

Salem Sediment Chemistry Results

July 28, 1997



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U.S. Army Corps of Engineers
696 Virginia Road
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Mr. John Caskey
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One Blackburn Drive
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Ms. Olga Quirin
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Boston, MA 02203

Mr. Philip Morrison
U.S. Fish and Wildlife Service
22 Bridge Street, Unit #1
Concord, NH 03301-4901

RE: **SALEM SEDIMENT CHEMISTRY RESULTS**
MASSACHUSETTS DREDGED MATERIAL MANAGEMENT PLAN
MGI #14787

Dear Sir/Madam:

Enclosed is a report that presents the bulk chemistry results for the above referenced project. Please review this material to determine the suitability of these sediments for open water disposal at the Massachusetts Bay Disposal Site (MBDS).

This report is organized as follows:

- Attachment 1 - Summary Tables
- Attachment 2 - MBDS Reference Data
- Attachment 3 - Grain Size Data for Individual Samples
- Attachment 4 - Grain Size Data for Composite Samples
- Attachment 5 - Metals Report
- Attachment 6 - PAH Report
- Attachment 7 - PCB/Pesticide Report
- Attachment 8 - Sampling Report
- Attachment 9 - Core Logs
- Attachment 10 - Sampling Maps

The sampling and testing plan was carried out in accordance with the specifications of the January 2, 1998 draft sediment sampling plan developed by the Army Corps of Engineers (ACE) as reiterated in the Dredged Material Management Plan Phase 2 Sediment Sampling Plans, February 13, 1998. There were a total of 18 stations sampled as shown in the Figures in Attachment 10. Individual samples were analyzed for grain size and reported to the Army Corps of Engineers

(ACE). A compositing scheme was devised by the ACE (Table 1) which consisted of 18 composite samples that were analyzed for metals, total organic carbon (TOC), % solids, TPH, PAHs, pesticides and PCBs.

The summary results are presented in Attachment 1. An annotated copy of a typical summary table (Figures 2a and 2b) explains these summary tables. The summary tables are also provided in electronic format (MS Excel). Laboratory reports containing raw data and quality assurance data are provided in the Attachments 3 - 7.



The summary tables present bulk chemistry information for the composite samples. This data is compared to the EPA/DAMOS reference data from MBDS (Attachment 2). Where the sample result is $>$ the reference + 2 standard deviations, an asterisk (*) is shown. Where results are below the minimum reporting limit (MRL), one-half the MRL is given. Where the laboratory has reported a value below the MRL with a "J" qualifier, that value has been reported in the summary table.

In addition, the PAH data has been normalized to % organic carbon for the salem samples and the MBDS reference. If the normalized sample result is $>$ the normalized MBDS reference value, then an asterisk (*) is shown.

PCB congeners are presented individually and then summed. There is currently no direct conversion from PCB congeners to total aroclors for sediment. A conversion has been developed by EPA Narragansett that is specific to upper New Bedford Harbor only and, therefore, is not used here.

Feel free to adjust the columns containing MBDS reference data in the spreadsheet (salemsum.xls). It is set-up so that an asterisk (*) will automatically appear if a sample results is greater than the MBDS data, so if you want to input different reference values, please do so.

This data and your suitability determination is slated to be presented at public workshops in Gloucester and Salem on August 12 and 14, respectively. Given the tight time constraint I believe it would be useful for us to meet to discuss the data. I will be calling you to discuss arrangements for a meeting.

In the meantime, If you have any questions, please call.

Sincerely,

A handwritten signature in dark ink, appearing to read "Stephen Lecco", written over a light-colored background.

Stephen Lecco

Senior Environmental Scientist

cc: Deerin Babb-Brott, Joe Freeman (without disk)

Table 1
Compositing Scheme for Salem Sediment Samples

Combine these samples	To create this composite for analysis
(S8)MFA, 0-3 + (S8) MFB, 0-5.2 + (S8) MFC, 0-3	MF-1(S)
(S8)MFA, 3-13 + (S8)MFB, 5.2-11.4	MF-1(M)
(S8)MFC, 3-8.4	MF-C(3-8.4)
(S8)MFB, 11.4-14 + (S8)MFC, 8.4-15	MF-1(B)
(S8) MTA, 0-13.9 + (S8) MTB, 0-17 + (S8) MTC 0-5.3	MT-1(S)
(S8) MTC, 5.3-13.8 + (S8) MTC 13.8-18	MT-1(B)
(S8) SPA, 0-2 + (S8) SPB, 0-2 + (S8) SPC, 0-2	SP-1(0-2)
(S8) SPA, 2-4 + (S8) SPB, 2-4 + (S8) SPC, 2-4	SP-1(2-4)
(S8) SPA, 4-6 + (S8) SPB, 4-6 + (S8) SPC, 4-6	SP-1(4-6)
(S8) SPA, 6-21	SP-A (6-21)
(S8)SPB, 6-26.8 + SPC, 6-26	SP-1 (6-B)
(S8)SPD, 0-2 + (S8)SPE, 0-2 + (S8)SPF, 0-2	SP-2(0-2)
(S8)SPD, 2-4 + (S8)SPE, 2-4 + (S8)SPF, 2-4	SP-2(2-4)
(S8)SPD, 4-6 + (S8)SPE, 4-6 + (S8)SPF, 4-6	SP-2(4-6)
(S8)SPD, 6-24.6 + (S8)SPE, 6-29 + (S8)SPF, 6-27	SP-2(6-B)
(S1B)NEP-A, 0-2 + (S1B)NEP-B, 0-3.5	NEP-1
(S1B)NEP-C, 0-2 + (S1B)NEP-D, 0-2	NEP-2
(S1B)NEP-E, 0-4.5 + (S1B)NEP-F, 0-6	NEP-3
<i>TOTAL # SAMPLES</i>	<i>18</i>

Note: (S) suffix denotes surface

(M) suffix denotes middle

(B) suffix denotes bottom

No suffix denotes no vertical stratification

Compositing scheme agreed to by P. Nimiskern (ACE) and S. Lecco (Maguire) on 4/23/98

Figure 1a. Sediment Summary Field Explanations for Metals and PAH Data

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<table><tr><th colspan="2"></th><th colspan="4">BULK CHEMISTRY</th><th colspan="4">NORMALIZED TOC</th></tr><tr><th colspan="2">Sample Data</th><th>Unit</th><th>Det.</th><th>SAMPLE</th><th>MBDS REF</th><th>REF + 2SD</th><th>SAMPLE</th><th>MBDS REF</th><th></th></tr><tr><th colspan="2"></th><th>(Dry)</th><th>Limit</th><th>RESULT</th><th>MEAN</th><th></th><th>RESULT</th><th>MEAN</th><th></th></tr><tr><td colspan="2">Harbor</td><td>Salem</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Project Code</td><td>S4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Sample I.D.</td><td>P-1(0-2)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="10">Physical</td></tr><tr><td colspan="2">% finer</td><td>%</td><td></td><td>71.34</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">% silt/clay</td><td>%</td><td></td><td>50.3</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">TOC</td><td>%</td><td></td><td>5.7</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">TPH</td><td>mg/kg</td><td></td><td>160</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="10">Metals</td></tr><tr><td colspan="2">Arsenic</td><td></td><td></td><td>8.6</td><td>15.7</td><td>28.7</td><td></td><td></td><td></td></tr><tr><td colspan="2">Cadmium</td><td></td><td></td><td>0.9</td><td>1.08</td><td>2.74</td><td></td><td></td><td></td></tr><tr><td colspan="2">Chromium</td><td></td><td></td><td>350</td><td>80</td><td>152</td><td></td><td></td><td></td></tr><tr><td colspan="2">Copper</td><td></td><td></td><td>25</td><td>19.7</td><td>31.7</td><td></td><td></td><td></td></tr><tr><td colspan="2">Mercury</td><td></td><td></td><td>0.3</td><td>0.121</td><td>0.277</td><td></td><td></td><td></td></tr><tr><td colspan="2">Nickel</td><td></td><td></td><td>20</td><td>25.1</td><td>40.5</td><td></td><td></td><td></td></tr><tr><td colspan="2">Lead</td><td></td><td></td><td>50</td><td>46.7</td><td>66.3</td><td></td><td></td><td></td></tr><tr><td colspan="2">Zinc</td><td></td><td></td><td>70</td><td>90</td><td>140</td><td></td><td></td><td></td></tr><tr><td colspan="10">PAH</td></tr><tr><td colspan="2">Naphthalene</td><td>ug/kg</td><td></td><td>50</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">2-Methylnaphthalene</td><td></td><td></td><td>49</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">1-Methylnaphthalene</td><td></td><td></td><td>20</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">2,6-Dimethylnaphthalene</td><td></td><td></td><td>23</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Acenaphthylene</td><td></td><td></td><td>35</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td 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colspan="2">Pyrene</td><td></td><td></td><td>420</td><td>384</td><td>460</td><td>73.68</td><td>168.1</td><td></td></tr><tr><td colspan="2">Benzo[a]anthracene</td><td></td><td></td><td>200</td><td>189</td><td>295</td><td>35.09</td><td>82.4</td><td></td></tr><tr><td colspan="2">Chrysene</td><td></td><td></td><td>220</td><td>194</td><td>284</td><td>38.60</td><td>85.3</td><td></td></tr><tr><td colspan="2">Benzo[k]fluoranthene</td><td></td><td></td><td>280</td><td>337</td><td>404</td><td>49.12</td><td>141.4</td><td></td></tr><tr><td colspan="2">Benzo[e]pyrene</td><td></td><td></td><td>84</td><td>325</td><td>412</td><td>14.74</td><td>136.6</td><td></td></tr><tr><td colspan="2">Benzo[a]pyrene</td><td></td><td></td><td>160</td><td></td><td></td><td>28.07</td><td></td><td></td></tr><tr><td colspan="2">Benzo[b]pyrene</td><td></td><td></td><td>200</td><td>257</td><td>362</td><td>35.09</td><td>111.9</td><td></td></tr><tr><td colspan="2">Perylene</td><td></td><td></td><td>120</td><td></td><td></td><td>21.05</td><td></td><td></td></tr><tr><td colspan="2">Indeno[1,2,3-c,d]pyrene</td><td></td><td></td><td>130</td><td>193</td><td>284</td><td>22.81</td><td>84.9</td><td></td></tr><tr><td colspan="2">Dibenz[a,h]anthracene</td><td></td><td></td><td>24</td><td>30</td><td>51</td><td>4.21</td><td>13.2</td><td></td></tr><tr><td colspan="2">Benzo[ghi]perylene</td><td></td><td></td><td>130</td><td>167</td><td>234</td><td>22.81</td><td>73.4</td><td></td></tr><tr><td colspan="2">TOTAL PAH</td><td></td><td></td><td>2412</td><td>2300</td><td>3080</td><td>423.16</td><td>994</td><td></td></tr><tr><td colspan="2">TOTAL LMW PAH</td><td></td><td></td><td>314</td><td>280</td><td>449</td><td>55.09</td><td>127</td><td></td></tr><tr><td colspan="2">TOTAL HMW PAH</td><td></td><td></td><td>2098</td><td>1980</td><td>2734</td><td>368.07</td><td>867</td><td></td></tr><tr><td colspan="10">* = reference + 2SD for bulk chemistry; reference 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Dibenz[a,h]anthracene				21			3.68																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Fluoranthene				410	353	493	71.93	154.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Pyrene				420	384	460	73.68	168.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Benzo[a]anthracene				200	189	295	35.09	82.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Chrysene				220	194	284	38.60	85.3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Benzo[k]fluoranthene				280	337	404	49.12	141.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Benzo[e]pyrene				84	325	412	14.74	136.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Benzo[a]pyrene				160			28.07																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Benzo[b]pyrene				200	257	362	35.09	111.9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Perylene				120			21.05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Indeno[1,2,3-c,d]pyrene				130	193	284	22.81	84.9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Dibenz[a,h]anthracene				24	30	51	4.21	13.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Benzo[ghi]perylene				130	167	234	22.81	73.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
TOTAL PAH				2412	2300	3080	423.16	994																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
TOTAL LMW PAH				314	280	449	55.09	127																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
TOTAL HMW PAH				2098	1980	2734	368.07	867																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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PAH, LMW and HMW total include only those compounds for which there is an MBDS reference standard.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

Figure 1b. Sediment Summary Field Explanations for PCBs and Pesticides

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Sediment Chemistry Data for (S1)SP-1(0-2)							
Sample Data	Units	Det.	BULK CHEMISTRY			NORMALIZED TOC	
			SAMPLE RESULT	MBDS REF MEAN	REF + 2SD	SAMPLE RESULT	MBDS REF MEAN
Harbor	Salem						
Project Code	S1						
Sample ID	SP-1(0-2)						
PCB	ug/kg						
8-2,4-Dichlorobiphenyl		1.3	0.65			0.11	
18-2,2,5-Trichlorobiphenyl		1.3	0.65			0.11	
28-2,4,4'-Trichlorobiphenyl			0.47			0.04	
44-2,2',3,5'-Tetrachlorobiphenyl			0.28			0.05	
52-2,2',5,5'-Tetrachlorobiphenyl			1.2			0.21	
66-2,3',4,4'-Tetrachlorobiphenyl			4			0.70	
101-2,2',4,5,5'-Pentachlorobiphenyl			3.6			0.63	
105-2,3,3',4,4'-Pentachlorobiphenyl			1.8			0.32	
118-2,3',4,4',5-Pentachlorobiphenyl			4.9			0.86	
128-2,2',3,3',4,4'-Hexachlorobiphenyl			1.3			0.23	
134-2,2',3,4,4',5-Hexachlorobiphenyl			6.8			1.19	
153-2,2',4,4',5,5'-Hexachlorobiphenyl			8.2			1.44	
170-2,2',3,3',4,4',5-Heptachlorobiphenyl			8.2			1.44	
180-2,2',3,4,4',5,5'-Heptachlorobiphenyl			2.6			0.46	
187-2,2',3,4',5,5',6-Heptachlorobiphenyl			5.4			0.95	
195-2,2',3,3',4,4',5,6-Octachlorobiphenyl		1.3	0.65			0.11	
206-2,2',3,3',4,4',5,5',6-Nanachlorobiphenyl			0.56			0.10	
209-2,2',3,3',4,4',5,5',6,1'-Decachlorobiphenyl			0.77			0.14	
TOTAL PCB CONGENERS			52.03			9.13	
TOTAL PCB (CONGENERS X2)			225.69			39.59	
Particulates	ug/kg					0.04	
Aldrin		1.3	0.65			0.11	
alpha-Chlordane			0.73			0.13	
gamma-Chlordane			0.91			0.16	
2,4'-DDT		1.3	0.65			0.11	
4,4'-DDT			0.91			0.16	
2,4'-DDE		1.3	0.65			0.11	
4,4'-DDE			5.1			0.89	
2,4'-DDD			2.7			0.47	
4,4'-DDD			12			2.11	
Dieldrin			0.44			0.08	
Methoxychlor			2.1			0.37	
Endosulfan I		1.3	0.65			0.11	
Endosulfan II			2.6			0.46	
Endosulfan Sulfate		1.3	0.65			0.11	
Endrin		1.3	0.65			0.11	
Endrin Aldehyde		1.3	0.65			0.11	
Heptachlor		1.3	0.65			0.11	
Heptachlor Epoxide		1.3	0.65			0.11	
alpha-hexachlorocyclohexane		1.3	0.65			0.11	
beta-hexachlorocyclohexane		1.3	0.65			0.11	
delta-hexachlorocyclohexane			0.084			0.01	
limonene			0.23			0.04	
trans-Nanachlor			0.62			0.11	
Toxaphene		1.3	0.65			0.11	

One-half the MRL is assumed:

The chemical concentration divided by the % TOC

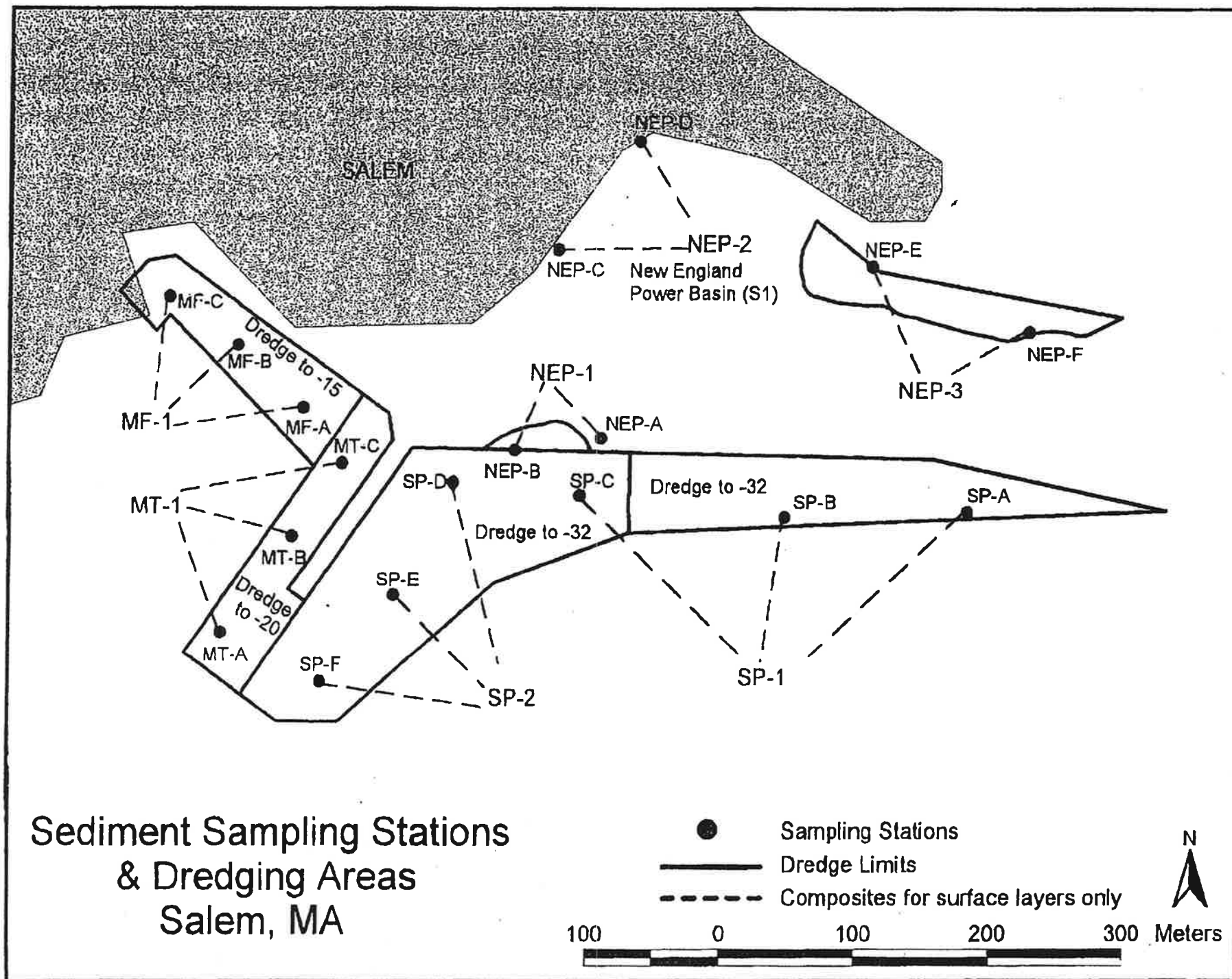
0.04

The sum of all PCB congeners listed above

This value is the minimum reporting limit (MRL)

SP-A(6-21) / SP-1(4-6) / SP-1(2-4) / SP-1(0-2) / MT-1(B) / MT-1(S) / RF-C(3-3-4) / RF-1(B) / RF-1(M) / RF-1(S) / PAH

Ready NUM



ATTACHMENT 2
MBDS REFERENCE DATA

Appendix D, Section 3

Table 1 (Page 2)

Descriptive Statistics Calculated for Individual Stations for Metals at MBDS

DAMOS/EPA Reference Area			As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
Area	Year	Replica								
REF-C	1989	a	16.0	1.95	45	10.7	0.103	14.8	32.5	50
REF-C	1989	b	29.4	1.22	59	13.3	0.084	17.6	39.2	63
REF-C	1989	c	14.1	2.15	51	12.7	0.117	16.6	41.5	56
REF-C	1989	d	19.3	1.80	30	8.3	0.065	12.8	21.5	39
REF-C	1989	e	20.9	1.86	40	11.4	0.119	13.0	37.2	42
REF-C	1989	f	21.4	1.86	38	10.5	0.119	12.9	38.1	48
Mean			20.2	1.81	44	11	0.10	15	35	50
STDS			5.3	0.31	10	2	0.02	2	7	9
MBD-REF	1990	1	20.7	0.14	114	22.4	0.171	30.5	50.6	113
MBD-REF	1990	2	20.4	0.12	113	23.8	0.173	31.4	50.6	116
MBD-REF	1990	3	18.7	0.12	103	22.2	0.168	30.4	57.6	108
MBD-REF	1990	4	14.8	0.14	114	24.6	0.174	34.2	62.5	118
MBD-REF	1990	5	16.2	0.15	116	24.2	0.179	33.4	61.0	117
MBD-REF	1990	6	13.9	0.14	116	24.2	0.167	33.9	61.4	116
Mean			17.5	0.14	113	24	0.17	32	60	115
STDS			2.9	0.01	5	1	0.00	2	2	4
Reference Area Mean			15.7	1.08	80	19.7	0.121	25.1	46.7	90
Reference Area STDS			6.5	0.83	36	6.0	0.078	7.7	9.8	28

Units are $\mu\text{g/g}$ dry weight.

