17.4	91.5±22.6	1.13±0.54	72.8±18.8
0.7–3.9	0.003–0.20	62–898	6.0–48.4	3.2–22.3	0.15–1.14	0.12–0.92	26.9–173	14.8–157	0.01–4.41	1.0–98.8

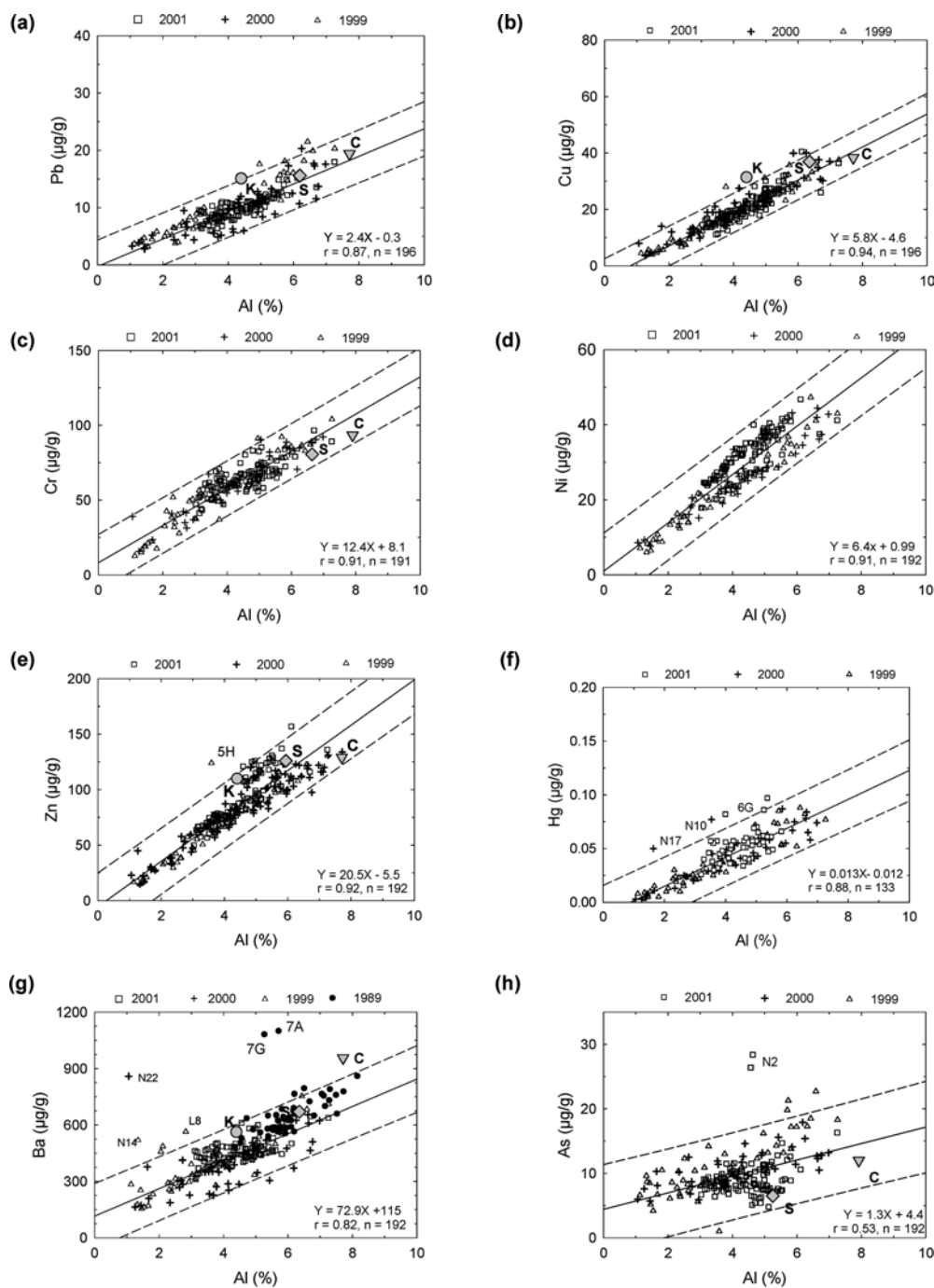


Fig. 3

Concentrations in sediment for Al versus Pb (a), Cu (b), Cr (c), Ni (d), Zn (e), Hg (f), Ba (g) and As (h). Equations are from linear regression calculations,  $r$  is the correlation coefficient and  $n$  is the total number of data points. Dashed lines above and below the regression line show the 99% prediction interval. Points marked with large letters on selected graphs are for suspended sediment from the Sagavanirktok (S), Kuparuk (K) and Colville (C) rivers. Data for sites identified on the graph were not included in the regression calculations

1989 are consistent with exploratory drilling and drilling residues in the area (Snyder-Conn and others 1990; Creclius and others 1991). The sensitivity of normalizing to Al is demonstrated by calculating the excess Ba concentration as total Ba minus natural Ba, where the natural Ba level determined from Fig. 3g is the value for Ba at the upper prediction interval for a given Al concentration. The most anomalous sample point in Fig. 3g from station N22 has an excess Ba level of  $509 \mu\text{g/g}$  ( $859-350 \mu\text{g/g}$ ) that can be explained by the presence of barite at only 0.09% of the total sediment mass, where pure barite contains Ba at  $588,000 \mu\text{g/g}$ . Subtle enhancement of Ba concentrations at site L8 (1999) may be a remnant of exploratory drilling in

the area in 1982 and 1997 (URS 2001). Although these various anomalies are minor, they do support the sensitivity of Al versus metal graphs and can help focus future field investigations.

Concentrations of Ag and Be were low and somewhat more variable (Table 1); therefore the correlations versus Al were weaker (Ag,  $r=0.57$ ; Be,  $r=0.69$ ). Background levels of As in the study area were high relative to average marine sediment. This point was previously noted throughout the Beaufort Sea by Valette-Silver and others (1999). In the present study, the authors found As levels in suspended sediments from local rivers to average  $15 \pm 5 \mu\text{g/g}$  ( $n=17$ ). Data shown on Fig. 3h for As are more scattered with a

**Table 2**

Summary of results for metal/Al ratios and related coefficients of variation (CV) in sediment cores from the following locations: Prudhoe Bay ( $n=29$ ), Endicott Island ( $n=13$ ), Pole Island 3A ( $n=10$ ), Colville Delta (6A,  $n=23$ ; 6G,  $n=14$ ), Northstar Island (N2,  $n=15$ )

Metal	(Metal/Al) ( $\times 10^{-4}$ ) All 104 samples	Range for CV (%) for (Metal/Al) for all six cores	Average CV (%) for (Metal/Al) from each of six cores
Ni/Al	7.1 $\pm$ 0.9	2–6	3.5
V/Al	22.3 $\pm$ 1.2	3–6	3.6
Zn/Al	20.3 $\pm$ 2.6	2–6	4.4
Fe/Al	5100 $\pm$ 200	2–10	4.6
Cr/Al	14.6 $\pm$ 1.8	4–6	5.1
Ba/Al	105 $\pm$ 16	5–8	5.8
Co/Al	2.0 $\pm$ 0.4	3–10	6.1
Tl/Al	0.11 $\pm$ 0.01	4–11	6.4
Be/Al	0.24 $\pm$ 0.3	5–14	7.7
Pb/Al	2.3 $\pm$ 0.4	4–16	8.7
Sb/Al	0.14 $\pm$ 0.02	5–15	9.4
Cu/Al	4.8 $\pm$ 1.0	7–14	10.2
Cd/Al	0.06 $\pm$ 0.02	12–19	14.8
As/Al	2.1 $\pm$ 0.7	11–22	15.1
Mn/Al	65 $\pm$ 19	8–42	20.4
Ag/Al	0.03 $\pm$ 0.01	16–39	26.5

lower  $r$  value of 0.53 and several points above the upper prediction interval, (Fig. 3h). These trends for As also were observed for Mn and Cd (Table 2) and are related to diagenetic impacts as discussed below.