Statistics calculated using 1/2 the detection limit for values below detection, without outliers in
 All reference areas used in final reference area calculation.

Appendix D, Section 2

Table 2

Summary Statistics for PAHs for the DAMOS and EPA Reference Areas at MBDS

DAMOS/EPA Reference Area			phenan- anthra-			Total	benzo(a)-				benzo(b)-	benzo(k)-	benzo(a)- dibenz(a,h)-		benzo(g,h,i)-	indeno(123-	Total	Total
Area	Year	Replicate	fluoren	fluene'	cene	LPAH	anthrene	pyrene	anthracene	chrysene	fluoranthene	fluoranthene	pyrene	anthracene	perylene	cd)pyrene	HPAH	PAH
18-17	1993	1	21	160	31	212	290	470	150	160	310	310	290	18	140	140	2298	2510
18-17	1993	2	21	170	36	227	290	490	150	160	390	380	350	16	150	190	2566	2793
18-17	1993	3	20	140	31	191	280	260	130	140	310	270	280	49	160	170	2049	2240
FG-23	1993	1	16	140	27	183	280	410	130	150	360	310	300	12	140	140	2232	2415
FG-23	1993	2	20	170	33	223	320	420	150	160	350	370	310	40	140	140	2400	2623
FG-23	1993	3	18	160	37	215	320	360	140	150	300	290	270	40	120	120	2110	2325
MBD-REF	1990	1	40	200	92	332	380	390	210	200			220	22	150	180	1762	2152
MBD-REF	1990	2	50	240	120	410	470	470	280	280			300	38	230	270	2338	2808
MBD-REF	1990	3	36	200	93	329	400	400	230	230			260	34	190	220	1964	2364
MBD-REF	1990	4	45	230	110	385	450	450	250	260			280	39	210	250	2189	2639
MBD-REF	1990	5	42	240	110	392	460	460	250	250			280	37	210	250	2197	2657
MBD-REF	1990	6	48	260	130	438	460	460	290	270			300	42	220	270	2312	2772
REF-A	1990	1	24	150	62	236	270	270	160	160			180	28	150	190	1408	1678
REF-A	1990	2	25	150	59	234	280	270	130	140			160	21	130	150	1281	1551
REF-A	1990	3	28	170	67	265	330	310	160	180			180	23	140	170	1493	1803
REF-A	1990	4	42	210	89	341	380	360	210	220			230	30	180	210	1820	2180
REF-A	1990	5	27	180	69	276	340	320	180	190			210	26	170	200	1636	1956
REF-A	1990	6	31	190	77	298	340	350	200	200			220	29	180	210	1729	2079
Mean			31	187	71	288	353	384	189	194	337	325	257	30	167	193	1988	2308
Maximum			50	260	130	438	470	490	290	280	390	380	350	49	230	270	2566	2808
Minimum			16	140	27	183	270	260	130	140	300	270	160	12	120	120	1281	1551
STDS			11.2	36.9	33.8	80.4	70.4	75.7	53.0	48.8	35.6	40.7	52.5	10.3	33.2	46.4	371.1	386.0
CV			36.4	19.8	47.8	27.9	19.9	19.7	28.1	24.1			20.4	34.0	19.9	24.1	18.7	16.7
+1STDS			42	224	105	369	423	460	242	241	372	369	309	40	200	239	2359	2694
+2STDS			53	261	138	449	493	536	295	288	408	412	362	51	234	286	2730	3080

Units are µg/kg dry weight

No outliers identified for this dataset.

ATTACHMENT 3
GRAIN SIZE DATA FOR INDIVIDUAL SAMPLES



Applied Marine Sciences, Inc.

502 N. Highway 3, Suite B • League City, TX 77573 • (281) 554-7272 • Fax (281) 554-63...

April 13, 1998

Mr. Stephen Lecco
Maguire Group, Inc.
One Court Street
New Britain, CT 06051

Re: Massachusetts Coastal Zone Management Dredged Material Management Plan Phase 2
Stage 1, Salem Harbor Sediment Particle Size and Total Solids Laboratory Report,
Maguire Group Project No. 98105, AMS Project No. 9810-01.

Dear Mr. Lecco,

Applied Marine Sciences, Inc. (AMS) is pleased to submit the enclosed laboratory report for Salem Harbor in support of the above referenced project. The laboratory report consists of a summary data table, sample results, quality control results, and chain of custody documentation. Electronic copies of the summary data table (Microsoft Excel) and the case narrative (WordPerfect V. 6.0) are on the enclosed diskette.

AMS received 43 original Salem Harbor field samples in three shipments which arrived on March 31, April 3, and April 7, 1998 under chain of custody. Upon receipt at AMS, the sample labels were compared to the chain of custodies and assigned a unique AMS sample ID number.

The sediment samples were analyzed for particle size (ASTM Method D422-Standard Method for Particle-Size Analysis of Soils) and total solids (EPA 160.3-Total Solids). To restore samples to their original water content and to obtain representative total solids and particle size aliquots, samples were transferred to stainless steel bowls and homogenized using stainless steel spatulas. After homogenization and subsampling, any remaining sediment was transferred to its original sample jar.

Total solids was determined on a 50 to 125 gram aliquot of sediment which was transferred to a pre-weighed aluminum evaporating dish and weighed to the nearest 0.1 mg. Samples were dried at 105°C for 24 hours and weighed. Percent total solids was calculated by dividing the weight of the oven-dried sediment by the weight of the wet sediment and multiplying by 100. To document quality control, a duplicate analysis was performed with every batch of 20 samples. The duplicate analysis must have a relative percent difference (RPD) of less than 15%.

Particle size was determined on a 50 to 175 gram aliquot of sediment which was transferred to a tared beaker and weighed to the nearest 0.1 mg. The samples were washed through a series of nested U.S. standard sieves (#4, #10, #40, and #200) using a pressurized spray nozzle to rapidly separate the individual fractions. Sediment retained on each sieve was washed into a labeled, pre-weighed beaker and dried at 105°C for 24 hours and weighed. The individual fraction weight



April 13, 1998

Page 2

Mr. Stephen Lecco
Maguire Group, Inc.

percentages were calculated by dividing the amount of dried sediment retained on each sieve by the calculated dried sample weight, which was based on the total solids. The percent passing the #200 sieve was calculated by subtracting the sum of material retained on the #4, #10, #40, and #200 sieves, from the total aliquot dry weight derived from the total solids calculation. To document quality control, a duplicate analysis was performed with every batch of 20 samples. The duplicate analysis must have a RPD of less than 15%.

Total solids and particle size results are reported as a dry weight percentage. Replicate total solids and particle size analyses are reported for samples (S-8) SP-A (0-2') (AMS ID 2340), (S-8) SP-B (0-2') (AMS ID 2360), and (G-45) NC-3 (0-4') (AMS ID 2408). Precision for total solids and particle size analyses are provided in Tables 1 and 2, respectively. Total solids RPD's ranged from 0.43% to 1.21% for the three duplicates analyzed for Salem Harbor, which meet the QC limit of <15% RPD. Particle size RPD's ranged from 0.46% to 10.52% which meet the QC limit of <15% RPD.

Table 1. Total Solids Relative Percent Difference (RPD)

AMS Sample ID	RPD (%)
2340	0.44
2360	1.21
2408	0.43

Table 2. Particle Size Relative Percent Difference (RPD)

Client ID	Interval (ft.)	AMS ID	Sieve #4 RPD	Sieve #10 RPD	Sieve #40 RPD	Sieve #200 RPD	Passing #200 RPD
(S-8) SP-A	0-2'	2340	0.00	7.00	4.98	9.38	1.66
(S-8) SP-B	0-2'	2360	0.00	2.17	10.52	3.04	0.63
(G-45) NC-3	0-4'	2408	0.00	4.69	3.82	3.91	0.46



Applied Marine Sciences, Inc.

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April 13, 1998

Page 3

Mr. Stephen Lecco
Maguire Group, Inc.

We look forward to your comments and suggestions for improving subsequent data package submissions.

Sincerely,

Kenneth S. Davis
President

enc. Salem Harbor Laboratory Report

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ATTACHMENT 1
SUMMARY TABLES

			BULK CHEMISTRY			NORMALIZED TOC		
Sample Data	Units	Def.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE		MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT		MEAN
Harbor	Salem							
Project Code	S8							
Sample I.D.	MF-C(3-8.4)							
Physical								
% fines	%		58.86					
% solids	%		79.9					
TOC	%		3.6					
TPH	mg/kg		330					
Metals	mg/kg							
Arsenic			8.3	15.7	28.7			
Cadmium		0.1	0.05	1.08	2.74			
Chromium			36	80	152			
Copper			10	19.7	31.7			
Mercury		0.05	0.025	0.121	0.277			
Nickel			21	25.1	40.5			
Lead			11	46.7	66.3			
Zinc			33	90	146			
PAH	ug/kg							
Naphthalene			2.2					
2-Methylnaphthalene			1.2					
1-Methylnaphthalene			0.66					
2,6-Dimethylnaphthalene		4	2					
Acenaphthylene		4	2					
Acenaphthene		4	2					
Biphenyl		4	2					
Fluorene		4	2	31	53	0.56		13.5
Anthracene		4	0.2	71	138	0.06		31.2
Phenanthrene			0.95	187	261	0.26		82
1-Methylphenanthrene		4	2			0.56		
Dibenzothiophene		4	2			0.56		
Fluoranthene			0.69	353	493	0.19		154.8
Pyrene			0.56	384	460	0.16		168.1
Benzo[a]anthracene		4	2	189	295	0.56		82.9
Chrysene		4	2	194	288	0.56		85.3
Benzo[b]fluoranthene		4	0.49	337	408	0.14		141.4
Benzo[k]fluoranthene		4	2	325	412	0.56		136.6
Benzo[e]pyrene		4	2			0.56		
Benzo[a]pyrene		4	2	257	362	0.56		111.9
Perylene			60			16.67		
Indeno[1,2,3,-c,d]pyrene		4	2	193	286	0.56		84.9
Dibenzo[a,h]anthracene		4	2	30	51	0.56		13.2
Benzo[g,h,i]perylene		4	2	167	234	0.56		73.4
TOTAL PAH			18.89	2308	3080	5.25		994
TOTAL LMW PAH			3.15	288	449	0.88		127
TOTAL HMW PAH			15.74	1988	2730	4.37		867
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data								
values below MRLs listed as one-half MRLs								

* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data
values below MRLs listed as one-half MRLs

Sediment Chemistry Data for (S8)MF-1(S)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
Harbor	Salem						
Project Code	S8						
Sample I.D.	MF-1(S)						
Physical							
% fines	%		24.66				
% solids	%		76.7				
TOC	%		0.8				
TPH	mg/kg						
Metals							
	mg/kg		20				
Arsenic			3.9	15.7	28.7		
Cadmium			0.16	1.08	2.74		
Chromium			29	80	152		
Copper			11	19.7	31.7		
Mercury			0.016	0.121	0.277		
Nickel			12	25.1	40.5		
Lead			29	46.7	66.3		
Zinc			29	90	146		
PAH							
	ug/kg	4.2					
Naphthalene			15				
2-Methylnaphthalene			6.7				
1-Methylnaphthalene			4.2				
2,6-Dimethylnaphthalene			3.3				
Acenaphthylene			6.5				
Acenaphthene			7.4				
Biphenyl			2.4				
Fluorene			13	31	53	16.25	13.5
Anthracene			29	71	138	36.25	31.2
Phenanthrene			83	187	261	103.75	82
1-Methylphenanthrene			21				
Dibenzothiophene			8				
Fluoranthene			140	353	493	175	154.8
Pyrene			170	384	460	212.5	168.1
Benzo[a]anthracene			100	189	295	125	82.9
Chrysene			88	194	288	110	85.3
Benzo[b]fluoranthene			140	337	408	175	141.4
Benzo[k]fluoranthene			53	325	412	66.25	136.6
Benzo[e]pyrene			71				
Benzo[a]pyrene			100	257	362	125	111.9
Perylene			25				
Indeno[1,2,3,-c,d]pyrene			59	193	286	73.75	84.9
Dibenzo[a,h]anthracene			9.6	30	51	12	13.2
Benzo[g,h,i]perylene			59	167	234	73.75	73.4
TOTAL PAH			1043.6	2308	3080	1304.5	994
TOTAL LMW PAH			125	288	449	156.25	127
TOTAL HMW PAH			918.6	1988	2730	1148.25	867
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)MF-1(S)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
PCBs	ug/kg						
8 - 2,4'-Dichlorobiphenyl		0.84	0.42				
18 - 2,2',5-Trichlorobiphenyl		0.84	0.42				
28 - 2,4,4'-Trichlorobiphenyl		0.84	0.42				
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.84	0.42				
52 - 2,2',5,5'-Tetrachlorobiphenyl		0.84	0.42				
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.84	0.42				
101 - 2,2',4,5,5'-Pentachlorobiphenyl			0.081				
105 - 2,3,3',4,4'-Pentachlorobiphenyl		0.84	0.42				
118 - 2,3',4,4',5-Pentachlorobiphenyl		0.84	0.42				
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.84	0.42				
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.36				
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl			0.091				
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		0.84	0.42				
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl			0.066				
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl			0.84				
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.84	0.42				
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		0.84	0.42				
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl			0.05				
TOTAL PCB CONGENERS			6.528				
Pesticides	ug/kg						
Aldrin		0.84	0.42				
alpha-Chlordane		0.84	0.42				
gamma-Chlordane		0.84	0.42				
2,4'-DDT			0.14				
4,4'-DDT		0.84	0.42				
2,4'-DDE		0.84	0.42				
4,4'-DDE		0.84	0.42				
2,4'-DDD		0.84	0.42				
4,4'-DDD			0.36				
Dieldrin		0.84	0.42				
Methoxychlor		0.84	0.42				
Endosulfan I		0.84	0.42				
Endosulfan II		0.84	0.42				
Endosulfan Sulfate		0.84	0.42				
Endrin		0.84	0.42				
Endrin Aldehyde		0.84	0.42				
Heptachlor		0.84	0.42				
Heptachlor Epoxide			0.11				
alpha-hexachlorocyclohexane		0.84	0.42				
beta-hexachlorocyclohexane		0.84	0.42				
delta-hexachlorocyclohexane		0.84	0.42				
lindane		0.84	0.42				
trans-Nonachlor		0.84	0.42				
Toxaphene		84	42				
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)MF-1(B)

Sample Data	Units	Det.	BULK CHEMISTRY			NORMALIZED TOC	
			SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
			RESULT	MEAN		RESULT	MEAN
PCBs	ug/kg						
8 - 2,4'-Dichlorobiphenyl		0.8	0.4			0.80	
18 - 2,2',5-Trichlorobiphenyl		0.8	0.4			0.80	
28 - 2,4,4'-Trichlorobiphenyl		0.8	0.4			0.80	
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.8	0.4			0.80	
52 - 2,2',5,5'-Tetrachlorobiphenyl		0.8	0.4			0.80	
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.8	0.4			0.80	
101 - 2,2',4,5,5'-Pentachlorobiphenyl		0.8	0.4			0.80	
105 - 2,3,3',4,4'-Pentachlorobiphenyl		0.8	0.4			0.80	
118 - 2,3',4,4',5-Pentachlorobiphenyl		0.8	0.4			0.80	
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.8	0.4			0.80	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.3			0.60	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl		0.8	0.4			0.80	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		0.8	0.4			0.80	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl		0.8	0.4			0.80	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl		0.8	0.4			0.80	
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.8	0.4			0.80	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		0.8	0.4			0.80	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		0.8	0.4			0.80	
TOTAL PCB CONGENERS			7.1			14.20	
Pesticides	ug/kg						
Aldrin		0.8	0.4			0.80	
alpha-Chlordane		0.8	0.4			0.80	
gamma-Chlordane		0.8	0.4			0.80	
2,4'-DDT		0.8	0.4			0.80	
4,4'-DDT		0.8	0.4			0.80	
2,4'-DDE		0.8	0.4			0.80	
4,4'-DDE		0.8	0.4			0.80	
2,4'-DDD		0.8	0.4			0.80	
4,4'-DDD		0.8	0.4			0.80	
Dieldrin		0.8	0.4			0.80	
Methoxychlor		0.8	0.4			0.80	
Endosulfan I			0.062			0.12	
Endosulfan II		0.8	0.4			0.80	
Endosulfan Sulfate		0.8	0.4			0.80	
Endrin		0.8	0.4			0.80	
Endrin Aldehyde		0.8	0.4			0.80	
Heptachlor		0.8	0.4			0.80	
Heptachlor Epoxide			0.013			0.03	
alpha-hexachlorocyclohexane		0.8	0.4			0.80	
beta-hexachlorocyclohexane		0.8	0.4			0.80	
delta-hexachlorocyclohexane		0.8	0.4			0.80	
lindane		0.8	0.4			0.80	
trans-Nonachlor		0.8	0.4			0.80	
Toxaphene		80	40			80.00	

* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data
 values below MRLs listed as one-half MRLs

Sediment Chemistry Data for (S8)MT-1(S)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
Harbor	Salem						
Project Code	S8						
Sample I.D.	MT-1(S)						
Physical							
% fines	%		27.43				
% solids	%		76.9				
TOC	%		4.5				
TPH	mg/kg		63				
Metals							
	mg/kg						
Arsenic			5.2	15.7	28.7		
Cadmium		0.1	0.13	1.08	2.74		
Chromium			34	80	152		
Copper			7.8	19.7	31.7		
Mercury		0.05	0.025	0.121	0.277		
Nickel			16	25.1	40.5		
Lead			11	46.7	66.3		
Zinc			27	90	146		
PAH							
	ug/kg						
Naphthalene			5.8				
2-Methylnaphthalene			4.7				
1-Methylnaphthalene			2.3				
2,6-Dimethylnaphthalene			1.8				
Acenaphthylene			3				
Acenaphthene			1.4				
Biphenyl			1.3				
Fluorene			3	31	53	0.67	13.5
Anthracene			5.4	71	138	1.20	31.2
Phenanthrene			16	187	261	3.56	82
1-Methylphenanthrene			3.6			0.80	
Dibenzothiophene			1.5			0.33	
Fluoranthene			29	353	493	6.44	154.8
Pyrene			33	384	460	7.33	168.1
Benzo[a]anthracene			15	189	295	3.33	82.9
Chrysene			16	194	288	3.56	85.3
Benzo[b]fluoranthene			21	337	408	4.67	141.4
Benzo[k]fluoranthene			7	325	412	1.56	136.6
Benzo[e]pyrene			13			2.89	
Benzo[a]pyrene			14	257	362	3.11	111.9
Perylene			4.5			1.00	
Indeno[1,2,3,-c,d]pyrene			10	193	286	2.22	84.9
Dibenzo[a,h]anthracene			2.1	30	51	0.47	13.2
Benzo[g,h,i]perylene			12	167	234	2.67	73.4
TOTAL PAH			183.5	2308	3080	40.78	994
TOTAL LMW PAH			24.4	288	449	5.42	127
TOTAL HMW PAH			159.1	1988	2730	35.36	867
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)MT-1(S)

Sample Data	Units	Det.	BULK CHEMISTRY			NORMALIZED TOC	
			SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
PCBs	ug/kg						
8 - 2,4'-Dichlorobiphenyl		0.82	0.41			0.09	
18 - 2,2',5-Trichlorobiphenyl		0.82	0.41			0.09	
28 - 2,4,4'-Trichlorobiphenyl		0.82	0.41			0.09	
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.82	0.41			0.09	
52 - 2,2',5,5'-Tetrachlorobiphenyl			0.057			0.01	
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.82	0.41			0.09	
101 - 2,2',4,5,5'-Pentachlorobiphenyl			0.11			0.02	
105 - 2,3,3',4,4'-Pentachlorobiphenyl			0.037			0.01	
118 - 2,3',4,4',5-Pentachlorobiphenyl			0.21			0.05	
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.82	0.41			0.09	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.41			0.09	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl			0.23			0.05	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl			0.47			0.10	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl			0.086			0.02	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl			0.22			0.05	
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.82	0.41			0.09	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl			0.03			0.01	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl			0.034			0.01	
TOTAL PCB CONGENERS			4.764			1.06	
Pesticides	ug/kg						
Aldrin		0.82	0.41			0.09	
alpha-Chlordane		0.82	0.41			0.09	
gamma-Chlordane			0.028			0.01	
2,4'-DDT		0.82	0.41			0.09	
4,4'-DDT		0.82	0.41			0.09	
2,4'-DDE		0.82	0.41			0.09	
4,4'-DDE			0.15			0.03	
2,4'-DDD			0.13			0.03	
4,4'-DDD			0.54			0.12	
Dieldrin			0.013			0.00	
Methoxychlor		0.82	0.41			0.09	
Endosulfan I		0.82	0.41			0.09	
Endosulfan II		0.82	0.41			0.09	
Endosulfan Sulfate		0.82	0.41			0.09	
Endrin		0.82	0.41			0.09	
Endrin Aldehyde		0.82	0.41			0.09	
Heptachlor			0.0098			0.00	
Heptachlor Epoxide		0.82	0.41			0.09	
alpha-hexachlorocyclohexane		0.82	0.41			0.09	
beta-hexachlorocyclohexane		0.82	0.41			0.09	
delta-hexachlorocyclohexane		0.82	0.41			0.09	
lindane			0.018			0.00	
trans-Nonachlor		0.82	0.41			0.09	
Toxaphene		82	41			9.11	

* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data
values below MRLs listed as one-half MRLs

Sediment Chemistry Data for (S8)MT-1(B)			BULK CHEMISTRY			NORMALIZED TOC		
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF	
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN	
Harbor	Salem							
Project Code	S8							
Sample I.D.	MT-1(B)							
Physical								
% fines	%		71.51					
% solids	%		74					
TOC	%		10.4					
TPH	mg/kg		50					
Metals								
	mg/kg							
Arsenic			8	15.7	28.7			
Cadmium			0.19	1.08	2.74			
Chromium			36	80	152			
Copper			11	19.7	31.7			
Mercury		0.05	0.025	0.121	0.277			
Nickel			24	25.1	40.5			
Lead			8.7	46.7	66.3			
Zinc			40	90	146			
PAH								
	ug/kg							
Naphthalene			2.7					
2-Methylnaphthalene			1.1					
1-Methylnaphthalene			0.68					
2,6-Dimethylnaphthalene		4.6	2.3					
Acenaphthylene		4.6	2.3					
Acenaphthene		4.6	2.3					
Biphenyl		4.6	2.3					
Fluorene		4.6	2.3	31	53	0.22	13.5	
Anthracene			0.35	71	138	0.03	31.2	
Phenanthrene		4.6	1.4	187	261	0.13	82	
1-Methylphenanthrene			0.19			0.02		
Dibenzothiophene		4.6	2.3			0.22		
Fluoranthene			0.89	353	493	0.09	154.8	
Pyrene			0.62	384	460	0.06	168.1	
Benzo[a]anthracene		4.6	2.3	189	295	0.22	82.9	
Chrysene		4.6	2.3	194	288	0.22	85.3	
Benzo[b]fluoranthene			0.43	337	408	0.04	141.4	
Benzo[k]fluoranthene			0.1	325	412	0.01	136.6	
Benzo[e]pyrene		4.6	2.3			0.22		
Benzo[a]pyrene		4.6	2.3	257	362	0.22	111.9	
Perylene			77			7.40		
Indeno[1,2,3,-c,d]pyrene		4.6	2.3	193	286	0.22	84.9	
Dibenzo[a,h]anthracene		4.6	2.3	30	51	0.22	13.2	
Benzo[g,h,i]perylene			0.68	167	234	0.07	73.4	
TOTAL PAH			18.27	2308	3080	1.76	994	
TOTAL LMW PAH			4.05	288	449	0.39	127	
TOTAL HMW PAH			14.22	1988	2730	1.37	867	
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data								
values below MRLs listed as one-half MRLs								

Sediment Chemistry Data for (S8)SP-A(6-21)			BULK CHEMISTRY			NORMALIZED TOC		
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE		MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT		MEAN
Harbor	Salem							
Project Code	S8							
Sample I.D.	SP-A(6-21)							
Physical								
% fines	%		44.52					
% solids	%		82.8					
TOC	%		0.78					
TPH	mg/kg		29					
Metals								
Arsenic			4.1	15.7	28.7			
Cadmium		0.1	0.05	1.08	2.74			
Chromium			28	80	152			
Copper			9.4	19.7	31.7			
Mercury		0.05	0.025	0.121	0.277			
Nickel			20	25.1	40.5			
Lead			9	46.7	66.3			
Zinc			34	90	146			
PAH								
Naphthalene	ug/kg		1.8					
2-Methylnaphthalene			1.5					
1-Methylnaphthalene			0.67					
2,6-Dimethylnaphthalene		3.8	1.9					
Benaphthylene		3.8	1.9					
Acenaphthene		3.8	1.9					
Biphenyl		3.8	1.9					
Fluorene		3.8	1.9	31	53	2.44		13.5
Anthracene			0.1	71	138	0.13		31.2
Phenanthrene			1.2	187	261	1.54		82
1-Methylphenanthrene			0.15			0.19		
Dibenzothiophene		3.8	1.9			2.44		
Fluoranthene			0.63	353	493	0.81		154.8
Pyrene			0.54	384	460	0.69		168.1
Benzo[a]anthracene		3.8	1.9	189	295	2.44		82.9
Chrysene			0.32	194	288	0.41		85.3
Benzo[b]fluoranthene			0.44	337	408	0.56		141.4
Benzo[k]fluoranthene		3.8	1.9	325	412	2.44		136.6
Benzo[e]pyrene			0.34			0.44		
Benzo[a]pyrene			0.25	257	362	0.32		111.9
Perylene			6.6			8.46		
Indeno[1,2,3,-c,d]pyrene		3.8	1.9	193	286	2.44		84.9
Dibenzo[a,h]anthracene		3.8	1.9	30	51	2.44		13.2
Benzo[g,h,i]perylene			0.34	167	234	0.44		73.4
TOTAL PAH			13.32	2308	3080	17.08		994
TOTAL LMW PAH			3.2	288	449	4.10		127
TOTAL HMW PAH			10.12	1988	2730	12.97		867
> reference + 2SD for bulk chemistry; > reference mean for TOC normalized data								
values below MRLs listed as one-half MRLs								

Sediment Chemistry Data for (S8)SP-A(6-21)			BULK CHEMISTRY			NORMALIZED TOC		
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE		MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT		MEAN
PCBs	ug/kg							
8 - 2,4'-Dichlorobiphenyl		0.77	0.39			0.49		
18 - 2,2',5-Trichlorobiphenyl		0.77	0.39			0.49		
28 - 2,4,4'-Trichlorobiphenyl		0.77	0.39			0.49		
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.77	0.39			0.49		
52 - 2,2',5,5'-Tetrachlorobiphenyl		0.77	0.39			0.49		
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.77	0.39			0.49		
101 - 2,2',4,5,5'-Pentachlorobiphenyl		0.77	0.39			0.49		
105 - 2,3,3',4,4'-Pentachlorobiphenyl		0.77	0.39			0.49		
118 - 2,3',4,4',5-Pentachlorobiphenyl		0.77	0.39			0.49		
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.77	0.39			0.49		
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.15			0.19		
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl		0.77	0.39			0.49		
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		0.77	0.39			0.49		
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl		0.77	0.39			0.49		
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl		0.77	0.39			0.49		
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.77	0.39			0.49		
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		0.77	0.39			0.49		
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		0.77	0.39			0.49		
TOTAL PCB CONGENERS			6.70			8.58		
Pesticides	ug/kg							
Aldrin		0.77	0.39			0.49		
alpha-Chlordane		0.77	0.39			0.49		
gamma-Chlordane		0.77	0.39			0.49		
2,4'-DDT		0.77	0.39			0.49		
4,4'-DDT		0.77	0.39			0.49		
2,4'-DDE		0.77	0.39			0.49		
4,4'-DDE		0.77	0.39			0.49		
2,4'-DDD		0.77	0.39			0.49		
4,4'-DDD		0.77	0.39			0.49		
Dieldrin		0.77	0.39			0.49		
Methoxychlor		0.77	0.39			0.49		
Endosulfan I		0.77	0.39			0.49		
Endosulfan II		0.77	0.39			0.49		
Endosulfan Sulfate		0.77	0.39			0.49		
Endrin		0.77	0.39			0.49		
Endrin Aldehyde		0.77	0.39			0.49		
Heptachlor		0.77	0.39			0.49		
Heptachlor Epoxide		0.77	0.39			0.49		
alpha-hexachlorocyclohexane		0.77	0.39			0.49		
beta-hexachlorocyclohexane		0.77	0.39			0.49		
delta-hexachlorocyclohexane		0.77	0.39			0.49		
lindane		0.77	0.39			0.49		
trans-Nonachlor		0.77	0.39			0.49		
Toxaphene						0.00		
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data								
values below MRLs listed as one-half MRLs								

= > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data			
values below MRLs listed as one-half MRLs			

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Sediment Chemistry Data for (S8)SP-1(2-4)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
Harbor	Salem						
Project Code	S8						
Sample I.D.	SP-1(2-4)						
Physical							
% fines	%		84.74				
% solids	%		45.6				
TOC	%		2.9				
TPH	mg/kg		65				
Metals							
Arsenic	mg/kg		6.4	15.7	28.7		
Cadmium			1	1.08	2.74		
Chromium			38	80	152		
Copper			14	19.7	31.7		
Mercury		0.05	0.025	0.121	0.277		
Nickel			20	25.1	40.5		
Lead			14	46.7	66.3		
Zinc			50	90	146		
PAH							
Naphthalene	ug/kg		3.9				
2-Methylnaphthalene			2.1				
1-Methylnaphthalene			1.9				
2,6-Dimethylnaphthalene			110				
Benaphthylene			1.9				
Benaphthene			4.8				
Biphenyl			1.7				
Fluorene			1.9	31	53	0.66	13.5
Anthracene			4.2	71	138	1.45	31.2
Phenanthrene			8.4	187	261	2.90	82
1-Methylphenanthrene			2.9			1.00	
Dibenzothiophene			0.93			0.32	
Fluoranthene			14	353	493	4.83	154.8
Pyrene			17	384	460	5.86	168.1
Benzo[a]anthracene			9.6	189	295	3.31	82.9
Chrysene			8.5	194	288	2.93	85.3
Benzo[b]fluoranthene			11	337	408	3.79	141.4
Benzo[k]fluoranthene			3.4	325	412	1.17	136.6
Benzo[e]pyrene			8.4			2.90	
Benzo[a]pyrene			10	257	362	3.45	111.9
Perylene			360			124.14	
Indeno[1,2,3,-c,d]pyrene			6	193	286	2.07	84.9
Dibenzo[a,h]anthracene			1.8	30	51	0.62	13.2
Benzo[g,h,i]perylene			5.6	167	234	1.93	73.4
TOTAL PAH			101.4	2308	3080	34.97	994
TOTAL LMW PAH			14.5	288	449	5.00	127
TOTAL HMW PAH			86.9	1988	2730	29.97	867
> reference + 2SD for bulk chemistry; > reference mean for TOC normalized data							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)SP-1(2-4)										
Sample Data	Units	Det.	BULK CHEMISTRY				NORMALIZED TOC			
			SAMPLE		MBDS REF	REF + 2SD	SAMPLE		MBDS REF	
			RESULT		MEAN		RESULT		MEAN	
PCBs	ug/kg							0.00		
8 - 2,4'-Dichlorobiphenyl		1.5	0.75					0.26		
18 - 2,2',5-Trichlorobiphenyl			0.16					0.06		
28 - 2,4,4'-Trichlorobiphenyl		1.5	0.75					0.26		
44 - 2,2',3,5'-Tetrachlorobiphenyl		1.5	0.75					0.26		
52 - 2,2',5,5'-Tetrachlorobiphenyl		1.5	0.75					0.26		
66 - 2,3',4,4'-Tetrachlorobiphenyl		1.5	0.75					0.26		
101 - 2,2',4,5,5'-Pentachlorobiphenyl		1.5	0.75					0.26		
105 - 2,3,3',4,4'-Pentachlorobiphenyl		1.5	0.75					0.26		
118 - 2,3',4,4',5-Pentachlorobiphenyl		1.5	0.75					0.26		
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		1.5	0.75					0.26		
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.22					0.08		
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl		1.5	0.75					0.26		
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		1.5	0.75					0.26		
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl		1.5	0.75					0.26		
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl		1.5	0.75					0.26		
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		1.5	0.75					0.26		
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		1.5	0.75					0.26		
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		1.5	0.75					0.26		
TOTAL PCB CONGENERS			12.38					4.27		
Pesticides	ug/kg									
Aldrin		1.5	0.75					0.26		
alpha-Chlordane		1.5	0.75					0.26		
gamma-Chlordane		1.5	0.75					0.26		
2,4'-DDT		1.5	0.75					0.26		
4,4'-DDT			0.17					0.06		
2,4'-DDE		1.5	0.75					0.26		
4,4'-DDE		1.5	0.75					0.26		
2,4'-DDD		1.5	0.75					0.26		
4,4'-DDD		1.5	0.75					0.26		
Dieldrin		1.5	0.75					0.26		
Methoxychlor		1.5	0.75					0.26		
Endosulfan I		1.5	0.75					0.26		
Endosulfan II		1.5	0.75					0.26		
Endosulfan Sulfate		1.5	0.75					0.26		
Endrin		1.5	0.75					0.26		
Endrin Aldehyde		1.5	0.75					0.26		
Heptachlor		1.5	0.75					0.26		
Heptachlor Epoxide		1.5	0.75					0.26		
alpha-hexachlorocyclohexane		1.5	0.75					0.26		
beta-hexachlorocyclohexane		1.5	0.75					0.26		
delta-hexachlorocyclohexane			0.075					0.03		
lindane			0.12					0.04		
trans-Nonachlor		1.5	0.75					0.26		
Toxaphene		150	75					25.86		

* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data
 values below MRLs listed as one-half MRLs

Sediment Chemistry Data for (S8)SP-1(4-6)			BULK CHEMISTRY			NORMALIZED TOC		
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF	
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN	
Harbor	Salem							
Project Code	S8							
Sample I.D.	SP-1(4-6)							
Physical								
% fines	%		90.61					
% solids	%		41.1					
TOC	%		3.5					
TPH	mg/kg		90					
Metals								
	mg/kg							
Arsenic			8	15.7	28.7			
Cadmium			1.2	1.08	2.74			
Chromium			45	80	152			
Copper			16	19.7	31.7			
Mercury		0.05	0.025	0.121	0.277			
Nickel			23	25.1	40.5			
Lead			9.8	46.7	66.3			
Zinc			57	90	146			
PAH								
	ug/kg							
Naphthalene			5.4					
2-Methylnaphthalene			2.9					
1-Methylnaphthalene			2					
2,6-Dimethylnaphthalene			1.2					
Benzenaphthylene			1.2					
Benzenaphthene			4.7					
Biphenyl			1.1					
Fluorene			1.8	31	53	0.51	13.5	
Anthracene			2.5	71	138	0.71	31.2	
Phenanthrene			7.2	187	261	2.06	82	
1-Methylphenanthrene			2			0.57		
Dibenzothiophene		7.8	3.9			1.11		
Fluoranthene			12	353	493	3.43	154.8	
Pyrene			12	384	460	3.43	168.1	
Benzo[a]anthracene			6.6	189	295	1.89	82.9	
Chrysene			6.5	194	288	1.86	85.3	
Benzo[b]fluoranthene			8.6	337	408	2.46	141.4	
Benzo[k]fluoranthene			2.3	325	412	0.66	136.6	
Benzo[e]pyrene			4.7			1.34		
Benzo[a]pyrene			5	257	362	1.43	111.9	
Perylene			440			125.71		
Indeno[1,2,3,-c,d]pyrene			4.4	193	286	1.26	84.9	
Dibenzo[a,h]anthracene			0.65	30	51	0.19	13.2	
Benzo[g,h,i]perylene			4.1	167	234	1.17	73.4	
TOTAL PAH			73.65	2308	3080	21.04	994	
TOTAL LMW PAH			11.5	288	449	3.29	127	
TOTAL HMW PAH			62.15	1988	2730	17.76	867	
= > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data								
Values below MRLs listed as one-half MRLs								

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Sediment Chemistry Data for (S8)SP-1(6-B)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
Harbor	Salem						
Project Code	S8						
Sample I.D.	SP-1(6-B)						
Physical							
% fines	%		91.47				
% solids	%		65.7				
TOC	%		1.15				
TPH	mg/kg		37				
Metals	mg/kg						
Arsenic			13	15.7	28.7		
Cadmium			0.17	1.08	2.74		
Chromium			62	80	152		
Copper			21	19.7	31.7		
Mercury		0.05	0.025	0.121	0.277		
Nickel			36	25.1	40.5		
Lead			18	46.7	66.3		
Zinc			77	90	146		
PAH	ug/kg						
Naphthalene			2.7				
2-Methylnaphthalene			1.3				
1-Methylnaphthalene			0.72				
2,6-Dimethylnaphthalene		4.7	2.35				
Acenaphthylene		4.7	2.35				
Acenaphthene		4.7	2.35				
Biphenyl		4.7	2.35				
Fluorene		4.7	2.35	31	53	2.04	13.5
Anthracene			0.29	71	138	0.25	31.2
Phenanthrene			2	187	261	1.74	82
1-Methylphenanthrene			0.2			0.17	
Dibenzothiophene		4.7	2.35			2.04	
Fluoranthene			0.9	353	493	0.78	154.8
Pyrene			0.72	384	460	0.63	168.1
Benzo[a]anthracene		4.7	2.35	189	295	2.04	82.9
Chrysene			0.55	194	288	0.48	85.3
Benzo[b]fluoranthene			0.55	337	408	0.48	141.4
Benzo[k]fluoranthene		4.7	2.35	325	412	2.04	136.6
Benzo[e]pyrene			0.48			0.42	
Benzo[a]pyrene			0.2	257	362	0.17	111.9
Perylene			180			156.52	
Indeno[1,2,3,-c,d]pyrene		4.7	2.35	193	286	2.04	84.9
Dibenzo[a,h]anthracene		4.7	2.35	30	51	2.04	13.2
Benzo[g,h,i]perylene			0.41	167	234	0.36	73.4
TOTAL PAH			17.37	2308	3080	15.10	994
TOTAL LMW PAH			4.64	288	449	4.03	127
TOTAL HMW PAH			12.73	1988	2730	11.07	867
> reference + 2SD for bulk chemistry; > reference mean for TOC normalized data							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)SP-1(6-B)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
PCBs	ug/kg					0.00	
8 - 2,4'-Dichlorobiphenyl		0.94	0.47			0.82	
18 - 2,2',5-Trichlorobiphenyl			0.053			0.05	
28 - 2,4,4'-Trichlorobiphenyl		0.94	0.47			0.41	
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.94	0.47			0.41	
52 - 2,2',5,5'-Tetrachlorobiphenyl		0.94	0.47			0.41	
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.94	0.47			0.41	
101 - 2,2',4,5,5'-Pentachlorobiphenyl		0.94	0.47			0.41	
105 - 2,3,3',4,4'-Pentachlorobiphenyl		0.94	0.47			0.41	
118 - 2,3',4,4',5-Pentachlorobiphenyl		0.94	0.47			0.41	
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.94	0.47			0.41	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.32			0.28	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl		0.94	0.47			0.41	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		0.94	0.47			0.41	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl		0.94	0.47			0.41	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl		0.94	0.47			0.41	
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.94	0.47			0.41	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		0.94	0.47			0.41	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		0.94	0.47			0.41	
TOTAL PCB CONGENERS			7.89			6.86	
Pesticides	ug/kg						
Aldrin		0.94	0.47			0.41	
alpha-Chlordane		0.94	0.47			0.41	
gamma-Chlordane		0.94	0.47			0.41	
2,4'-DDT		0.94	0.47			0.41	
4,4'-DDT		0.94	0.47			0.41	
2,4'-DDE		0.94	0.47			0.41	
4,4'-DDE		0.94	0.47			0.41	
2,4'-DDD		0.94	0.47			0.41	
4,4'-DDD			0.075			0.07	
Dieldrin		0.94	0.47			0.41	
Methoxychlor		0.94	0.47			0.41	
Endosulfan I		0.94	0.47			0.41	
Endosulfan II		0.94	0.47			0.41	
Endosulfan Sulfate		0.94	0.47			0.41	
Endrin		0.94	0.47			0.41	
Endrin Aldehyde		0.94	0.47			0.41	
Heptachlor		0.94	0.47			0.41	
Heptachlor Epoxide		0.94	0.47			0.41	
alpha-hexachlorocyclohexane		0.94	0.47			0.41	
beta-hexachlorocyclohexane		0.94	0.47			0.41	
delta-hexachlorocyclohexane		0.94	0.47			0.41	
lindane			0.025			0.02	
trans-Nonachlor		0.94	0.47			0.41	
toxaphene		94	47			40.87	

* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data
values below MRLs listed as one-half MRLs

= > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data									
values below MRLs listed as one-half MRLs									



value

Sediment Chemistry Data for (S8)SP-2(2-4)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
PCBs	ug/kg						
8 - 2,4'-Dichlorobiphenyl		0.79	0.40			1.14	
18 - 2,2',5-Trichlorobiphenyl		0.79	0.40			1.14	
28 - 2,4,4'-Trichlorobiphenyl		0.79	0.40			1.14	
44 - 2,2',3,5'-Tetrachlorobiphenyl		0.79	0.40			1.14	
52 - 2,2',5,5'-Tetrachlorobiphenyl		0.79	0.40			1.14	
66 - 2,3',4,4'-Tetrachlorobiphenyl		0.79	0.40			1.14	
101 - 2,2',4,5,5'-Pentachlorobiphenyl		0.79	0.40			1.14	
105 - 2,3,3',4,4'-Pentachlorobiphenyl		0.79	0.40			1.14	
118 - 2,3',4,4',5-Pentachlorobiphenyl		0.79	0.40			1.14	
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl		0.79	0.40			1.14	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl			0.19			0.55	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl		0.79	0.40			1.14	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl		0.79	0.40			1.14	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl		0.79	0.40			1.14	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl		0.79	0.40			1.14	
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl		0.79	0.40			1.14	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		0.79	0.40			1.14	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		0.79	0.40			1.14	
TOTAL PCB CONGENERS			6.905			20.01	
Pesticides	ug/kg						
Aldrin		0.79	0.40			1.14	
alpha-Chlordane		0.79	0.40			1.14	
gamma-Chlordane		0.79	0.40			1.14	
2,4'-DDT		0.79	0.40			1.14	
4,4'-DDT			0.037			0.11	
2,4'-DDE		0.79	0.40			1.14	
4,4'-DDE		0.79	0.40			1.14	
2,4'-DDD		0.79	0.40			1.14	
4,4'-DDD			0.09			0.26	
Dieldrin		0.79	0.40			1.14	
Methoxychlor		0.79	0.40			1.14	
Endosulfan I		0.79	0.40			1.14	
Endosulfan II		0.79	0.40			1.14	
Endosulfan Sulfate		0.79	0.40			1.14	
Endrin		0.79	0.40			1.14	
Endrin Aldehyde		0.79	0.40			1.14	
Heptachlor		0.79	0.40			1.14	
Heptachlor Epoxide		0.79	0.40			1.14	
alpha-hexachlorocyclohexane		0.79	0.40			1.14	
beta-hexachlorocyclohexane		0.79	0.40			1.14	
delta-hexachlorocyclohexane			0.051			0.15	
lindane			0.019			0.06	
trans-Nonachlor		0.79	0.40			1.14	
toxaphene		79	39.50			114.49	
* = > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data							
values below MRLs listed as one-half MRLs							

Sediment Chemistry Data for (S8)SP-2(4-6)			BULK CHEMISTRY			NORMALIZED TOC	
Sample Data	Units	Det.	SAMPLE	MBDS REF	REF + 2SD	SAMPLE	MBDS REF
	(Dry)	Limit	RESULT	MEAN		RESULT	MEAN
Harbor	Salem						
Project Code	S8						
Sample I.D.	SP-2(4-6)						
Physical							
% fines	%		31.41				
% solids	%		78.2				
TOC	%		0.29				
TPH	mg/kg		77				
Metals							
	mg/kg						
Arsenic			4.5	15.7	28.7		
Cadmium			0.11	1.08	2.74		
Chromium			18	80	152		
Copper			7.5	19.7	31.7		
Mercury		0.05	0.025	0.121	0.277		
Nickel			12	25.1	40.5		
Lead			7.8	46.7	66.3		
Zinc			28	90	146		
PAH							
	ug/kg						
Naphthalene			1.9				
2-Methylnaphthalene			1				
1-Methylnaphthalene			0.57				
2,6-Dimethylnaphthalene		4.2	2.1				
acenaphthylene		4.2	2.1				
Acenaphthene		4.2	2.1				
Biphenyl		4.2	2.1				
Fluorene		4.2	2.1	31	53	7.24	13.5
Anthracene			0.16	71	138	0.55	31.2
Phenanthrene			1.1	187	261	3.79	82
1-Methylphenanthrene			0.16			0.55	
Dibenzothiophene		4.2	2.1			7.24	
Fluoranthene			0.65	353	493	2.24	154.8
Pyrene			0.6	384	460	2.07	168.1
Benzo[a]anthracene		4.2	2.1	189	295	7.24	82.9
Chrysene		4.2	2.1	194	288	7.24	85.3
Benzo[b]fluoranthene			0.42	337	408	1.45	141.4
Benzo[k]fluoranthene			0.062	325	412	0.21	136.6
Benzo[e]pyrene			0.22			0.76	
Benzo[a]pyrene			0.18	257	362	0.62	111.9
Perylene			26			89.66	
Indeno[1,2,3,-c,d]pyrene		4.2	2.1	193	286	7.24	84.9
Dibenzo[a,h]anthracene		4.2	2.1	30	51	7.24	13.2
Benzo[g,h,i]perylene			0.24	167	234	0.83	73.4
TOTAL PAH			13.91	2308	3080	47.97	994
TOTAL LMW PAH			3.36	288	449	11.59	127
TOTAL HMW PAH			10.552	1988	2730	36.39	867
= > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data							
values below MRLs listed as one-half MRLs							



> reference + 2SD for bulk chemistry; > reference mean for TOC normalized data

✓	
---	--

= > reference + 2SD for bulk chemistry; > reference mean for TOC normalized data

✓





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Salem Harbor Particle Size Results Summary Table

Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01

Methods
Particle Size: ASTM D422
Total Solids: EPA 160.3

Client Sample ID	Core Interval (ft.)	AMS Sample ID	Date Sampled	Date Received	Date Analyzed	Total Solids (%)	U.S. Standard Sieve Size or Number				Passing #200 (%)
							#4 (%)	#10 (%)	#40 (%)	#200 (%)	
(S1-B) NEP-A	0-2	2305	3/20/98	3/23/98	3/24/98	58.56	0.00	0.49	1.43	11.95	86.13
(S1-B) NEP-B	0-3.5	2306	3/20/98	3/23/98	3/24/98	38.85	0.00	0.00	0.95	6.46	92.59
(S1-B) NEP-C	0-2	2307	3/20/98	3/23/98	3/24/98	30.11	1.49	0.89	2.13	5.57	89.92
(S1-B) NEP-F	0-6	2308	3/20/98	3/23/98	3/24/98	48.38	0.00	0.00	0.48	6.70	92.82
(S1-B) NEP-E	0-4.5	2325	3/23/98	3/26/98	3/26/98	43.08	0.00	0.98	2.04	10.30	86.68
(S1-B) NEP-D	0-2	2326	3/23/98	3/26/98	3/26/98	36.70	0.00	1.41	1.78	4.39	92.41
(S8) MF-C	0-3	2327	3/23/98	3/26/98	3/26/98	74.09	0.00	0.00	24.73	52.37	22.89
(S8) MF-C	3-8.4	2328	3/23/98	3/26/98	3/26/98	78.94	0.00	0.00	1.23	38.59	60.18
(S8) MF-C	8.4-15	2329	3/23/98	3/26/98	3/26/98	79.31	0.00	0.00	0.64	38.13	61.24
(S8) MF-B	0-5.2	2330	3/24/98	3/26/98	3/26/98	77.03	0.00	1.07	5.71	64.99	28.24
(S8) MF-B	5.2-11.4	2331	3/24/98	3/26/98	3/26/98	65.69	0.00	0.24	2.61	30.06	67.09
(S8) MF-B	11.4-14	2332	3/24/98	3/26/98	3/26/98	80.77	0.00	0.00	0.42	3.84	95.74
(S8) MT-C	0-5.3	2333	3/24/98	3/26/98	3/26/98	66.19	0.00	0.58	11.12	51.03	37.27
(S8) MT-C	5.3-13.8	2334	3/24/98	3/26/98	3/26/98	60.73	0.00	0.14	1.90	18.43	79.52
(S8) MT-C	13.8-18	2335	3/24/98	3/26/98	3/26/98	84.63	0.00	1.45	1.72	26.31	70.52
(S8) MT-A	0-13.9	2336	3/24/98	3/26/98	3/26/98	80.99	0.00	0.00	2.70	75.99	21.31
(S-8) MF-A	0-3	2337	3/25/98	3/30/98	3/31/98	73.44	0.00	1.60	13.19	61.28	23.93
(S-8) MF-A	3-13	2338	3/25/98	3/30/98	3/31/98	63.13	0.00	0.46	3.23	27.16	69.15
(S-8) MT-B	0-17	2339	3/25/98	3/30/98	3/31/98	81.37	0.00	3.11	6.75	58.69	31.46
(S-8) SP-A	0-2	2340	3/25/98	3/30/98	3/31/98	48.06	0.00	1.79	8.03	19.30	70.88
(S-8) SP-A	2-4	2341	3/25/98	3/30/98	3/31/98	37.79	0.00	0.09	1.00	1.75	97.15
(S-8) SP-A	4-6	2342	3/25/98	3/30/98	3/31/98	46.85	0.00	0.00	1.94	7.78	90.27
(S-8) SP-A	6-21	2343	3/25/98	3/30/98	3/31/98	82.71	0.00	2.20	13.13	40.20	44.46
(S-8) SP-E	0-2	2344	3/26/98	3/30/98	3/31/98	71.76	0.00	2.16	12.07	53.23	32.54
(S-8) SP-E	2-4	2345	3/26/98	3/30/98	3/31/98	83.47	0.00	3.90	11.96	63.66	20.49
(S-8) SP-E	4-6	2346	3/26/98	3/30/98	3/31/98	84.26	0.00	0.00	1.04	78.83	20.13


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Salem Harbor Particle Size Results Summary Table

Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01

Methods
Particle Size: ASTM D422
Total Solids: EPA 160.3

Client Sample ID	Core Interval (ft.)	AMS Sample ID	Date Sampled	Date Received	Date Analyzed	Total Solids (%)	U.S. Standard Sieve Size or Number				Passing #200 (%)
							#4 (%)	#10 (%)	#40 (%)	#200 (%)	
(S-8) SP-E	6-29	2347	3/26/98	3/30/98	3/31/98	78.67	0.00	0.00	0.11	17.06	82.83
(S-8) SP-F	0-2	2348	3/26/98	3/30/98	3/31/98	75.99	0.00	0.00	0.30	45.66	54.04
(S-8) SP-F	2-4	2349	3/26/98	3/30/98	3/31/98	80.38	0.00	0.00	0.33	51.46	48.21
(S-8) SP-F	4-6	2350	3/26/98	3/30/98	3/31/98	81.62	0.00	0.00	0.71	62.70	36.59
(S-8) SP-F	6-27	2351	3/26/98	3/30/98	3/31/98	81.61	0.00	0.03	0.41	54.62	44.94
(S-8) SP-D	0-2	2352	3/28/98	3/31/98	4/1/98	55.83	0.00	1.08	14.22	40.40	44.30
(S-8) SP-D	2-4	2353	3/28/98	3/31/98	4/1/98	76.81	0.00	2.77	18.04	63.81	15.37
(S-8) SP-D	4-6	2354	3/28/98	3/31/98	4/1/98	70.34	0.00	0.82	2.47	48.67	48.03
(S-8) SP-D	6-24.6	2355	3/28/98	3/31/98	4/1/98	74.11	0.00	3.65	2.53	12.57	81.25
(S-8) SP-C	0-2	2356	3/28/98	3/31/98	4/1/98	53.09	0.00	1.27	4.03	19.95	74.75
(S-8) SP-C	2-4	2357	3/28/98	3/31/98	4/1/98	39.68	0.00	0.16	2.92	7.17	89.75
(S-8) SP-C	4-6	2358	3/28/98	3/31/98	4/2/98	38.32	0.00	0.10	3.03	7.72	89.15
(S-8) SP-C	6-26	2359	3/28/98	3/31/98	4/2/98	64.52	0.00	0.79	0.78	4.06	94.36
(S-8) SP-B	0-2	2360	3/27/98	3/31/98	4/2/98	47.56	0.00	0.93	9.50	16.82	72.74
(S-8) SP-B	2-4	2361	3/27/98	3/31/98	4/2/98	55.47	0.00	2.50	5.91	22.72	68.87
(S-8) SP-B	4-6	2362	3/27/98	3/31/98	4/2/98	38.72	0.00	0.20	1.40	3.37	95.03
(S-8) SP-B	6-26.8	2363	3/27/98	3/31/98	4/2/98	72.00	0.00	0.04	1.47	7.88	90.61


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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-A
AMS Sample ID: 2305

Date Sampled: 3/20/98
Date Received: 3/23/98
Date Analyzed: 3/24/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.49%
#40	0.0165	0.42	1.43%
#200	0.0029	0.074	11.95%
>#200	<0.0029	<0.074	86.13%

Total Solids (EPA 160.3) 58.56%

Comments: _____


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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-B
AMS Sample ID: 2306

Date Sampled: 3/20/98
Date Received: 3/23/98
Date Analyzed: 3/24/98
Core Interval (ft.): 0-3.5

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.95%
#200	0.0029	0.074	6.46%
>#200	<0.0029	<0.074	92.59%

Total Solids (EPA 160.3) 38.85%

Comments: _____

K. S. B.
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-C
AMS Sample ID: 2307

Date Sampled: 3/20/98
Date Received: 3/23/98
Date Analyzed: 3/24/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	1.49%
#10	0.079	2.00	0.89%
#40	0.0165	0.42	2.13%
#200	0.0029	0.074	5.57%
>#200	<0.0029	<0.074	89.92%

Total Solids (EPA 160.3) 30.11%

Comments Material retained on #4 sieve consisted of a mussel valve.

KSDani
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-F
AMS Sample ID: 2308

Date Sampled: 3/20/98
Date Received: 3/23/98
Date Analyzed: 3/24/98
Core Interval (ft.): 0-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.48%
#200	0.0029	0.074	6.70%
>#200	<0.0029	<0.074	92.82%

Total Solids (EPA 160.3) 48.38%

Comments: _____

KSD
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-E
AMS Sample ID: 2325

Date Sampled: 3/23/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-4.5

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.98%
#40	0.0165	0.42	2.04%
#200	0.0029	0.074	10.30%
>#200	<0.0029	<0.074	86.68%

Total Solids (EPA 160.3) 43.06%

Comments: Material retained on #10 sieve consists of shell fragments.

K. S. Davis
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S1-B) NEP-D
AMS Sample ID: 2326

Date Sampled: 3/23/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.41%
#40	0.0165	0.42	1.78%
#200	0.0029	0.074	4.39%
>#200	<0.0029	<0.074	92.41%

Total Solids (EPA 160.3) 36.70%

Comments: Material retained on #10 sieve consists of shell fragments.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-C
AMS Sample ID: 2327

Date Sampled: 3/23/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-3

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	24.73%
#200	0.0029	0.074	52.37%
>#200	<0.0029	<0.074	22.89%

Total Solids (EPA 160.3) 74.09%

Comments: _____

KSD
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-C
AMS Sample ID: 2328

Date Sampled: 3/23/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 3-8.4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	1.23%
#200	0.0029	0.074	38.59%
>#200	<0.0029	<0.074	60.18%

Total Solids (EPA 160.3) 78.94%

Comments:

KSD
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-C
AMS Sample ID: 2329

Date Sampled: 3/23/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 8.4-15

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.64%
#200	0.0029	0.074	38.13%
>#200	<0.0029	<0.074	61.24%

Total Solids (EPA 160.3) 79.31%

Comments: _____


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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-B
AMS Sample ID: 2330

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-5.2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.07%
#40	0.0165	0.42	5.71%
#200	0.0029	0.074	64.99%
>#200	<0.0029	<0.074	28.24%

Total Solids (EPA 160.3) 77.03%

Comments: Material retained on #10 sieve consists of rock fragments.


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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-B
AMS Sample ID: 2331

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 5.2-11.4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.24%
#40	0.0165	0.42	2.61%
#200	0.0029	0.074	30.06%
>#200	<0.0029	<0.074	67.09%

Total Solids (EPA 160.3) 65.69%

Comments: Material retained on #10 sieve consists of rock fragments.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-B
AMS Sample ID: 2332

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 11.4-14

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.42%
#200	0.0029	0.074	3.84%
>#200	<0.0029	<0.074	95.74%

Total Solids (EPA 160.3) 80.77%

Comments: _____


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MT-C
AMS Sample ID: 2333

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-5.3

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.58%
#40	0.0165	0.42	11.12%
#200	0.0029	0.074	51.03%
>#200	<0.0029	<0.074	37.27%

Total Solids (EPA 160.3) 66.19%

Comments: Material retained on #10 sieve consists of shell and rock fragments.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MT-C
AMS Sample ID: 2334

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 5.3-13.8

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.14%
#40	0.0165	0.42	1.90%
#200	0.0029	0.074	18.43%
>#200	<0.0029	<0.074	79.52%

Total Solids (EPA 160.3) 60.73%

Comments: Material retained on #10 sieve consists of shell and rock fragments.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MT-C
AMS Sample ID: 2335

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 13.8-18

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.45%
#40	0.0165	0.42	1.72%
#200	0.0029	0.074	26.31%
>#200	<0.0029	<0.074	70.52%

Total Solids (EPA 160.3) 84.63%

Comments: Material retained on #10 sieve consists of rock fragments.


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MT-A
AMS Sample ID: 2336

Date Sampled: 3/24/98
Date Received: 3/26/98
Date Analyzed: 3/26/98
Core Interval (ft.): 0-13.9

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	2.70%
#200	0.0029	0.074	75.99%
>#200	<0.0029	<0.074	21.31%

Total Solids (EPA 160.3) 80.99%

Comments: _____


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-A
AMS Sample ID: 2337

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 0-3

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.60%
#40	0.0165	0.42	13.19%
#200	0.0029	0.074	61.28%
>#200	<0.0029	<0.074	23.93%

Total Solids (EPA 160.3) 73.44%

Comments: Material retained on #10 sieve consists of rock fragments.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MF-A
AMS Sample ID: 2338

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 3-13

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.46%
#40	0.0165	0.42	3.23%
#200	0.0029	0.074	27.16%
>#200	<0.0029	<0.074	69.15%

Total Solids (EPA 160.3) 63.13%

Comments: Material retained on #10 sieve consists of shell fragments.

AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S8) MT-B
AMS Sample ID: 2339

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 0-17

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	3.11%
#40	0.0165	0.42	6.75%
#200	0.0029	0.074	58.69%
>#200	<0.0029	<0.074	31.46%

Total Solids (EPA 160.3) 81.37%

Comments: Material retained on #10 sieve consists of rock fragments.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-A
AMS Sample ID: 2340

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.79%
#40	0.0165	0.42	8.03%
#200	0.0029	0.074	19.30%
>#200	<0.0029	<0.074	70.88%

Total Solids (EPA 160.3) 48.06%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KS Don
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-A
AMS Sample ID: 2341

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.09%
#40	0.0165	0.42	1.00%
#200	0.0029	0.074	1.75%
>#200	<0.0029	<0.074	97.15%

Total Solids (EPA 160.3) 37.79%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KS
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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-A
AMS Sample ID: 2342

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	1.94%
#200	0.0029	0.074	7.78%
>#200	<0.0029	<0.074	90.27%

Total Solids (EPA 160.3) 46.85%

Comments: _____


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-A
AMS Sample ID: 2343

Date Sampled: 3/25/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 6-21

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	2.20%
#40	0.0165	0.42	13.13%
#200	0.0029	0.074	40.20%
>#200	<0.0029	<0.074	44.46%

Total Solids (EPA 160.3) 82.71%

Comments: Material retained on #10 sieve consists of rock fragments.