#### Temporal distribution of sediment metal concentrations

The historical record of metal levels in sediments from the coastal Beaufort Sea is developed here from age-dated cores. Metal data from sediment cores, coupled with results for river-suspended particles, also are used to help identify possible diagenetic effects. Collecting sediment cores suitable for age-dating in the study area is complicated by bottom-fast ice, ice gouging, low net sediment accumulation rates, low activities of excess  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$ , and storm-induced resuspension and transport of sediments offshore into deeper water. Even when coring sites were chosen based on bathymetry (i.e., semi-restricted basins) or surface sediment composition (i.e., >90% silt plus clay), only one in four cores was viable for establishing a geochronology over the past 50 to 100 years. In many instances, extremely low levels of excess  $^{210}\text{Pb}$  (<0.2 dpm/g) or  $^{137}\text{Cs}$  (<0.02 dpm/g) were found, even in the top 0.5 cm of sediment. Such observations are consistent with previous reports that characterize this coastal area as a net erosional environment (Reimnitz and Wolf 1998).

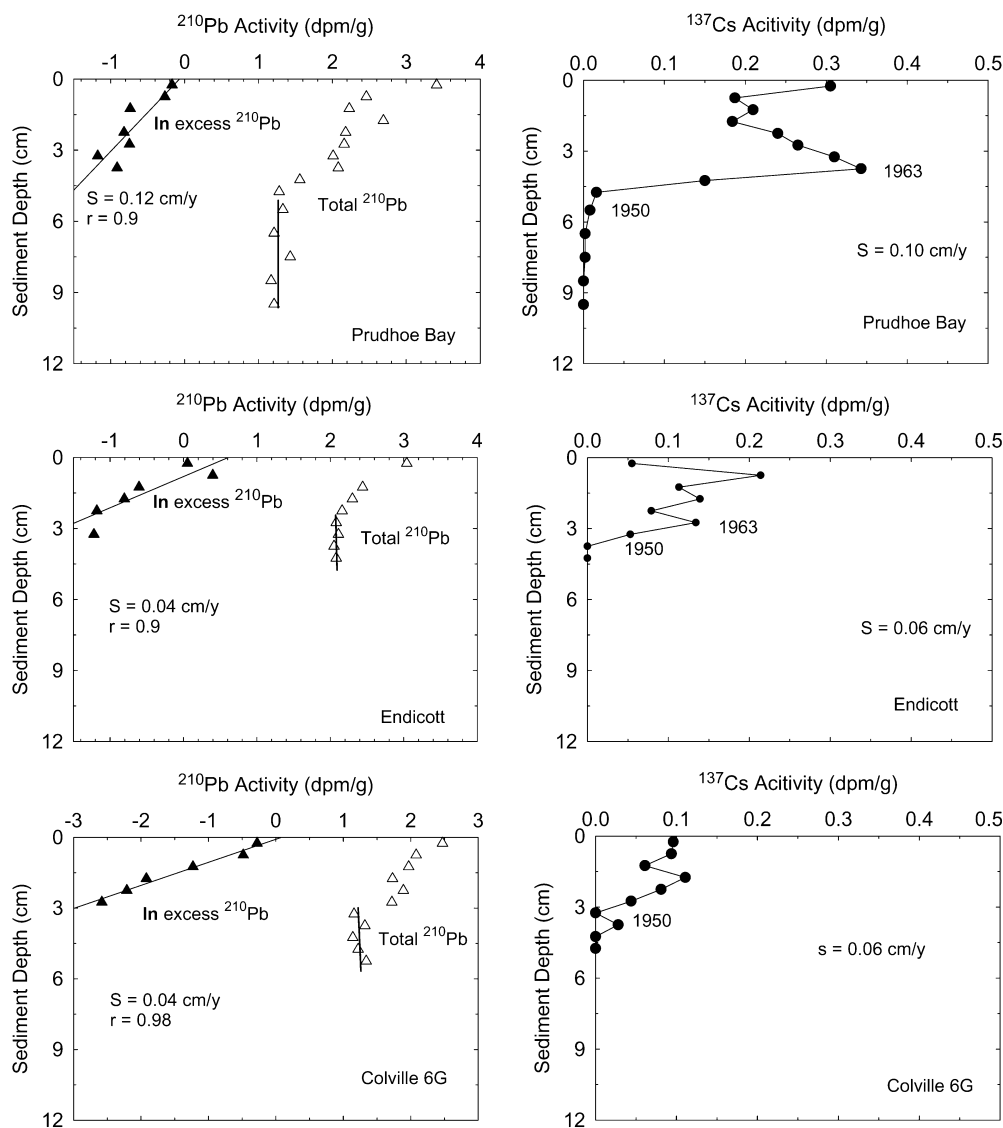
Past efforts to reconstruct recent geochronology for coastal sediments from this nearshore area of the Beaufort Sea (Weiss and Naidu 1986; Naidu and others 2001) have encountered many of the same difficulties reported here. Weiss and Naidu (1986) used vertical profiles for the activity of total  $^{210}\text{Pb}$  to calculate sedimentation rates of 0.6 to 1 cm/year at sites in Simpson Lagoon, near stations 6A and 6G (Fig. 1); however, the activities for total  $^{210}\text{Pb}$