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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-E
AMS Sample ID: 2344

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	2.16%
#40	0.0165	0.42	12.07%
#200	0.0029	0.074	53.23%
>#200	<0.0029	<0.074	32.54%

Total Solids (EPA 160.3) 71.76%

Comments: Material retained on #10 sieve consists of rock and shell fragments.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-E
AMS Sample ID: 2345

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	3.90%
#40	0.0165	0.42	11.96%
#200	0.0029	0.074	63.66%
>#200	<0.0029	<0.074	20.49%

Total Solids (EPA 160.3) 83.47%

Comments: Material retained on #10 sieve consists of rock fragments.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-E
AMS Sample ID: 2346

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	1.04%
#200	0.0029	0.074	78.83%
>#200	<0.0029	<0.074	20.13%

Total Solids (EPA 160.3) 84.26%

Comments: _____

KSD
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-E
AMS Sample ID: 2347

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 6-29

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.11%
#200	0.0029	0.074	17.06%
>#200	<0.0029	<0.074	82.83%

Total Solids (EPA 160.3) 78.67%

Comments: _____

K. D. Dan
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-F
AMS Sample ID: 2348

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.30%
#200	0.0029	0.074	45.66%
>#200	<0.0029	<0.074	54.04%

Total Solids (EPA 160.3) 75.99%

Comments: _____


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-F
AMS Sample ID: 2349

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.33%
#200	0.0029	0.074	51.46%
>#200	<0.0029	<0.074	48.21%

Total Solids (EPA 160.3) 80.38%

Comments: _____


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-F
AMS Sample ID: 2350

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	0.71%
#200	0.0029	0.074	62.70%
>#200	<0.0029	<0.074	36.59%

Total Solids (EPA 160.3) 81.62%

Comments: _____


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-F
AMS Sample ID: 2351

Date Sampled: 3/26/98
Date Received: 3/30/98
Date Analyzed: 3/31/98
Core Interval (ft.): 6-27

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.03%
#40	0.0165	0.42	0.41%
#200	0.0029	0.074	54.62%
>#200	<0.0029	<0.074	44.94%

Total Solids (EPA 160.3) 81.61%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-D
AMS Sample ID: 2352

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.08%
#40	0.0165	0.42	14.22%
#200	0.0029	0.074	40.40%
>#200	<0.0029	<0.074	44.30%

Total Solids (EPA 160.3) 55.83%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
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Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-D
AMS Sample ID: 2353

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	2.77%
#40	0.0165	0.42	18.04%
#200	0.0029	0.074	63.81%
>#200	<0.0029	<0.074	15.37%

Total Solids (EPA 160.3) 76.81%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-D
AMS Sample ID: 2354

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.82%
#40	0.0165	0.42	2.47%
#200	0.0029	0.074	48.67%
>#200	<0.0029	<0.074	48.03%

Total Solids (EPA 160.3) 70.34%

Comments: Material retained on #10 sieve consists of rock and shell material.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-D
AMS Sample ID: 2355

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 6-24.6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	3.65%
#40	0.0165	0.42	2.53%
#200	0.0029	0.074	12.57%
>#200	<0.0029	<0.074	81.25%

Total Solids (EPA 160.3) 74.11%

Comments: Material retained on #10 sieve consists of rock and shell material.

KS
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-C
AMS Sample ID: 2356

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.27%
#40	0.0165	0.42	4.03%
#200	0.0029	0.074	19.95%
>#200	<0.0029	<0.074	74.75%

Total Solids (EPA 160.3) 53.09%

Comments: Material retained on #10 sieve consists of rock and shell material.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-C
AMS Sample ID: 2357

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/1/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.16%
#40	0.0165	0.42	2.92%
#200	0.0029	0.074	7.17%
>#200	<0.0029	<0.074	89.75%

Total Solids (EPA 160.3) 39.68%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-C
AMS Sample ID: 2358

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.10%
#40	0.0165	0.42	3.03%
#200	0.0029	0.074	7.72%
>#200	<0.0029	<0.074	89.15%

Total Solids (EPA 160.3) 38.32%

Comments: Material retained on #10 sieve consists of rock material.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-C
AMS Sample ID: 2359

Date Sampled: 3/28/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 6-26

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.79%
#40	0.0165	0.42	0.78%
#200	0.0029	0.074	4.06%
>#200	<0.0029	<0.074	94.36%

Total Solids (EPA 160.3) 64.52%

Comments: Material retained on #10 sieve consists of rock and shell material.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-B
AMS Sample ID: 2360

Date Sampled: 3/27/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 0-2

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.93%
#40	0.0165	0.42	9.50%
#200	0.0029	0.074	16.82%
>#200	<0.0029	<0.074	72.74%

Total Solids (EPA 160.3) 47.56%

Comments: Material retained on #10 sieve consists of rock and shell material.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-B
AMS Sample ID: 2361

Date Sampled: 3/27/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 2-4

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	2.50%
#40	0.0165	0.42	5.91%
#200	0.0029	0.074	22.72%
>#200	<0.0029	<0.074	68.87%

Total Solids (EPA 160.3) 55.47%

Comments: Material retained on #10 sieve consists of rock and shell material.


AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-B
AMS Sample ID: 2362

Date Sampled: 3/27/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 4-6

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.20%
#40	0.0165	0.42	1.40%
#200	0.0029	0.074	3.37%
>#200	<0.0029	<0.074	95.03%

Total Solids (EPA 160.3) 38.72%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Client Project #: 98105
Project Name: C2M DMMP
AMS Project #: 9810-01
Client Sample ID: (S-8) SP-B
AMS Sample ID: 2363

Date Sampled: 3/27/98
Date Received: 3/31/98
Date Analyzed: 4/2/98
Core Interval (ft.): 6-26.8

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.04%
#40	0.0165	0.42	1.47%
#200	0.0029	0.074	7.88%
>#200	<0.0029	<0.074	90.61%

Total Solids (EPA 160.3) 72.00%

Comments: Material retained on #10 sieve consists of rock material.

KSD
AMS, Inc. Project Manager

QUALITY CONTROL DOCUMENTATION



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 3/31/98

AMS Project Number: 9810-01
Date Received: 3/30/98
Matrix: Sediment
Methods: ASTM D422

Replicate Analysis

Client	Interval	AMS	Particle	U.S. Standard	Sample	Duplicate	RPD	QC Limits
Sample ID	(ft.)	Sample ID	Diameter (mm)	Sieve Mesh #	Result (%)	Result (%)	(%)	% RPD
(S-8) SP-A	0-2	2340	4.76	No. 4	0.00	0.00	0.00	<15
			2.00	No. 10	1.79	1.92	7.00	<15
			0.42	No. 40	8.03	8.44	4.98	<15
			0.074	No. 200	19.30	17.57	9.38	<15
			<0.074	>No. 200	70.88	72.07	1.66	<15

Samples in Batch (AMS ID):

2305	2326	2331	2336
2306	2327	2332	2337
2307	2328	2333	2338
2308	2329	2334	2339
2325	2330	2335	2340


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 4/2/98

AMS Project Number: 9810-01
Date Received: 3/31/98
Matrix: Sediment
Methods: ASTM D422

Replicate Analysis

Client	Interval	AMS	Particle	U.S. Standard	Sample	Duplicate	RPD	QC Limits
Sample ID	(ft.)	Sample ID	Diameter (mm)	Sieve Mesh #	Result (%)	Result (%)	(%)	% RPD
(S-8) SP-B	0-2	2360	4.76	No. 4	0.00	0.00	0.00	<15
			2.00	No. 10	0.93	0.91	2.17	<15
			0.42	No. 40	9.50	8.55	10.52	<15
			0.074	No. 200	16.82	17.34	3.04	<15
			<0.074	>No. 200	72.74	73.20	0.63	<15

Samples in Batch (AMS ID):

2341	2346	2351	2356
2342	2347	2352	2357
2343	2348	2353	2358
2344	2349	2354	2359
2345	2350	2355	2360


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 4/7/98

AMS Project Number: 9810-01
Date Received: 4/3/98
Matrix: Sediment
Methods: ASTM D422

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Particle Diameter (mm)	U.S. Standard Sieve Mesh #	Sample Result (%)	Duplicate Result (%)	RPD (%)	QC Limits % RPD
(G-45) NC-3	0-4	2408	4.76	No. 4	0.00	0.00	0.00	<15
			2.00	No. 10	1.31	1.25	4.69	<15
			0.42	No. 40	0.77	0.80	3.82	<15
			0.074	No. 200	9.91	9.53	3.91	<15
			<0.074	>No. 200	88.01	88.42	0.46	<15

Samples in Batch (AMS ID):

2361	2366	2371	2404
2362	2367	2400	2405
2363	2368	2401	2406
2364	2369	2402	2407
2365	2370	2403	2408


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 3/31/98

AMS Project Number: 9810-01
Date Received: 3/30/98
Matrix: Sediment
Methods: EPA 160.3

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Total Solids Result (%)	Replicate Result (%)	RPD (%)	QC Limits % RPD
(S-8) SP-A	0-2	2340	48.27	48.06	0.44	<15

Samples in Batch (AMS ID):

2305	2326	2331	2336
2306	2327	2332	2337
2307	2328	2333	2338
2308	2329	2334	2339
2325	2330	2335	2340


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 4/2/98

AMS Project Number: 9810-01
Date Received: 3/31/98
Matrix: Sediment
Methods: EPA 160.3

Replicate Analysis

Client	Interval	AMS	Total Solids	Replicate	RPD	QC Limits
Sample ID	(ft.)	Sample ID	Result (%)	Result (%)	(%)	% RPD
(S-8) SP-B	0-2	2360	47.56	46.99	1.21	<15

Samples in Batch (AMS ID):

2341	2346	2351	2356
2342	2347	2352	2357
2343	2348	2353	2358
2344	2349	2354	2359
2345	2350	2355	2360


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 4/7/98

AMS Project Number: 9810-01
Date Received: 4/3/98
Matrix: Sediment
Methods: EPA 160.3

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Total Solids Result (%)	Replicate Result (%)	RPD (%)	QC Limits % RPD
(G-45) NC-3	0-4	2408	34.64	34.49	0.43	<15

Samples in Batch (AMS ID):

2361	2366	2371	2404
2362	2367	2400	2405
2363	2368	2401	2406
2364	2369	2402	2407
2365	2370	2403	2408


AMS, Inc. Project Manager

CHAIN OF CUSTODY



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: ~~GEI Consultants, Inc.~~
APPLIED MARINE SCIENCES

DOCUMENT NUMBER

AMS - 1

Chain-of-Custody Record

Project Name and Number: C2M DMMP 98105						Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890				Phone: 781-721-4000 Fax: 781-721-4073		Preservative None				Remarks	
Samplers: SASKIA COSTINE RICHARD VAN ETEN						Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051				Phone: 860-224-9141 Fax: 860-224-9147		Analysis					
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water										
2305	3/20/98	1550	Sediment	(S1-B) NEP-A, 0-2'	2	X	X							use one container			
2306	3/20/98	1640	"	(S1-B) NEP-B, 0-3.5'	2	X	X							for initial testing			
2307	3/20/98	1805	"	(S1-B) NEP-C, 0-2'	2	X	X							Second container			
2308	3/20/98	1730	"	(S1-B) NEP-F, 0-6'	2	X	X							is for compositing			
														as directed by			
														Steve Lecco			
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal																	
Relinquished by: Saskia Costine			Date/Time: 3/21/98 0930			Received by: FEDERAL EXPRESS			Relinquished by:			Date/Time: 			Received by:		
Relinquished by:			Date/Time: 			Received by:			Relinquished by:			Date/Time: 			Received for Laboratory by: KSDan 3/23/98 1135 hrs		
Method of Shipment: FEDERAL EXPRESS						Remarks:											

IMS ID



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: ~~GEI Consultants, Inc.~~
APPLIED MARINE SCIENCES

DOCUMENT NUMBER

AMS-2.1

Chain-of-Custody Record

pg. 1 of 2

Project Name and Number: C2M 98105
Samples collected by: GEI Consultants, Inc.
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: SASKIA COSTING
RICHARD VAN ETEN
Send data to: Maguire Group Inc.
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None

Analysis

Remarks

AMS ID

2325

2326

2327

2328

2329

2330

2331

2332

Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water				
SALEM	3/27/98	11:55	SED	(S1-B) NEP-E, 0-45'	2	X	X				
	3/27/98	13:00	SED	(S1-B) NEP-D, 0-2'	2	X	X				
	3/27/98	17:30	SED	(S8) MF-C, 0-3'	2	X	X				
	3/23/98	17:45	SED	(S8) MF-C, 3-8.4'	2	X	X				
	3/23/98	18:00	SED	(S8) MF-C, 8.4-15'	2	X	X				
	3/24/98	08:45	SED	(S8) MF-B, 0-5.2'	2	X	X				
	3/24/98	11:45	SED	(S8) MF-B, 5.2-11.4'	2	X	X				
	3/24/98	12:00	SED	(S8) MF-B, 11.4-14'	2	X	X				

TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal

Relinquished by: P. Van Etten	Date/Time: 3/27/98 11:00	Received by: FED EX. AIRBILL #6772558041	Relinquished by:	Date/Time:	Received by:
Relinquished by:	Date/Time: 	Received by:	Relinquished by:	Date/Time: 3/26/98 0900 hrs	Received for Laboratory by: KJ

Method of Shipment: FED EXPRESS
STND. OVRNITE

Remarks:

GEI Consultants, Inc. Winchester, Massachusetts		LABORATORY: GEI Consultants, Inc. APPLIED MARINE SCIENCES		DOCUMENT NUMBER AMS-2.2		Chain-of-Custody Record pg. 2 of 2		
Project Name and Number: C2M 98105		Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890		Phone: 781-721-4000 Fax: 781-721-4073		Preservative		
						None		
Samplers: SASKIA OOSTING RICHARD VAN ETEN		Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051		Phone: 860-224-9141 Fax: 860-224-9147		Analysis		
						Grain Size Analysis % water		
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water	Remarks
SALEM	3/24/98	13:45	SED	(S8) MT-C, 0-5.3'	2	X	X	
	3/24/98	14:00	SED	(S8) MT-C, 13.8-18'	2	X	X	
	3/24/98	14:20	SED	(S8) MT-C, 5.3-13.8'	2	X	X	
	3/24/98	15:50	SED	(S8) MT-A, 0-13.9'	2	X	X	
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal								
Relinquished by:		Date/Time:		Received by:		Date/Time:		Received by:
P. Van Etten		3/25/98 11:00		FED. EX AIRBILL #6772558041		1		
Relinquished by:		Date/Time:		Received by:		Date/Time:		Received for Laboratory by:
		1				3/26/98 0900 hrs		KSDani
Method of Shipment:				Remarks:				
FED. EXPRESS								



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: ^{AMS} ~~GEI Consultants, Inc.~~

DOCUMENT NUMBER

AMS - 3.1

Chain-of-Custody Record

PAGE 1 OF 2

Project Name and Number: C2M 98105						Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890				Phone: 781-721-4000 Fax: 781-721-4073		Preservative None				Remarks
Samplers: SASKIA COSTING RICHARD VAN ETEN						Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051				Phone: 860-224-9141 Fax: 860-224-9147		Analysis				
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water									
2337	✓ 3/25/98	1030	Sed.	(S-8) MF-A, 0-3'	2	X	X					Use one container for initial testing. Second container is for compositing as directed by Steve Lecco				
2338	✓	1045		(S-8) MF-A, 3-13'	2	X	X									
2339	✓	0900		(S-8) MF-B, 0-17'	2	X	X									
2340	✓	1145		(S-8) SP-A, 0-2'	2	X	X									
2341	✓	1230		(S-8) SP-A, 2-4'	2	X	X									
2342	✓	1245		(S-8) SP-A, 4-6'	2	X	X									
2343	X ↓	1400		(S-8) SP-A, 6-24' ^{21 ASD 4/4/98}	2	X	X									
2344	✓ 3/26/98	1000		(S-8) SP-E, 0-2'	2	X	X									
2345	✓ ↓	1010	↓	(S-8) SP-E, 2-4'	2	X	X									
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal																
Relinquished by: Saskia Costing		Date/Time: 3/26/98 2000		Received by: SAMPLE FRIDGE		Relinquished by:		Date/Time: 3/27/98 1230		Received by: Saskia Costing						
Relinquished by: Saskia Costing		Date/Time: 3/27/98 1230		Received by: FEDERAL EXPRESS		Relinquished by:		Date/Time: 3/30/98 1400 hrs		Received for Laboratory by: Kurt S. D.						
Method of Shipment: FEDERAL EXPRESS				Remarks:												

AMS ID



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: GEI Consultants, Inc.
AMS

DOCUMENT NUMBER

AMS 3.2

Chain-of-Cu. Record

PAGE 20F2

Project Name and Number: **C2M 98105**
Samples collected by: **GEI Consultants, Inc.**
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: **SASKIA COSTING**
RICHARD VAN ETTEN
Send data to: **Maguire Group Inc.**
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None

Analysis

Remarks

Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water				
	✓ 3/26/98	1040	Sed.	(S-8)SP-E, 4-6'	2	X	X				
	✓	1140		(S-8)SP-E, 6-29'	2	X	X				
	✓	1400		(S-8)SP-E, 0-2'	2	X	X				
	✓	1410		(S-8)SP-F, 2-4'	2	X	X				
	✓	1445		(S-8)SP-F, 4-6'	2	X	X				
	x ▽	1620	▽	(S-8)SP-F, 6-27'	2	X	X				
				Total:	30						

TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal

Relinquished by: <i>Salvatore E. Costing</i>	Date/Time: <i>3/26/98 2000</i>	Received by: <i>SAMPLE FRIDGE</i>	Relinquished by: <i>▽</i>	Date/Time: <i>3/27/98 1230</i>	Received by: <i>Salvatore E. Costing</i>
Relinquished by: <i>Salvatore E. Costing</i>	Date/Time: <i>3/27/98 1230</i>	Received by: <i>FEDERAL EXPRESS</i>	Relinquished by:	Date/Time: <i>3/31/98 1400 hrs</i>	Received for Laboratory by: <i>Kenneth S. D...</i>
Method of Shipment: <i>FEDERAL EXPRESS</i>					
Remarks:					

AMS ID

2346

2347

2348

2349

2350

2351



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: GEI Consultants, Inc.
Applied Marine Sciences

DOCUMENT NUMBER

AMS-5

Chain-of-Custody Record

Page 1 of 1

Project Name and Number: <i>C2M 98105</i>						Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890				Phone: 781-721-4000 Fax: 781-721-4073				Preservative None				Remarks <i>Use one container for individual analysis. Second container is for compositing as directed by Steve Lecco.</i>
Samplers: <i>SASKIA OOSTING</i> <i>RICHARD VAN ETEN</i>						Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051				Phone: 860-224-9141 Fax: 860-224-9147				Analysis				
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Grain Size Analysis	% water											
<i>Salem</i>	<i>3/28/98</i>	<i>0910</i>	<i>Sed</i>	<i>(S-8) SP-D, 0-2'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2352</i>		<i>0930</i>		<i>(S-8) SP-D, 2-4'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2353</i>		<i>1000</i>		<i>(S-8) SP-D, 4-6'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2354</i>		<i>1140</i>		<i>(S-8) SP-D, 6-24.6'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2355</i>		<i>1530</i>		<i>(S-8) SP-C, 0-2'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2356</i>		<i>1540</i>		<i>(S-8) SP-C, 2-4'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2357</i>		<i>1555</i>		<i>(S-8) SP-C, 4-6'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2358</i>		<i>1710</i>		<i>(S-8) SP-C, 6-26'</i>	<i>2</i>	<i>X</i>	<i>X</i>											
<i>2359</i>																		
<i>2360</i>																		

TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal

Relinquished by: <i>Saskia E. Oosting</i>	Date/Time: <i>3/28/98 1900</i>	Received by: <i>SAMPLE FRIDGE</i>	Relinquished by: _____	Date/Time: <i>3/30/98 0600</i>	Received by: <i>Saskia E. Oosting</i>
Relinquished by: <i>Saskia E. Oosting</i>	Date/Time: <i>3/30/98 0600</i>	Received by: <i>FEDERAL EXPRESS</i>	Relinquished by: _____	Date/Time: <i>3/31/98 1100</i>	Received for Laboratory by: <i>KS</i>
Method of Shipment: <i>FED EX STANDARD OVERNIGHT</i>		Remarks:			

GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: ~~GEI Consultants, Inc.~~
APPLIED MARINE SCIENCES

DOCUMENT NUMBER ~~SED~~
AMS-43.1 3/28/98

Chain-of-Custody Record

Project Name and Number: C2M
98105
Samples collected by: GEI Consultants, Inc.
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Preservative

None

Samplers: SASKIA OOSTING
RICHARD VAN ETEN
Send data to: Maguire Group Inc.
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Analysis

Grain
Size
Analysis

%
water

Remarks

Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers
-------------	------	-----------------	--------	---------------	----------------------

SALEM	3/27/98	10:20	SED.	(58) SP.B, 0-2'	2
	3/27/98	10:30	SED.	(58) SP.B, 2-4'	2
	3/27/98	11:00	SED.	(58) SP.B, 4-6'	2
	3/27/98	13:00	SED.	(58) SP.B, 6-268'	2

Use one container
initial
for analysis.
Second container
is for composition
as directed by
Steve Lecco.

TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received for Laboratory by:

Method of Shipment:

Remarks:

FED. EXPRESS
STANDARD. OVNITE



ATTACHMENT 4
GRAINS SIZE DATA FOR COMPOSITE SAMPLES



Applied Marine Sciences, Inc.

502 N. Highway 3, Suite B • League City, TX 77573 • (281) 554-7272 • Fax (281) 554-6350

May 15, 1998

Mr. Stephen Lecco
Maguire Group, Inc.
One Court Street
New Britain, CT 06051

Re: Massachusetts Coastal Zone Management Dredged Material Management Plan Phase 2
Stage 1, Composite Sample Laboratory Reports (Salem, Gloucester, Fall River, and New
Bedford Harbors), Maguire Group Project No. 98105, AMS Project No. 9810-01.

Dear Mr. Lecco,

Applied Marine Sciences, Inc. (AMS) is pleased to submit the enclosed composite sample laboratory reports for Salem, Gloucester, Fall River, and New Bedford Harbors in support of the above referenced project. Each laboratory report consists of a summary data table, sample results, quality control results, and chain of custody documentation. Electronic copies of each summary data table (Microsoft Excel) and this case narrative (WordPerfect V. 6.0) are on the enclosed diskette.

AMS composited samples for particle size analysis according to the compositing schemes provided by S. Lecco. Compositing was accomplished by subsampling each field sample jar and combining aliquots in a stainless steel bowl for homogenization. Composited sediment samples were analyzed for particle size (ASTM Method D422-Standard Method for Particle-Size Analysis of Soils) and total solids (EPA 160.3-Total Solids).

Total solids was determined on a 50 to 125 gram aliquot of composite sediment which was transferred to a pre-weighed aluminum evaporating dish and weighed to the nearest 0.1 mg. Samples were dried at 105°C for 24 hours and weighed. Percent total solids was calculated by dividing the weight of the oven-dried sediment by the weight of the wet sediment and multiplying by 100. To document quality control, a duplicate analysis was performed with every batch of 20 samples. The duplicate analysis must have a relative percent difference (RPD) of less than 15%.

Particle size was determined on a 100 to 200 gram aliquot of composite sediment which was transferred to a tared beaker and weighed to the nearest 0.1 mg. The samples were washed through a series of nested U.S. standard sieves (#4, #10, #40, and #200) using a pressurized spray nozzle to rapidly separate the individual fractions. Sediment retained on each sieve was washed into a labeled, pre-weighed beaker and dried at 105°C for 24 hours and weighed. The individual fraction weight percentages were calculated by dividing the amount of dried sediment retained on each sieve by the calculated dried sample weight, which was based on the total solids. The percent passing the #200 sieve was calculated by subtracting the sum of material retained on the



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May 15, 1998

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Mr. Stephen Lecco
Maguire Group, Inc.

#4, #10, #40, and #200 sieves, from the total aliquot dry weight derived from the total solids calculation. To document quality control, a duplicate analysis was performed with every batch of 20 samples. The duplicate analysis must have a RPD of less than 15%.

Total solids and particle size results are reported as a dry weight percentage. Replicate total solids and particle size analyses are reported for composite samples NEP-3 (AMS ID 2710), RI-A (AMS ID 2730), AA-A (AMS ID 2750), and FI-B (AMS ID 2767). Precision for total solids and particle size analyses are provided in Tables 1 and 2, respectively. Total solids RPD's ranged from 0.07% to 2.72%, which meet the QC limit of <15% RPD. Particle size RPD's ranged from 0.02% to 10.57% which meet the QC limit of <15% RPD.

Table 1. Total Solids Relative Percent Difference (RPD)

Client ID	AMS Sample ID	RPD (%)
NEP-3	2710	2.72
RI-A	2730	0.07
AA-A	2750	1.41
FI-B	2767	0.92

Table 2. Particle Size Relative Percent Difference (RPD)

Client ID	AMS ID	Sieve #4 RPD	Sieve #10 RPD	Sieve #40 RPD	Sieve #200 RPD	Passing #200 RPD
NEP-3	2710	0.00	7.59	2.53	4.35	0.37
RI-A	2730	0.00	10.52	5.38	0.02	4.95
AA-A	2750	0.00	3.49	2.47	6.01	0.34
FI-B	2767	0.00	10.57	4.00	1.18	0.46



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Maguire Group, Inc.

We look forward to your comments and suggestions for improving subsequent data package submissions.

Sincerely,

Kenneth S. Davis
President

enc. Composite Sample Laboratory Report

c:\ams\maguire\981001\project\lt051598.wpd



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Salem Harbor Particle Size Composite Results Summary Table

Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01

Methods
Particle Size: ASTM D422
Total Solids: EPA 160.3

Composite

Client Sample ID	AMS Sample ID	Date Composited	Date Analyzed	Total Solids (%)	U.S. Standard Sieve Size or Number				Passing #200 (%)
					#4 (%)	#10 (%)	#40 (%)	#200 (%)	
MF-1 (S)	2683	5/7/98	5/8/98	75.40	0.00	0.93	18.39	56.03	24.66
MF-1 (M)	2684	5/7/98	5/8/98	64.38	0.00	0.41	3.16	27.17	69.26
MF-C (3-8.4)	2685	5/7/98	5/8/98	79.59	0.00	0.00	1.35	39.79	58.86
MF-1 (B)	2686	5/7/98	5/8/98	80.27	0.00	0.07	0.53	24.07	75.34
MT-1 (S)	2687	5/7/98	5/8/98	79.64	0.00	0.68	5.27	66.62	27.43
MT-1 (B)	2688	5/7/98	5/8/98	71.49	0.00	1.31	1.59	25.58	71.51
SP-1 (0-2)	2699	5/7/98	5/8/98	49.33	0.00	2.53	5.77	20.36	71.34
SP-1 (2-4)	2700	5/7/98	5/8/98	42.97	0.00	1.04	2.70	11.52	84.74
SP-1 (4-6)	2701	5/7/98	5/8/98	41.63	0.00	0.14	2.14	7.11	90.61
SP-A (6-21)	2702	5/7/98	5/8/98	85.89	0.00	1.92	13.17	40.38	44.52
SP-1 (6-B)	2703	5/7/98	5/8/98	68.52	0.00	0.94	1.12	6.47	91.47
SP-2 (0-2)	2704	5/7/98	5/8/98	67.42	0.00	1.70	9.19	48.95	40.17
SP-2 (2-4)	2705	5/7/98	5/8/98	81.29	0.00	1.94	10.30	63.44	24.32
SP-2 (4-6)	2706	5/7/98	5/8/98	78.86	0.00	0.31	1.36	66.91	31.41
SP-2 (6-B)	2707	5/7/98	5/8/98	78.39	0.00	0.84	0.69	23.96	74.51
NEP-1	2708	5/7/98	5/8/98	50.51	0.00	0.38	1.05	10.82	87.76
NEP-2	2709	5/7/98	5/8/98	37.95	0.00	1.49	2.25	4.38	91.89
NEP-3	2710	5/7/98	5/8/98	46.40	0.00	0.38	1.17	9.16	89.29


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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MF-1(S)
AMS Sample ID: 2683

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.93%
#40	0.0165	0.42	18.39%
#200	0.0029	0.074	56.03%
>#200	<0.0029	<0.074	24.66%

Total Solids (EPA 160.3) 75.40%

Comments: Material retained on #10 sieve consists of rock and shell material.

KSD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MF-1(M)
AMS Sample ID: 2684

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.41%
#40	0.0165	0.42	3.16%
#200	0.0029	0.074	27.17%
>#200	<0.0029	<0.074	69.26%

Total Solids (EPA 160.3) 64.38%

Comments: Material retained on #10 sieve consists of rock and shell material.

KD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MF-C (3-8.4)
AMS Sample ID: 2685

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.00%
#40	0.0165	0.42	1.35%
#200	0.0029	0.074	39.79%
>#200	<0.0029	<0.074	58.86%

Total Solids (EPA 160.3) 79.59%

Comments: _____

K. S. [Signature]
AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MF-1 (B)
AMS Sample ID: 2686

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.07%
#40	0.0165	0.42	0.53%
#200	0.0029	0.074	24.07%
>#200	<0.0029	<0.074	75.34%

Total Solids (EPA 160.3) 80.27%

Comments: Material retained on #10 sieve consists of rock fragments.

KSD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MT-1 (S)
AMS Sample ID: 2687

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.68%
#40	0.0165	0.42	5.27%
#200	0.0029	0.074	66.62%
>#200	<0.0029	<0.074	27.43%

Total Solids (EPA 160.3) 79.64%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KST
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: MT-1 (B)
AMS Sample ID: 2688

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.31%
#40	0.0165	0.42	1.59%
#200	0.0029	0.074	25.58%
>#200	<0.0029	<0.074	71.51%

Total Solids (EPA 160.3) 71.49%

Comments: Material retained on #10 sieve consists of rock fragments.

KSD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-1 (0-2)
AMS Sample ID: 2699

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	2.53%
#40	0.0165	0.42	5.77%
#200	0.0029	0.074	20.36%
>#200	<0.0029	<0.074	71.34%

Total Solids (EPA 160.3) 49.33%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-1 (2-4)
AMS Sample ID: 2700

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.04%
#40	0.0165	0.42	2.70%
#200	0.0029	0.074	11.52%
>#200	<0.0029	<0.074	84.74%

Total Solids (EPA 160.3) 42.97%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-1 (4-6)
AMS Sample ID: 2701

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.14%
#40	0.0165	0.42	2.14%
#200	0.0029	0.074	7.11%
>#200	<0.0029	<0.074	90.61%

Total Solids (EPA 160.3) 41.63%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KSD

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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-A (6-21)
AMS Sample ID: 2702

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.92%
#40	0.0165	0.42	13.17%
#200	0.0029	0.074	40.38%
>#200	<0.0029	<0.074	44.52%

Total Solids (EPA 160.3) 85.89%

Comments: Material retained on #10 sieve consists of rock fragments.

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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-1 (6-B)
AMS Sample ID: 2703

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.94%
#40	0.0165	0.42	1.12%
#200	0.0029	0.074	6.47%
>#200	<0.0029	<0.074	91.47%

Total Solids (EPA 160.3) 68.52%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KSD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-2 (0-2)
AMS Sample ID: 2704

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.70%
#40	0.0165	0.42	9.19%
#200	0.0029	0.074	48.95%
>#200	<0.0029	<0.074	40.17%

Total Solids (EPA 160.3) 67.42%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KSD
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-2 (2-4)
AMS Sample ID: 2705

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.94%
#40	0.0165	0.42	10.30%
#200	0.0029	0.074	63.44%
>#200	<0.0029	<0.074	24.32%

Total Solids (EPA 160.3) 81.29%

Comments: Material retained on #10 sieve consists of rock fragments.

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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-2 (4-6)
AMS Sample ID: 2706

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.31%
#40	0.0165	0.42	1.36%
#200	0.0029	0.074	66.91%
>#200	<0.0029	<0.074	31.41%

Total Solids (EPA 160.3) 78.86%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: SP-2 (6-B)
AMS Sample ID: 2707

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.84%
#40	0.0165	0.42	0.69%
#200	0.0029	0.074	23.96%
>#200	<0.0029	<0.074	74.51%

Total Solids (EPA 160.3) 78.39%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

K. D. ...

AMS, Inc. Project Manager



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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: NEP-1
AMS Sample ID: 2708

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.38%
#40	0.0165	0.42	1.05%
#200	0.0029	0.074	10.82%
>#200	<0.0029	<0.074	87.76%

Total Solids (EPA 160.3) 50.51%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KSDani
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: NEP-2
AMS Sample ID: 2709

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	1.49%
#40	0.0165	0.42	2.25%
#200	0.0029	0.074	4.38%
>#200	<0.0029	<0.074	91.89%

Total Solids (EPA 160.3) 37.95%

Comments: Material retained on #10 sieve consists of rock and shell fragments.

KSA
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Client Project #: 98105
Project Name: CZM DMMP
AMS Project #: 9810-01
Client Sample ID: NEP-3
AMS Sample ID: 2710

Date Sampled: 5/7/98
Date Analyzed: 5/8/98

Particle Size (ASTM D422)

U.S. Standard Sieve Size or Number	Diameter (inches)	Diameter (mm)	Fraction Weight (%)
#4	0.187	4.76	0.00%
#10	0.079	2.00	0.38%
#40	0.0165	0.42	1.17%
#200	0.0029	0.074	9.16%
>#200	<0.0029	<0.074	89.29%

Total Solids (EPA 160.3) 46.40%

Comments: Material retained on #10 sieve consists of rock and shell fragments.


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QUALITY CONTROL DOCUMENTATION



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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 5/8/98

AMS Project Number: 9810-01
Date Composited: 5/7/98
Matrix: Sediment
Methods: ASTM D422

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Particle Diameter (mm)	U.S. Standard Sieve Mesh #	Sample Result (%)	Duplicate Result (%)	RPD (%)	QC Limits % RPD
NEP-3	N/A	2710	4.76	No. 4	0.00	0.00	0.00	<15
			2.00	No. 10	0.38	0.41	7.59	<15
			0.42	No. 40	1.17	1.20	2.53	<15
			0.074	No. 200	9.16	8.77	4.35	<15
			<0.074	>No. 200	89.29	89.62	0.37	<15

Samples in Batch (AMS ID):

2671	2686	2701	2706
2672	2687	2702	2707
2683	2688	2703	2708
2684	2699	2704	2709
2685	2700	2705	2710


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AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 5/8/98

AMS Project Number: 9810-01
Date Composited: 5/7/98
Matrix: Sediment
Methods: EPA 160.3

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Total Solids Result (%)	Replicate Result (%)	RPD (%)	QC Limits % RPD
NEP-3	N/A	2710	46.40	47.68	2.72	<15

Samples in Batch (AMS ID):

2671	2686	2701	2706
2672	2687	2702	2707
2683	2688	2703	2708
2684	2699	2704	2709
2685	2700	2705	2710


AMS, Inc. Project Manager

COMPOSITING SCHEME

Compositing Scheme for Salem Sediment Samples

Combine these samples	To create this composite for analysis
(S8)MFA, 0-3 + (S8) MFB, 0-5.2 + (S8) MFC, 0-3	MF-1(S)
(S8)MFA, 3-13 + (S8)MFB, 5.2-11.4	MF-1(M)
(S8)MFC, 3-8.4	MF-C(3-8.4)
(S8)MFB, 11.4-14 + (S8)MFC, 8.4-15	MF-1(B)
(S8) MTA, 0-13.9 + (S8) MTB, 0-17 + (S8) MTC 0-5.3	MT-1(S)
(S8) MTC, 5.3-13.8 + (S8) MTC 13.8-18	MT-1(B)
(S8) SPA, 0-2 + (S8) SPB, 0-2 + (S8) SPC, 0-2	SP-1(0-2)
(S8) SPA, 2-4 + (S8) SPB, 2-4 + (S8) SPC, 2-4	SP-1(2-4)
(S8) SPA, 4-6 + (S8) SPB, 4-6 + (S8) SPC, 4-6	SP-1(4-6)
(S8) SPA, 6-21	SP-A (6-21)
(S8)SPB, 6-26.8 + SPC, 6-26	SP-1 (6-B)
(S8)SPD, 0-2 + (S8)SPE, 0-2 + (S8)SPF, 0-2	SP-2(0-2)
(S8)SPD, 2-4 + (S8)SPE, 2-4 + (S8)SPF, 2-4	SP-2(2-4)
(S8)SPD, 4-6 + (S8)SPE, 4-6 + (S8)SPF, 4-6	SP-2(4-6)
(S8)SPD, 6-24.6 + (S8)SPE, 6-29 + (S8)SPF, 6-27	SP-2(6-B)
(S1B)NEP-A, 0-2 + (S1B)NEP-B, 0-3.5	NEP-1
(S1B)NEP-C, 0-2 + (S1B)NEP-D, 0-2	NEP-2
(S1B)NEP-E, 0-4.5 + (S1B)NEP-F, 0-6	NEP-3
TOTAL # SAMPLES	18

Note: (S) suffix denotes surface
 (M) suffix denotes middle
 (B) suffix denotes bottom
 No suffix denotes no vertical stratification

Compositing scheme agreed to by P. Nimiskern (COE) and S. Lecco (Maguire) on 4/23/98

QUALITY CONTROL DOCUMENTATION



Applied Marine Sciences, Inc.

502 N. Highway 3, Suite B • League City, TX 77573 • (281) 554-7272 • Fax (281) 554-6356

AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 5/8/98

AMS Project Number: 9810-01
Date Compositing: 5/7/98
Matrix: Sediment
Methods: ASTM D422

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Particle Diameter (mm)	U.S. Standard Sieve Mesh #	Sample Result (%)	Duplicate Result (%)	RPD (%)	QC Limits % RPD
NEP-3	N/A	2710	4.76	No. 4	0.00	0.00	0.00	<15
			2.00	No. 10	0.38	0.41	7.59	<15
			0.42	No. 40	1.17	1.20	2.53	<15
			0.074	No. 200	9.16	8.77	4.35	<15
			<0.074	>No. 200	89.29	89.62	0.37	<15

Samples in Batch (AMS ID):

2671	2686	2701	2706
2672	2687	2702	2707
2683	2688	2703	2708
2684	2699	2704	2709
2685	2700	2705	2710


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

502 N. Highway 3, Suite B • League City, TX 77573 • (281) 554-7272 • Fax (281) 554-6356

AMS QUALITY CONTROL REPORT

Project Number: 98105
Project Title: CZM DMMP
Client: Maguire Group, Inc.
Date Analyzed: 5/8/98

AMS Project Number: 9810-01
Date Composited: 5/7/98
Matrix: Sediment
Methods: EPA 160.3

Replicate Analysis

Client Sample ID	Interval (ft.)	AMS Sample ID	Total Solids Result (%)	Replicate Result (%)	RPD (%)	QC Limits % RPD
NEP-3	N/A	2710	46.40	47.68	2.72	<15

Samples in Batch (AMS ID):

2671	2686	2701	2706
2672	2687	2702	2707
2683	2688	2703	2708
2684	2699	2704	2709
2685	2700	2705	2710


AMS, Inc. Project Manager

COMPOSITING SCHEME

Compositing Scheme for Salem Sediment Samples

Combine these samples	To create this composite for analysis
(S8)MFA, 0-3 + (S8) MFB, 0-5.2 + (S8) MFC, 0-3	MF-1(S)
(S8)MFA, 3-13 + (S8)MFB, 5.2-11.4	MF-1(M)
(S8)MFC, 3-8.4	MF-C(3-8.4)
(S8)MFB, 11.4-14 + (S8)MFC, 8.4-15	MF-1(B)
(S8) MTA, 0-13.9 + (S8) MTB, 0-17 + (S8) MTC 0-5.3	MT-1(S)
(S8) MTC, 5.3-13.8 + (S8) MTC 13.8-18	MT-1(B)
(S8) SPA, 0-2 + (S8) SPB, 0-2 + (S8) SPC, 0-2	SP-1(0-2)
(S8) SPA, 2-4 + (S8) SPB, 2-4 + (S8) SPC, 2-4	SP-1(2-4)
(S8) SPA, 4-6 + (S8) SPB, 4-6 + (S8) SPC, 4-6	SP-1(4-6)
(S8) SPA, 6-21	SP-A (6-21)
(S8)SPB, 6-26.8 + SPC, 6-26	SP-1 (6-B)
(S8)SPD, 0-2 + (S8)SPE, 0-2 + (S8)SPF, 0-2	SP-2(0-2)
(S8)SPD, 2-4 + (S8)SPE, 2-4 + (S8)SPF, 2-4	SP-2(2-4)
(S8)SPD, 4-6 + (S8)SPE, 4-6 + (S8)SPF, 4-6	SP-2(4-6)
(S8)SPD, 6-24.6 + (S8)SPE, 6-29 + (S8)SPF, 6-27	SP-2(6-B)
(S1B)NEP-A, 0-2 + (S1B)NEP-B, 0-3.5	NEP-1
(S1B)NEP-C, 0-2 + (S1B)NEP-D, 0-2	NEP-2
(S1B)NEP-E, 0-4.5 + (S1B)NEP-F, 0-6	NEP-3
TOTAL # SAMPLES	18

Note: (S) suffix denotes surface
 (M) suffix denotes middle
 (B) suffix denotes bottom
 No suffix denotes no vertical stratification

Compositing scheme agreed to by P. Nimiskern (COE) and S. Lecco (Maguire) on 4/23/98

**ATTACHMENT 5
METALS REPORT**



Case Narrative

ETR: 40612

Client: Maguire Group

Project: CZM - Salem Port Development

Date Received:

03/26/98 & 03/30/98

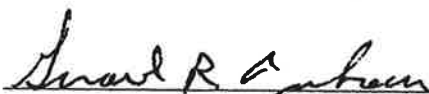
All analyses were performed within holding time and with appropriate quality control measures except where noted. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted.

Sample handling and storage

Sediment samples from Salem harbor were received on 3/26/98 and 3/30/98. They were frozen upon receipt at the laboratory and maintained frozen until removed from the freezer on 5/08/98. The samples were composited on 05/11/98 according to the compositing scheme faxed on 04/24/98.

The enclosed results of analyses are representative of the samples as received by the laboratory. Woods Hole Group makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Woods Hole Group. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by:



Woods Hole Group Environmental Laboratories

Date: 6-4-98

RECEIVED

JUN 25 1998

MAGUIRE GROUP CT.

Compositing Scheme for Salem Sediment Samples

40612

Combine these samples	To create this composite for analysis
(S8)MFA, 0-3 ^A + (S8) MFB, 0-5.2 ^B + (S8) MFC, 0-3 ^C	MF-1(S) - 1D
(S8)MFA, 3-13 ^A + (S8)MFB, 5.2 ^B -11.4	MF-1(M) - 2C
(S8)MFC, 3-8.4	MF-C(3-8.4) - 3
(S8)MFB, 11.4-14 ^A + (S8)MFC, 8.4-15 ^B	MF-1(B) - 4C
(S8) MTA, 0-13.9 ^A + (S8) MTB, 0-17 ^B + (S8) MTC 0-5.3 ^C	MT-1(S) - 5D
(S8) MTC, 5.3 ^A -13.8 + (S8) MTC 13.8-18 ^B	MT-1(B) - 6C
(S8) SPA, 0-2 ^A + (S8) SPB, 0-2 ^B + (S8) SPC, 0-2 ^C	SP-1(0-2) - 7D
(S8) SPA, 2-4 ^A + (S8) SPB, 2-4 ^B + (S8) SPC, 2-4 ^C	SP-1(2-4) - 8D
(S8) SPA, 4-6 ^A + (S8) SPB, 4-6 ^B + (S8) SPC, 4-6 ^C	SP-1(4-6) - 9D
(S8) SPA, 6-21	SP-A (6-21) - 10
(S8)SPB, 6-26.8 ^A + SPC, 6-26 ^B	SP-1 (6-B) - 11C
(S8)SPD, 0-2 ^A + (S8)SPE, 0-2 ^B + (S8)SPF, 0-2 ^C	SP-2(0-2) - 12D
(S8)SPD, 2-4 ^A + (S8)SPE, 2-4 ^B + (S8)SPF, 2-4 ^C	SP-2(2-4) - 13D
(S8)SPD, 4-6 ^A + (S8)SPE, 4-6 ^B + (S8)SPF, 4-6 ^C	SP-2(4-6) - 14D
(S8)SPD, 6-24.6 ^A + (S8)SPE, 6-29 ^B + (S8)SPF, 6-27 ^C	SP-2(6-B) - 15D
(S1B)NEP-A, 0-2 + (S1B)NEP-B, 0-3.5	NEP-1
(S1B)NEP-C, 0-2 + (S1B)NEP-D, 0-2	NEP-2
(S1B)NEP-E, 0-4.5 + (S1B)NEP-F, 0-6	NEP-3
TOTAL # SAMPLES	18

Note: (S) suffix denotes surface
 (M) suffix denotes middle
 (B) suffix denotes bottom
 No suffix denotes no vertical stratification

Compositing scheme agreed to by P. Nimiskern (COE) and S. Lecco (Maguire) on 4/23/98



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: Woods Hole Group

DOCUMENT NUMBER

WHS-2.2

Chain-of-Custody Record

pg 2 of 2

Project Name and Number: C2M 98105 Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890 Phone: 781-721-4000 Fax: 781-721-4073						Preservative None None None				Remarks Total metals are: Ag, As, Cd, Cr, Cu Hg, Ni, Pb, Zn Please wait with analysis until notified by Steve Lecco	
Samplers: SASKIA OSTING RICHARD VAN ETEN Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051 Phone: 860-224-9141 Fax: 860-224-9147						Analysis Total Metals TPH 418.1 Total Organic Carbon					
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Total Metals	TPH 418.1	Total Organic Carbon			
SALEM	3/24/98	13:45	SED	(SB) MT-C, 0-5.3'	1	X	X	X			
	3/24/98	14:00	SED	(SB) MT-C, 13.8-18.	1	X	X	X			
	3/24/98	14:20	SED	(SB) MT-C, 5.3-13.8	1	X	X	X			
	3/24/98	15:50	SED	(SB) MT-A, 0-13.9'	1	X	X	X			
TOTAL					12						
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal											
Relinquished by: R. Van Eten		Date/Time: 3/24/98 20:50		Received by: GEI SAMPLE FRIDGE		Relinquished by: [Signature]		Date/Time: 3/25/98 0600		Received by: Saskia Oosting	
Relinquished by: Saskia Oosting		Date/Time: 3/24/98 12:45		Received by: Ed Butler		Relinquished by: Ed Butler		Date/Time: 3/24/98 13:10		Received for Laboratory by: _____	
Method of Shipment: COURIER				Remarks:							

Project Name and Number: C2M 98105		Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890		Phone: 781-721-4000 Fax: 781-721-4073		Preservative				Remarks	
Samplers: SASKIA COSTING RICHARD VAN ETTEN		Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051		Phone: 860-224-9141 Fax: 860-224-9147		Analysis					
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Total Metals	TPH 418.1	Total Organic Carbon			
SALEM	3/23/98	11:55	SED	(S1-B) NEP-E, 0-4.5'	1	X	X	X			
	3/23/98	13:00	SED	(S1-B) NEP-D, 0-2'	1	X	X	X		Total metals are: Ag, As, Cd, Cr, Cu	
	3/23/98	17:30	SED	(S8) MF-C, 0-3'	1	X	X	X		Please wait with analysis until notified by Steve Lecco	
	3/23/98	17:45	SED	(S8) MF-C, 3-8.4'	1	X	X	X			
	3/23/98	18:00	SED	(S8) MF-C, 8.4-15'	1	X	X	X			
	3/24/98	08:45	SED	(S8) MF-B, 0-5.2'	1	X	X	X			
	3/24/98	11:45	SED	(S8) MF-B, 5.2-11.4'	1	X	X	X			
✓	3/24/98	12:00	SED	(S8) MF-B, 11.4-14'	1	X	X	X			
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal											
Relinquished by: R. Van Etten		Date/Time: 3/24/98 20:50		Received by: GET SAMPLE FRIDGE		Relinquished by:		Date/Time: 3/25/98 0600		Received by: Saskia Costing	
Relinquished by: Saskia Costing		Date/Time: 3/24/98 12:45		Received by: Ed Butta		Relinquished by: Ed Butta		Date/Time: 3/24/98 3:10		Received for Laboratory by:	
Method of Shipment: COURIER				Remarks:							

Sample Receipt Checklist

Client: <u>LEI</u>	Receipt date: <u>3/26/98</u>
Project:	Log-in date:
ETR #:	Inspection/ Log-in by:

Comments / Notes

Were samples shipped? yes, FedEx / UPS / other _____ <u>no</u>, <u>courier pick up</u> / hand delivered	
Is bill of lading retained? yes, tracking# _____ no, unavailable / <u>na</u>	
Indicate cooler temperature upon opening: <u>11</u> °C / na	
Were samples chilled? <u>yes</u> / no	
Chain-of-Custody present? <u>yes</u> / no complete? <u>yes</u> / no	
Custody Seals present on cooler? yes / <u>no</u> on bottles? yes / <u>no</u> intact? yes / no / na	
Were sample containers intact? <u>yes</u> / no	
If chemical preservation is appropriate- Were samples field preserved? yes / no / na	
Preservation (pH) verified at lab for EVERY bottle? (not VOAs) yes / no If NO:	
Preservation (pH) verified for sample #(s):	
Were sample received within hold time? yes / no	Samples Frozen upon Receipt at Lab, 3/26/98. Removed from Freezer 5/8/98 Compositing 5/11/98
Discrepancy between bottle labels & chain? yes / no	
Was proj. mgr. notified of any problems? yes / no / na	
proj. mgr. acknowledgement:	



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: Woods Hole Group

DOCUMENT NUMBER

WHG-3.1

Chain-of-Custody Record

PAGE 1 OF 2

Project Name and Number: **C2M 98105**
Samples collected by: **GEI Consultants, Inc.**
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: **SASKIA COSTING**
RICHARD VAN ETTEN
Send data to: **Maguire Group Inc.**
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None

None

None

Analysis

Remarks

Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Total Metals	TPH 418.1	Total Organic Carbon			Remarks
	3/25/98	1030	Sed.	(S-8) MF-A, 0-3'	1	X	X	X			Total metals are:
		1045		(S-8) MF-A, 3-13'	1	X	X	X			Ag, As, Cd, Cr, Cu
		0900		(S-8) MT-B, 0-17'	1	X	X	X			Hg, Ni, Pb, Zn
		1145		(S-8) SP-A, 0-2'	1	X	X	X			Please wait with
		1230		(S-8) SPA, 2-4'	1	X	X	X			analysis until
		1245		(S-8) SP-A, 4-6'	1	X	X	X			notified by
		1400		(S-8) SP-A, 6-21'	1	X	X	X			Steve Lecco
	3/26/98	1000		(S-8) SP-E, 0-2'	1	X	X	X			(S-8) SP-A, 6-29' per SL 3/2/98
	3/26/98	1010		(S-8) SP-E, 2-4'	1	X	X	X			

TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal

Relinquished by: Saskia Costing	Date/Time: 3/26/98 2000	Received by: SAMPLE FRIDGE	Relinquished by: D	Date/Time: 3/30/96 0600	Received by: Saskia Costing
Relinquished by: Saskia Costing	Date/Time: 3/26/98 10:20	Received by: Ed Butler	Relinquished by: Ed Butler	Date/Time: 3/26/98 11:40	Received for Laboratory by:

Method of Shipment: **COURIER**

Remarks:

Project Name and Number: *C2M 98105*
Samples collected by: GEI Consultants, Inc.
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: *SASKIA COSTING*
RICHARD VAN ETTEN
Send data to: Maguire Group Inc.
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None

None

None

Analysis

Remarks

Station No.

Date

Time
(hours)

Matrix

Sample Number

No. of
Containers

Total
Metals

TPH
418.1

Total
Organic
Carbon

Total metals are:

Ag, As, Cd, Cr, Cu

Hg, Ni, Pb, Zn

Please wait with
analysis until
notified by
Steve Lecco

Total : 15

TAT:

24 hr

48 hr

72 hr

Normal

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received by:

Relinquished by:

Date/Time:

Received for Laboratory by:

Method of Shipment:

COURIER

Remarks:

GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: Woods Hole Group

DOCUMENT NUMBER

WHG-3.1

Chain-of-Custody Record

Project Name and Number: C2M 98105		Samples collected by: GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890		Phone: 781-721-4000 Fax: 781-721-4073		Preservative None None None				Remarks Total metals are: Ag, As, Cd, Cr, Cu Hg, Ni, Pb, Zn Please wait with analysis until notified by Steve Lecco
Samplers: SASKIA OSTING RICHARD VAN ETEN		Send data to: Maguire Group Inc. Attn: Steve Lecco One Court Street New Britain, CT 06051		Phone: 860-224-9141 Fax: 860-224-9147		Analysis				
Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Total Metals	TPH 418.1	Total Organic Carbon		
SALEM	3/27/98	10:20	SED.	(S8) SP-B, 0-2'	1	X	X	X		
	3/27/98	10:30	SED.	(S8) SP-B, 2-4'	1	X	X	X		
	3/27/98	11:00	SED.	(S8) SP-B, 4-6'	1	X	X	X		
	3/27/98	13:00	SED.	(S8) SP-B, 6-26.8'	1	X	X	X		
TOTAL:					4					
TAT: _____ 24 hr _____ 48 hr _____ 72 hr _____ Normal										
Relinquished by: R. Van Etten		Date/Time: 3/27/98 17:00		Received by: GEI SAMPLE FRINGE		Relinquished by: _____		Date/Time: 3/30/96 0600		Received by: Saskia E. Oosting
Relinquished by: Saskia E. Oosting		Date/Time: 3/28/98 10:20		Received by: Ed Butler		Relinquished by: Ed Butler		Date/Time: 3/28/98 11:40		Received for Laboratory by:
Method of Shipment: COURIER				Remarks:						

Project Name and Number: **C2M 98105**
Samples collected by: **GEI Consultants, Inc.**
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: **SASKIA OSTING**
RICHARD VAN ETEN
Send data to: **Maguire Group Inc.**
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None

None

None

Analysis

Total Metals

TPH 418.1

Total Organic Carbon

Remarks

Station No.

Date

Time (hours)

Matrix

Sample Number

No. of Containers

Salem

3/28/98

0910

Sed

(S-8) SP-D, 0-2'

1

X

X

X

Total metals are:

Ag, As, Cd, Cr, Cu

0930

(S-8) SP-D, 2-4'

1

X

X

X

Hg, Ni, Pb, Zn

1000

(S-8) SP-D, 4-6'

1

X

X

X

Please wait with analysis until

1140

(S-8) SP-D, 6-24.6

1

X

X

X

notified by Steve Lecco

1530

(S-8) SP-C, 0-2'

1

X

X

X

1540

(S-8) SP-C, 2-4'

1

X

X

X

1555

(S-8) SP-C, 4-6'

1

X

X

X

1710

(S-8) SP-C, 6-26

1

X

X

X

TOTAL:

8

TAT:

24 hr

48 hr

72 hr

Normal

Relinquished by:

Sobuz Elosky

Date/Time:

3/28/98 1900

Received by:

SAMPLE FRIDGE

Relinquished by:

Date/Time:

3/30/98 0600

Received by:

Sobuz Elosky

Relinquished by:

Sobuz Elosky

Date/Time:

3/30/98 10:20

Received by:

Ed Butcher

Relinquished by:

Ed Butcher

Date/Time:

3/30/98 11:40

Received for Laboratory by:

Method of Shipment:

COURIER

Remarks:

Sample Receipt Checklist

Client: <u>B.F.I.</u>	Receipt date: <u>3/30/98</u>
Project:	Log-in date:
ETR #:	Inspection/ Log-in by:

Comments / Notes

Were samples shipped? yes, FedEx / UPS / other _____ no, <u>courier pick up</u> / hand delivered	Samples Frozen upon receipt at Lab 5/30/98. Samples removed from freezer 5/8/98, Compositing 5/11/98.
Is bill of lading retained? yes, tracking# _____ no, unavailable / <u>na</u>	
Indicate cooler temperature upon opening: <u>18</u> °C / na	
Were samples chilled? <u>yes</u> / no	
Chain-of-Custody present? <u>yes</u> / no complete? <u>yes</u> / no	
Custody Seals present on cooler? yes / <u>no</u> on bottles? yes / <u>no</u> intact? yes / no / na	
Were sample containers intact? <u>yes</u> / no	
If chemical preservation is appropriate- Were samples field preserved? yes / no / na	
Preservation (pH) verified at lab for EVERY bottle? (not VOAs) yes / no If NO:	
Preservation (pH) verified for sample #(s):	
Were sample received within hold time? yes / no	
Discrepancy between bottle labels & chain? yes / no	
Was proj. mgr. notified of any problems? yes / no / na proj. mgr. acknowledgement:	

Inorganic Quality Control Summary

Client: Maguire Group
Project: Salem Port Development
ETR: 40612

Salem Harbor

Parameter	sample ID	analysis date	blank (mg/L)	sample result (mg/kg)	RPD of duplicates	MS added (mg/kg)	%recovery matrix spike	LCS conc. (mg/kg)	% recovery LCS	CRM conc. (mg/kg)	% recovery CRM	quali-fier
Arsenic	40612-2C	05/22/98	<0.002	6.3	3	1.3	87	151	98	26.2	66	
Cadmium	40612-2C	05/27/98	<0.005	0.37	8	1.32	77	136	99	2.11	90	
Chromium	40612-2C	05/21/98	<0.020	30	12	132	80	57.6	100	90.7	46	
Copper	40612-2C	05/21/98	<0.010	8.6	1	132	83	60.0	98	310	92	
Lead	40612-2C	06/01/98	<0.002	6.9	4	1.32	98	84.9	97	183	83	
Nickel	40612-2C	05/27/98	<0.020	18	6	132	80	138	101	39.5	62	
Mercury	40612-2C	06/02/98	<0.0002	<0.05	0	0.47	104	1.13	108	3.04	119	
Zinc	40612-2C	05/21/98	<0.010	38	3	132	77	986	98	364	84	
TOC	40612-2F	05/15/98	<100	16000	3.4	11662	90	6250	108	NA	NA	
TPH-IR	40612-2	05/25/98	<2	43	7.1	492	104	2530	103	NA	NA	

Qualifiers & Notes:

Reported QC is for associated batch

LCS = laboratory control standard

RPD = relative percent difference

A = Recovery is for method standard in place of matrix spike.

C= Not spiked 2X> than sample concentration

L= LCS is a laboratory fortified blank.

M = Matrix spike concentration too small relative to sample concentration for effective recovery.

N = See narrative

P = Post digestion spike recovery

R = RPD criteria not applicable to results <5X the detection limit.

X = It is not possible to calculate % RPD, result is BDL, duplicate is just above detection.