averaged <2 dpm/g with variable texture in each core. In recent work, Naidu and others (2001) reported no excess  $^{210}\text{Pb}$  and no detectable  $^{137}\text{Cs}$  in a core from Simpson Lagoon whereas they found levels of excess  $^{210}\text{Pb}$  levels at 0.9 to 1.2 dpm/g and  $^{137}\text{Cs}$  activities of 0.2 dpm/g at a site near our station 3B (Fig. 1). Based on inherent difficulties with area sediments, a primary goal of the geochronology effort for the present study was to collect some representative sediment that was deposited prior to the onset of development during the late 1960s and early 1970s and some sediments that was deposited post-development. Detailed results for geochronology were obtained for three sites: (1) station P1 in Prudhoe Bay, (2) station E1, just east of Endicott Island near the mouth of the Sagavanirktok River, and (3) station 6G in the eastern section of the Colville River delta (Fig. 1). At stations L2, 3A, N2 and 6A, either no detectable excess  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$  were found or very low levels were found only in the top 0.5 cm. The locations of these sites with little or no detectable recent sediments extend across the study area and support the contention that deposition of present-day sediment is patchy and thin.

In Prudhoe Bay (station P1), the maximum activity of excess  $^{210}\text{Pb}$  in the surface layer of sediment was 0.84 dpm/g with detectable decay to a depth of ~5 cm and a calculated sedimentation rate of 0.11 $\pm$ 0.02 cm/year (Fig. 4a). The vertical profile for  $^{137}\text{Cs}$  supports the results from excess  $^{210}\text{Pb}$  with a sedimentation rate of 0.10 cm/year based on the 1950 appearance of  $^{137}\text{Cs}$  at ~5 cm and the observed 1963 peak at ~3.75 cm (Fig. 4b). Samples from depths >4 cm were most likely deposited before development began during the 1960s in the area of Prudhoe Bay. Preservation of such detail in the geochronological record over such a short depth interval for this site is surprising; however, boat traffic in the inner portion of the Prudhoe Bay is rare and water depths in the deepest portion of the secluded bay (~3 m) are sufficient to minimize the effects of bottom-fast ice and ice gouging. Even if a combination of sediment deposition and winnowing at station P1 created an apparent sedimentation rate, it seems reasonable to suggest that the top 1 to 2 cm contain post-development sediments and that sediments found deeper than 4 to 5 cm were deposited prior to development.

At station E1, the activity of excess  $^{210}\text{Pb}$  was 1.1 dpm/g at 0 to 0.5 cm and 1.5 dpm/g at 0.5 to 1.0 cm (Fig. 4c). The calculated sedimentation rate based on excess  $^{210}\text{Pb}$  is about 0.04 $\pm$ 0.02 cm/year. Activities of  $^{137}\text{Cs}$  were detectable to a depth of 3.25 cm, yielding a sedimentation rate of ~0.06 cm/year (Fig. 4d), a value that is reasonably consistent with that obtained from the profile for excess  $^{210}\text{Pb}$  considering the uncertainty in the data. These data for station E1 support the likelihood that sediments at depths >4 cm pre-date development.

Additional support for low sedimentation rates at stations P1 and E1 can be developed from data for river inputs of sediment. The Sagavanirktok River, the major river carrying sediments into this area, is estimated to have an annual sediment load of about  $0.3 \times 10^6$  mt (Rember and Trefry 2003). The depositional area for these sediments in



**Fig. 4a-f**  
Vertical profiles for activities of excess  $^{210}\text{Pb}$ , total  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$  for sediment cores from sites in Prudhoe Bay (P1), near the Endicott development (E1) and on the Colville River delta (6G)

the coastal Beaufort Sea is at least  $1,000 \text{ km}^2$  to yield an estimated deposition rate of  $\sim 0.02 \text{ cm/year}$  based on a sediment bulk density of  $1.6 \text{ g/cm}^3$  ( $[0.3 \times 10^{12} \text{ g dry sediment}/1,000 \times 10^{10} \text{ cm}^2] \times [(1.6 \text{ g wet sediment}/\text{cm}^3)/(2.6 \text{ g dry sediment}/\text{cm}^3)]$ ). As previously noted, the study area may be net erosional at this time (Reimnitz and Wolf 1998).

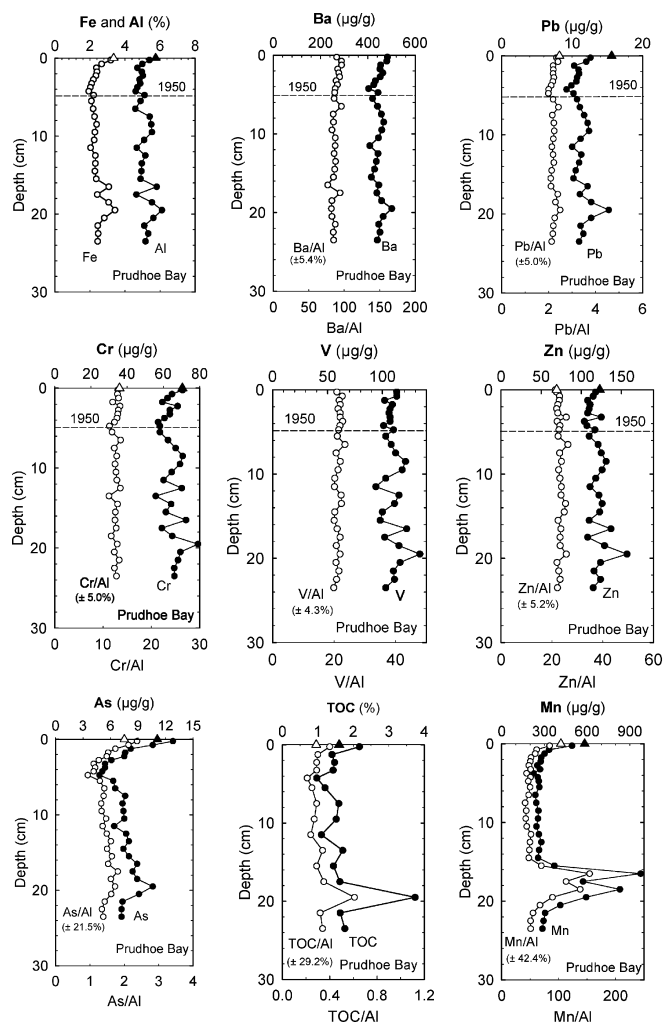
In the Colville River delta at station 6G, the maximum activity of excess  $^{210}\text{Pb}$  was  $0.76 \text{ dpm/g}$  and the calculated sedimentation rate was  $0.04 \pm 0.02 \text{ cm/year}$  (Fig. 4e). The  $^{137}\text{Cs}$  profile supports a sediment accumulation rate of  $\sim 0.06 \text{ cm/year}$  (Fig. 4f). Once again, the record of sediment input since the 1950s is sequestered in the top 4 to 5 cm of sediment. At nearby station 6A, detectable levels of excess  $^{210}\text{Pb}$  at  $0.27 \text{ dpm/g}$  were observed only in the top 0.5 cm of the sediment column. This latter result is consistent with that of Naidu and others (2001) for the same area.

Concentrations of trace metals were determined for 104 samples from six cores (P1, E1, 3A, 6A, 6G and N2). Some variability in concentrations of metals was observed in

each core (Table 1 and Figs. 5, 6), mainly due to variations in amounts of fine-grained sediment. However, the CV for metal/Al ratios averaged 10% in each of the six cores for Ni, V, Zn, Fe, Cr, Ba, Co, Tl, Be, Pb, Sb and Cu (Table 2). Such uniform metal/Al ratios support long-term deposition of sediments with uniform composition and no identifiable impact from diagenesis for these metals. These conclusions are further supported below through detailed evaluation of cores from stations P1 and 6G and from data for river-suspended sediments.

In Prudhoe Bay (station P1), concentrations of Al and Fe follow parallel trends down core (Fig. 5). Variations in concentrations of Al and Fe in the core result from shifts in the fraction of sand, silt and clay deposited during a given time period. Vertical distributions for Ba, Pb, Cr, V and Zn (Fig. 5), as well as Be, Cu, Ni, Sb and Tl, follow trends similar to those observed for Al and Fe with the CVs for the metal/Al ratios all  $< 8\%$ . These vertical profiles support long-term deposition of sediments with no discernible shifts in metal/Al ratios or anthropogenic inputs. Metal concentrations and the metal/Al ratios for





**Fig. 5**

Vertical profiles for concentrations and ratios to Al in sediment core from Prudhoe Bay (station PI) for Fe and Al, Ba, Pb, Cr, V, Zn, As, total organic carbon (TOC), and Mn. Triangles plotted at 0 cm show concentrations and metal/Al ratios for suspended sediment from the Sagavanirktok River. Numbers in parentheses show coefficient of variation for metal/Al ratio. Graphs with no line identifying a sediment age of 1950 (As, TOC and Mn) lack geochronological significance due to post-depositional diagenesis/diffusion

Fe, Al, Pb, Cr, Zn in suspended sediments from the Sagavanirktok River are plotted at the top of each vertical profile in Fig. 5 and are coincident with values found in the surficial layers of the core. This continuity, in conjunction with the vertical profiles, supports no discernible diagenetic impacts in the vertical distributions for Ag, Ba, Be, Co, Cr, Cu, Hg, Ni, Pb, Sb, Tl, V and Zn.

Concentrations of TOC (and the TOC/Al ratio) are elevated by about 30% in the top 0.5 cm and by a factor of ~2 at about 20 cm relative to other sections in the core (Fig. 5). Coincident with elevated levels of TOC in the surface layer of sediment are higher values of As/Al and slightly lower levels of Mn/Al (Fig. 5). Furthermore, the Mn/Al ratios are enriched in the layers at ~20 cm where concentrations of TOC are high. Diagenetic impacts on Mn in sediments are well studied and can lead to a variety of perturbations in concentrations of Mn (Trefry and Presley

1982; Gobeil and others 1997). In the top 0.5 cm of the core from Prudhoe Bay, concentrations of Mn are about double levels found in subsequent layers to a depth of 15 cm, yet the Mn and Mn/Al levels in the top 0.5 cm of sediment are about 25% lower than in river-suspended sediment. One possible explanation for this observation is that particles deposited in the sediment lose Mn via reductive dissolution and diffusion of dissolved  $Mn^{2+}$  from the sediments to the overlying water column (e.g., Gobeil and others 1997). The onset of this process in Prudhoe Bay occurs in the top layer of sediment and reaches completion at depths >1 cm. Such behavior (reducing conditions in the top 1 cm) seems inconsistent with a sedimentation rate of 0.1 cm/year and may reflect processes that occur in a stagnant, thin (<1-m-thick) layer of water trapped under 2 m of ice during 8 months of the year. A similar impact on As levels is observed in this core. The loss of As from the sediments is related to release of As from sediments to the overlying water during diagenetic remobilization under reducing conditions (Farmer and Lovell 1986). Overall, diagenetic effects alter the vertical distributions of Mn, As and, to some lesser degree, Cd, but none of the other metals studied are impacted.

At station 6G, on the Colville River delta, post-development sediments appear to be restricted to the top 3 cm of the sediment column. No discernible differences in metal/Al ratios are observed for all metals except Mn (Fig. 6). Available data for suspended sediments from the Colville River show that concentrations of Fe, Al, Pb and Cr are higher than observed for sediments at station 6G; however, the metal/Al ratios are similar (Fig. 6). No indications of anthropogenic inputs of metals are found in the core from station 6G and only concentrations of Mn are impacted by diagenesis.

Metal data from other cores in the area of Pole Island (station 3A) to Northstar Island, including stations 3A, L2, E1 and N2, show similar trends with uniform metal/Al ratios throughout the cores (Table 2). In some cases, the surficial layer of sediment could be quite old as demonstrated by undetectable levels of  $^{137}Cs$  and excess  $^{210}Pb$ . Concentrations of Mn, As and Cd show varying amounts of distortion due to diagenetic effects. Overall, concentrations of Ag, Ba, Be, Co, Cr, Cu, Hg, Ni, Pb, Sb, Tl, V and Zn in cores from these five sites are unimpacted by anthropogenic inputs or diagenesis.

## Conclusions

Region wide, nearly all sediments collected contained natural levels of Ag, Ba, Be, Co, Cr, Cu, Hg, Ni, Pb, Sb, Tl, V and Zn. About eight exceptions (or 0.7% of the 1,222 data points from 94 surface samples) were identified by clear, positive anomalies (>10% above upper prediction interval) on the metal/Al plots. These exceptions include the following: Ag (N14 in 1999), Ba (N14 in 1999; L08 in 1999 and N22 in 2000), Hg (N10 and N17 in 2000), Sb (5(10) in 1999) and Zn (5H in 1999). Most of these minor

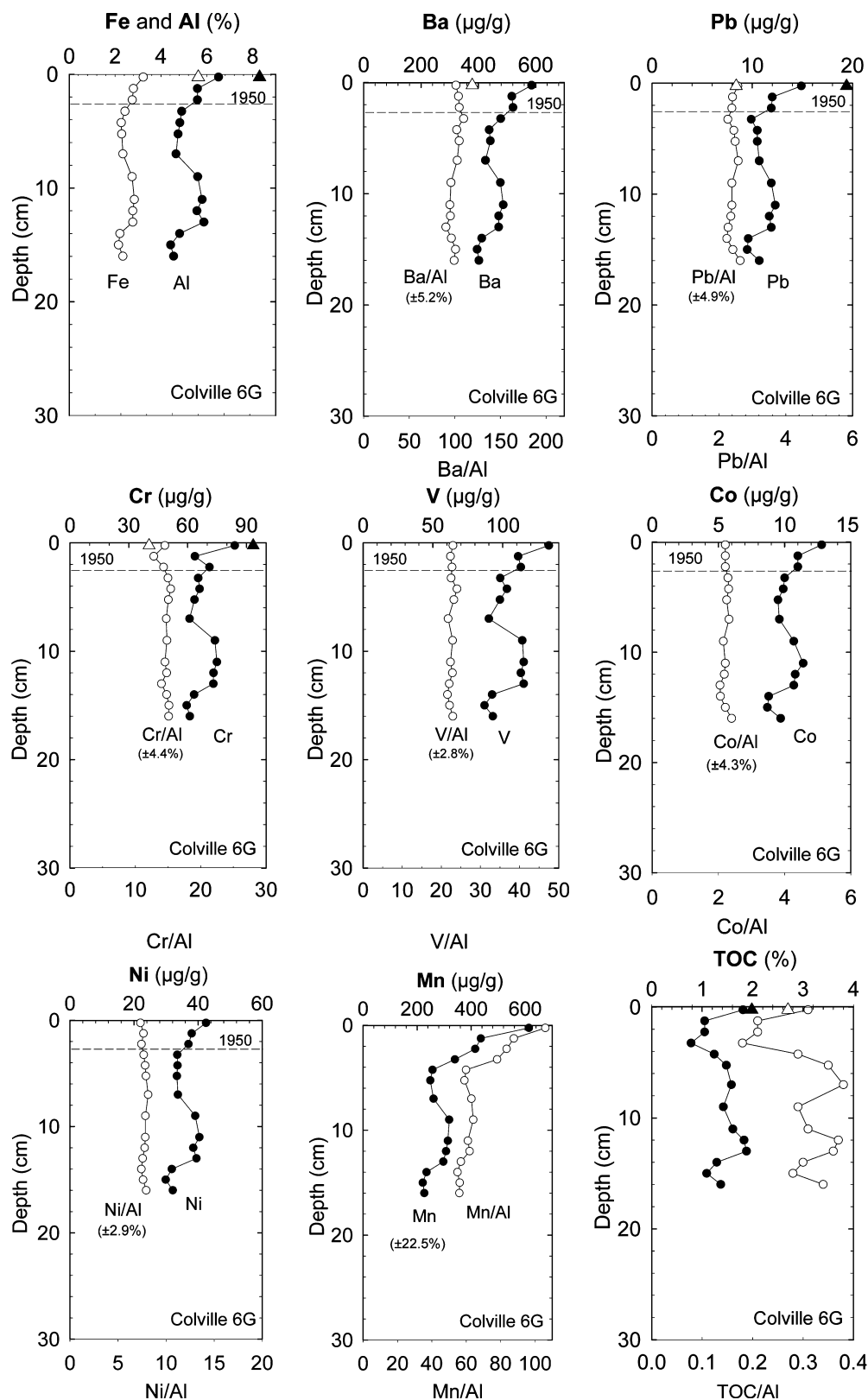


Fig. 6

Vertical profiles for concentrations and ratios to Al in sediment core from Colville River delta (station 6G) for Fe and Al, Ba, Pb, Cr, V, Co, Ni, Mn and total organic carbon (TOC). Triangles plotted at 0 cm show concentrations and metal/Al ratios for suspended sediment from the Colville River. Numbers in parentheses show coefficient of variation for metal/Al ratio. Graphs with no line identifying a sediment age of 1950 (Mn and TOC) lack geochronological significance due to post-depositional diagenesis/diffusion

deviations were found in the most active areas between West Dock (near station 5D) and Northstar Island; however, the instances and magnitude of the deviations show that, with respect to trace metals, the sediments are essentially pristine. In a 1989 study that incorporated a

larger geographical area (Boehm and others 1990), concentrations of Ba and/or Cr were elevated at locations in Harrison Bay (7A, 7B and 7G) and near the mouth of the Canning River (2E). Thus, in addition to the patchy distribution of sediment types in the study area,

a few instances of minor contamination have been observed.

Early detection of potential environmental problems near industrial sites is the goal at many locations around the Earth, including the coastal waters of the western Beaufort Sea. Because many trace metals are a ubiquitous part of modern industry, metals in sediments can often help identify subtle increases in the accumulation of potential pollutants before they lead to an adverse environmental consequence. For example, in sediments from the coastal Beaufort Sea with an Al concentration of 6.0%, natural Pb levels are predicted to be  $15 \pm 5 \mu\text{g/g}$  with 99% confidence (Fig. 3a). Data for two sediment samples represented on Fig. 3a with slightly  $>6\%$  Al show that Pb levels of 20.3 and  $21.5 \mu\text{g/g}$  plot slightly above the upper prediction limit. These samples are from stations N23 and 5(10), respectively. The slight degree of Pb enrichment and the locations of these two sites near Northstar Island help focus future efforts in this area.

Overall, the constancy of metal/Al ratios in (1) river-suspended sediment, (2) the surface layers of bottom sediments and (3) deeper, older layers in bottom sediments show that anthropogenic inputs of trace metals have not significantly elevated metals levels in sediments in areas of offshore oil exploration and production in the coastal Beaufort Sea. The results presented in this study provide a framework for continued efforts to assess any cumulative impacts of offshore development in the coastal Beaufort Sea. However, the sediments in this region are dynamic and care must be taken to assure that investigators know whether sediment samples that are collected are representative of the most recent inputs.

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