Maguire Group Inc.
One Court Street
New Britain, CT 06051

Attention : Steve Lecco

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-1D MF-1(S) : [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil), Total Recoverable	20 f		05/23/98	MAK
7060	Arsenic, Total	3.9 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.16 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	29 f	05/19/98	05/21/98	LMV
6010	Copper, Total	11 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	0.016 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	12 f	05/19/98	05/27/98	LMV
6010	Lead, Total	29 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	29 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	8000 f		05/15/98	MAK
IN623	% Solids	76.7 c		05/12/98	KJB
40612-1E MF-1(S) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	8000 f		05/15/98	MAK
40612-2C MF-1(M) : [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	42 f		05/23/98	MAK
7060	Arsenic, Total	6.3 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.37 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	30 f	05/19/98	05/21/98	LMV
6010	Copper, Total	8.7 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	18 f	05/19/98	05/27/98	LMV
7421	Lead, Total	6.9 f	05/19/98	06/01/98	LMV

Comments/Notes

f = mg/Kg dry weight
c = %

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-2C MF-1(M) : [C] 05/11/98 (SEDIMENT)					
6010	Zinc, Total	38 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	17000 f		05/15/98	MAK
IN623	% Solids	65.6 c		05/12/98	KJB
40612-2E MF-1(M) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	17000 f		05/15/98	MAK
40612-2D MF-1(M) DUP: [DUP] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	43 f		05/23/98	MAK
7060	Arsenic, Total	6.2 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.31 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	34 f	05/19/98	05/21/98	LMV
6010	Copper, Total	8.6 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	17 f	05/19/98	05/27/98	LMV
7421	Lead, Total	7.4 f	05/19/98	06/01/98	LMV
6010	Zinc, Total	39 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	16000 f		05/15/98	MAK
IN623	% Solids	66.0 c		05/12/98	KJB
40612-2F MF-1(M) QUAD: [DUP] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	16000 f		05/15/98	MAK

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-3	MF-C(3-8.4) : [C] 05/11/98 (SEDIMENT)				
418.1	TPH by IR (Soil)	330 f		05/23/98	MAK
7060	Arsenic, Total	8.3 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	<0.1 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	36 f	05/19/98	05/21/98	LMV
6010	Copper, Total	10 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	21 f	05/19/98	05/27/98	LMV
6010	Lead, Total	11 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	33 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	3600 f		05/15/98	MAK
IN623	% Solids	79.9 c		05/12/98	KJB
40612-3A	MF-C(3-8.4) DUP: [D] 05/11/98 (SEDIMENT)				
9060	Total Organic Carbon	3500 f		05/15/98	MAK
40612-4C	MF-1(B) : [C] 05/11/98 (SEDIMENT)				
418.1	TPH by IR (Soil)	110 f		05/23/98	MAK
7060	Arsenic, Total	11 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	<0.1 f	05/19/98	06/01/98	LMV
6010	Chromium, Total	46 f	05/19/98	05/27/98	LMV
6010	Copper, Total	17 f	05/19/98	05/27/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	34 f	05/19/98	05/27/98	LMV
6010	Lead, Total	13 f	05/19/98	05/21/98	LMV

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date.	Analysis Date	Analyst
40612-4C MF-1(B) : [C] 05/11/98 (SEDIMENT)					
6010	Zinc, Total	51 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	500 f		05/15/98	MAK
IN623	% Solids	79.6 c		05/12/98	KJB
40612-4D MF-1(B) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	400 f		05/15/98	MAK
40612-5D MT-1(S) : [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	63 f		05/23/98	MAK
7060	Arsenic, Total	5.2 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.13 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	34 f	05/19/98	05/21/98	LMV
6010	Copper, Total	7.8 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	16 f	05/19/98	05/27/98	LMV
6010	Lead, Total	11 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	27 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	4900 f		05/15/98	MAK
IN623	% Solids	76.9 c		05/12/98	KJB
40612-5E MT-1(S) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	4100 f		05/15/98	MAK

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst

40612-6C MT-1(B) : [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	50 f		05/23/98	MAK
7060	Arsenic, Total	8.0 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.19 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	36 f	05/19/98	05/21/98	LMV
6010	Copper, Total	11 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	24 f	05/19/98	05/27/98	LMV
7421	Lead, Total	8.7 f	05/19/98	06/01/98	LMV
6010	Zinc, Total	40 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	11000 f		05/15/98	MAK
IN623	% Solids	74.0 c		05/12/98	KJB
40612-6D MT-1(B) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	9800 f		05/15/98	MAK
40612-7D SP-1(0-2) : [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	160 f		05/23/98	MAK
7060	Arsenic, Total	8.6 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.90 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	350 f	05/19/98	05/27/98	LMV
6010	Copper, Total	25 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	0.30 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	20 f	05/19/98	05/27/98	LMV
6010	Lead, Total	50 f	05/19/98	05/21/98	LMV

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-7D SP-1(0-2): [C] 05/11/98 (SEDIMENT)					
6010	Zinc, Total	70 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	56000 f		05/15/98	MAK
IN623	% Solids	50.3 c		05/12/98	KJB
40612-7E SP-1(0-2) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	58000 f		05/15/98	MAK
40612-8D SP-1(2-4): [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	65 f		05/23/98	MAK
7060	Arsenic, Total	6.4 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	1.0 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	38 f	05/19/98	05/21/98	LMV
6010	Copper, Total	14 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	20 f	05/19/98	05/27/98	LMV
7421	Lead, Total	14 f	05/19/98	06/01/98	LMV
6010	Zinc, Total	50 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	30000 f		05/19/98	MAK
IN623	% Solids	45.6 c		05/12/98	KJB
40612-8E SP-1(2-4) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	28000 f		05/19/98	MAK

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-9D SP-1(4-6):[C]05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	90 f		05/23/98	MAK
7060	Arsenic, Total	8.0 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	1.2 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	45 f	05/19/98	05/21/98	LMV
6010	Copper, Total	16 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/97	RMT
6010	Nickel, Total	23 f	05/19/98	05/27/98	LMV
7421	Lead, Total	9.8 f	05/19/98	06/01/98	LMV
6010	Zinc, Total	57 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	36000 f		05/19/98	MAK
IN623	% Solids	41.1 c		05/12/98	KJB
40612-9E SP-1(4-6) DUP:[D]05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	34000 f		05/19/98	MAK
40612-10 SP-A(6-21):[C]05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	29 f		05/23/98	MAK
7060	Arsenic, Total	4.1 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	<0.1 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	28 f	05/19/98	05/21/98	LMV
6010	Copper, Total	9.4 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	20 f	05/19/98	05/27/98	LMV
6010	Lead, Total	9.0 f	05/19/98	05/21/98	LMV

Comments/Notes

f = mg/Kg dry weight
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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40612-10 SP-A(6-21):[C]05/11/98 (SEDIMENT)					
6010	Zinc, Total	34 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	830 f		05/19/98	MAK
IN623	% Solids	82.8 c		05/12/98	KJB
4061210D SP-A(6-21) DUP:[D]05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	720 f		05/19/98	MAK
4061211C SP-1(6-B):[C]05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	37 f		05/23/98	MAK
7060	Arsenic, Total	13 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.17 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	62 f	05/19/98	05/27/98	LMV
6010	Copper, Total	21 f	05/19/98	05/27/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	36 f	05/19/98	05/27/98	LMV
6010	Lead, Total	18 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	77 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	12000 f		05/19/98	MAK
IN623	% Solids	65.7 c		05/12/98	KJB
4061211D SP-1(6-B) DUP:[D]05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	11000 f		05/19/98	MAK

Comments/Notes

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
4061212D	SP-2 (0-2) : [C] 05/11/98 (SEDIMENT)				
418.1	TPH by IR (Soil)	44 f		05/23/98	MAK
7060	Arsenic, Total	5.3 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.33 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	52 f	05/19/98	05/21/98	LMV
6010	Copper, Total	9.9 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	13 f	05/19/98	05/27/98	LMV
6010	Lead, Total	12 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	34 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	12000 f		05/19/98	MAK
IN623	% Solids	66.8 c		05/12/98	KJB
4061212E	SP-2 (0-2) DUP: [D] 05/11/98 (SEDIMENT)				
9060	Total Organic Carbon	13000 f		05/19/98	MAK
4061213D	SP-2 (2-4) : [C] 05/11/98 (SEDIMENT)				
418.1	TPH by IR (Soil)	100 f		05/23/98	MAK
7060	Arsenic, Total	5.0 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.12 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	14 f	05/19/98	05/21/98	LMV
6010	Copper, Total	6.7 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	9.5 f	05/19/98	05/27/98	LMV
7421	Lead, Total	5.4 f	05/19/98	06/01/98	LMV

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Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
4061213D SP-2(2-4): [C] 05/11/98 (SEDIMENT)					
6010	Zinc, Total	25 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	3500 f		05/19/98	MAK
IN623	% Solids	80.1 c		05/12/98	KJB
4061213E SP-2(2-4) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	3400 f		05/19/98	MAK
4061214D SP-2(4-6): [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	77 f		05/23/98	MAK
7060	Arsenic, Total	4.5 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	0.11 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	18 f	05/19/98	05/21/98	LMV
6010	Copper, Total	7.5 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	12 f	05/19/98	05/27/98	LMV
6010	Lead, Total	7.8 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	28 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	3000 f		05/19/98	MAK
IN623	% Solids	78.2 c		05/12/98	KJB
4061214E SP-2(4-6) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	2800 f		05/19/98	MAK

Comments/Notes

f = mg/Kg dry weight
c = %

< Cont. Next Page >



Maguire Group Inc.
One Court Street
New Britain, CT 06051

Attention : Steve Lecco

Date : 06/04/98
ETR Number : 40612
Project No.: S 8
No. Samples: 32
Arrived : 05/11/98
P.O. Number: 14787

Page 11

Project: Salem Port Development

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
4061215D SP-2(6-B): [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	110 f		05/23/98	MAK
7060	Arsenic, Total	7.8 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	<0.1 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	40 f	05/19/98	05/21/98	LMV
6010	Copper, Total	15 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	<0.05 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	26 f	05/19/98	05/27/98	LMV
6010	Lead, Total	13 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	52 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	3700 f		05/19/98	MAK
IN623	% Solids	79.9 c		05/12/98	KJB
4061215E SP-2(6-B) DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	3700 f		05/19/98	MAK

Comments/Notes

f = mg/Kg dry weight
c = %

< Last Page >

Submitted By :

Samuel R. Jordan



Woods Hole Group

Environmental Laboratories

375 Paramount Drive • Suite B
Raynham, MA 02767-5154 • USA
Phone: 508-822-9300
Fax: 508-822-3280

Case Narrative

ETR: 40613

Client: Maguire Group

Project: CZM - N.E. Power Turning Basin

Date Received:

03/26/98

All analyses were performed within holding time and with appropriate quality control measures except where noted. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted.

Sample handling and storage

Sediment samples from Salem harbor were received on 3/26/98. They were frozen upon receipt at the laboratory and maintained frozen until removed from the freezer on 5/08/98. The samples were composited on 05/11/98 according to the compositing scheme faxed on 04/24/98.

The enclosed results of analyses are representative of the samples as received by the laboratory. Woods Hole Group makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Woods Hole Group. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by:

David R. Zerkow
Woods Hole Group Environmental Laboratories

Date:

6-5-98

RECEIVED

JUN 25 1998

MAGUIRE GROUP CT.

Compositing Scheme for Salem Sediment Samples

40613

Combine these samples	To create this composite for analysis
(S8)MFA, 0-3 + (S8) MFB, 0-5.2 + (S8) MFC, 0-3	MF-1(S)
(S8)MFA, 3-13 + (S8)MFB, 5.2-11.4	MF-1(M)
(S8)MFC, 3-8.4	MF-C(3-8.4)
(S8)MFB, 11.4-14 + (S8)MFC, 8.4-15	MF-1(B)
(S8) MTA, 0-13.9 + (S8) MTB, 0-17 + (S8) MTC 0-5.3	MT-1(S)
(S8) MTC, 5.3-13.8 + (S8) MTC 13.8-18	MT-1(B)
(S8) SPA, 0-2 + (S8) SPB, 0-2 + (S8) SPC, 0-2	SP-1(0-2)
(S8) SPA, 2-4 + (S8) SPB, 2-4 + (S8) SPC, 2-4	SP-1(2-4)
(S8) SPA, 4-6 + (S8) SPB, 4-6 + (S8) SPC, 4-6	SP-1(4-6)
(S8) SPA, 6-21	SP-A (6-21)
(S8)SPB, 6-26.8 + SPC, 6-26	SP-1 (6-B)
(S8)SPD, 0-2 + (S8)SPE, 0-2 + (S8)SPF, 0-2	SP-2(0-2)
(S8)SPD, 2-4 + (S8)SPE, 2-4 + (S8)SPF, 2-4	SP-2(2-4)
(S8)SPD, 4-6 + (S8)SPE, 4-6 + (S8)SPF, 4-6	SP-2(4-6)
(S8)SPD, 6-24.6 + (S8)SPE, 6-29 + (S8)SPF, 6-27	SP-2(6-B)
(S1B)NEP- ^A 0-2 + (S1B)NEP- ^B 0-3.5	NEP-1 - 1 c
(S1B)NEP- ^A 0-2 + (S1B)NEP- ^B D, 0-2	NEP-2 - 2 c
(S1B)NEP- ^A E, 0-4.5 + (S1B)NEP- ^B F, 0-6	NEP-3 - 3 c
TOTAL # SAMPLES	18

Note: (S) suffix denotes surface
 (M) suffix denotes middle
 (B) suffix denotes bottom
 No suffix denotes no vertical stratification

Compositing scheme agreed to by P. Nimiskern (COE) and S. Lecco (Maguire) on 4/23/98



GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: Woods Hole Group

DOCUMENT NUMBER

WHG-1

Chain-of-Custody Record

Project Name and Number:

C2M DMMP
98105

Samples collected by:

GEI Consultants, Inc.
1021 Main Street
Winchester, MA 01890

Phone: 781-721-4000

Fax: 781-721-4073

Preservative

None

None

None

Samplers:

SASKIA OSTING

RICHARD VAN ETEN

Send data to:

Maguire Group Inc.
Attn: Steve Lecco
One Court Street
New Britain, CT 06051

Phone: 860-224-9141

Fax: 860-224-9147

Analysis

Remarks

Station No.

Date

Time
(hours)

Matrix

Sample Number

No. of
Containers

Total
Metals

TPH
418.1

Total
Organic
Carbon

Total metals are:

Ag, As, Cd, Cr, Cu

Hg, Ni, Pb, Zn

Please wait with
analysis until
notified by
Steve Lecco

TAT:

24 hr

48 hr

72 hr

Normal

Relinquished by:

Saskia Osting

Date/Time:

3/20/98 1855

Received by:

GEI
SAMPLE FRIDGE

Relinquished by:

Date/Time:

3/25/98 0600

Received by:

Saskia Osting

Relinquished by:

Saskia Osting

Date/Time:

3/29/98 12:15

Received by:

Ed Butler

Relinquished by:

Ed Butler

Date/Time:

3/29/98 Ed Butler

Received for Laboratory by:

Method of Shipment:

COURIER

Remarks:

GEI Consultants, Inc.
Winchester, Massachusetts

LABORATORY: Woods Hole Group.

DOCUMENT NUMBER

WHG-2.1

Chain-of-Custody Record

pg 1 of 2

Project Name and Number: **C2M 98105**
Samples collected by: **GEI Consultants, Inc.**
1021 Main Street
Winchester, MA 01890
Phone: 781-721-4000
Fax: 781-721-4073

Samplers: **SASKIA OSTING**
RICHARD VAN ETTEN
Send data to: **Maguire Group Inc.**
Attn: Steve Lecco
One Court Street
New Britain, CT 06051
Phone: 860-224-9141
Fax: 860-224-9147

Preservative

None None None

Analysis

Remarks

Station No.	Date	Time (hours)	Matrix	Sample Number	No. of Containers	Total Metals	TPH 418.1	Total Organic Carbon	Remarks
SALEM	3/23/98	11:55	SED	(S1-B) NEP-E, 0-4.5'	1	X	X	X	Total metals are: Ag, As, Cd, Cr, Cu
	3/23/98	13:00	SED	(S1-B) NEP-D, 0-2'	1	X	X	X	Hg, Ni, Pb, Zn
	3/23/98	17:30	SED	(S8) MF-C, 0-3'	1	X	X	X	Please wait with
	3/23/98	17:45	SED	(S8) MF-C, 3-8.4'	1	X	X	X	analysis until
	3/23/98	18:00	SED	(S8) MF-C, 8.4-15'	1	X	X	X	notified by
	3/24/98	08:45	SED	(S8) MF-B, 0-5.2'	1	X	X	X	Steve Lecco
	3/24/98	11:45	SED	(S8) MF-B, 5.2-11.4'	1	X	X	X	
	3/24/98	12:00	SED	(S8) MF-B, 11.4-14'	1	X	X	X	

TAT: 24 hr 48 hr 72 hr Normal

Relinquished by: R. Van Etten	Date/Time: 3/24/98 20:50	Received by: GEI SAMPLE FRIDGE	Relinquished by: [Signature]	Date/Time: 3/25/98 0600	Received by: [Signature]
Relinquished by: [Signature]	Date/Time: 3/24/98 12:45	Received by: [Signature]	Relinquished by: [Signature]	Date/Time: 3/24/98 3:10	Received for Laboratory by: [Signature]
Method of Shipment: COURIER		Remarks:			

Sample Receipt Checklist

Client: <u>LEI</u>	Receipt date: <u>3/26/98</u>
Project:	Log-in date:
ETR #:	Inspection/ Log-in by:

Comments / Notes

Were samples shipped? yes, FedEx / UPS / other _____ <u>no</u>, <u>courier pick up</u> / hand delivered	
Is bill of lading retained? yes, tracking# _____ no, unavailable / <u>na</u>	
Indicate cooler temperature upon opening: <u>11</u> °C / na	
Were samples chilled? <u>yes</u> / no	
Chain-of-Custody present? <u>yes</u> / no complete? <u>yes</u> / no	
Custody Seals present on cooler? yes / <u>no</u> on bottles? yes / <u>no</u> intact? yes / no / na	
Were sample containers intact? <u>yes</u> / no	
If chemical preservation is appropriate- Were samples field preserved? yes / no / na	
Preservation (pH) verified at lab for EVERY bottle? (not VOAs) yes / no If NO:	
Preservation (pH) verified for sample #(s):	
Were sample received within hold time? yes / no	
Discrepancy between bottle labels & chain? yes / no	
Was proj. mgr. notified of any problems? yes / no / na proj. mgr. acknowledgement:	

Inorganic Quality Control Summary

Client: Maguire Group
Project: N.E. Power Turning Basin
ETR: 40613

Salem Harbor

Parameter	sample ID	analysis date	blank (mg/L)	sample result (mg/kg)	RPD of duplicates	MS added (mg/kg)	%recovery matrix spike	LCS conc. (mg/kg)	% recovery LCS	CRM conc. (mg/kg)	% recovery CRM	quali-fier
Arsenic	40612-2C	05/22/98	<0.002	6.3	3	1.3	87	151	98	26.2	66	B
Cadmium	40612-2C	05/27/98	<0.005	0.37	8	1.32	77	136	99	2.11	90	B
Chromium	40612-2C	05/21/98	<0.020	30	12	132	80	57.6	100	90.7	46	B
Copper	40612-2C	05/21/98	<0.010	8.6	1	132	83	60.0	98	310	92	B
Lead	40612-2C	06/01/98	<0.002	6.9	4	1.32	98	84.9	97	183	83	B
Nickel	40612-2C	05/27/98	<0.020	18	6	132	80	138	101	39.5	62	B
Mercury	40612-2C	06/02/98	<0.0002	<0.05	0	0.47	104	1.13	108	3.04	119	B
Zinc	40612-2C	05/21/98	<0.010	38	3	132	77	986	98	364	84	B
TOC	40612-10	05/19/98	<100	830	12.1	5300	103	6250	105	6239	99	B
TPH-IR	40612-2D	05/23/98	2	43	7.1	492	7.1	2350	103	2517	95	B

Qualifiers & Notes:

B= Reported QC is for associated batch

LCS = laboratory control standard

RPD = relative percent difference



Maguire Group Inc.
One Court Street
New Britain, CT 06051

Attention : Steve Lecco

Date : 06/04/98
ETR Number : 40613
Project No.: S1B
No. Samples: 7
Arrived : 05/11/98
P.O. Number: 14787

Page 1

Project: N.E. Power Turning Basin

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40613-1C NEP-1: [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	430 f		05/23/98	MAK
7060	Arsenic, Total	11 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	1.5 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	610 f	05/19/98	05/27/98	LMV
6010	Copper, Total	46 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	0.42 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	36 f	05/19/98	05/27/98	LMV
6010	Lead, Total	75 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	100 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	34000 f		05/19/98	MAK
IN623	% Solids	47.8 c		05/12/98	KJB
40613-1D NEP-1 DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	36000 f		05/19/98	MAK
40613-2C NEP-2: [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	430 f		05/23/98	MAK
7060	Arsenic, Total	14 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	2.1 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	790 f	05/19/98	05/27/98	LMV
6010	Copper, Total	86 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	0.47 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	32 f	05/19/98	05/27/98	LMV
6010	Lead, Total	100 f	05/19/98	05/21/98	LMV

Comments/Notes

f = mg/Kg dry weight

c = %



Maguire Group Inc.
One Court Street
New Britain, CT 06051

Attention : Steve Lecco

Date : 06/04/98
ETR Number : 40613
Project No.: S1B
No. Samples: 7
Arrived : 05/11/98
P.O. Number: 14787

Page 2

Project: N.E. Power Turning Basin

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40613-2C NEP-2: [C] 05/11/98 (SEDIMENT)					
6010	Zinc, Total	140 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	48000 f		05/19/98	MAK
IN623	% Solids	35.1 c		05/12/98	KJB
40613-2D NEP-2 DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	50000 f		05/19/98	MAK
40613-3C NEP-3: [C] 05/11/98 (SEDIMENT)					
418.1	TPH by IR (Soil)	270 f		05/23/98	MAK
7060	Arsenic, Total	13 f	05/19/98	05/22/98	LCP
7131	Cadmium, Total	1.4 f	05/19/98	05/27/98	LCP
6010	Chromium, Total	1000 f	05/19/98	05/27/98	LMV
6010	Copper, Total	46 f	05/19/98	05/21/98	LMV
7471	Mercury, Total	0.54 f	05/29/98	06/02/98	RMT
6010	Nickel, Total	26 f	05/19/98	05/27/98	LMV
6010	Lead, Total	93 f	05/19/98	05/21/98	LMV
6010	Zinc, Total	110 f	05/19/98	05/21/98	LMV
9060	Total Organic Carbon	53000 f		05/19/98	MAK
IN623	% Solids	45.6 c		05/12/98	KJB
40613-3D NEP-3 DUP: [D] 05/11/98 (SEDIMENT)					
9060	Total Organic Carbon	54000 f		05/19/98	MAK

Comments/Notes

f = mg/Kg dry weight
c = %



Maguire Group Inc.
One Court Street
New Britain, CT 06051

Attention : Steve Lecco

Date : 06/04/98
ETR Number : 40613
Project No.: S1B
No. Samples: 7
Arrived : 05/11/98
P.O. Number: 14787

Page 3

Project: N.E. Power Turning Basin

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Lab No./ Method No.	Sample Description/ Parameter	Result	Prep Date	Analysis Date	Analyst
40613-4	SRM:05/11/98 (SRM)				
418.1	TPH by IR (Soil)	2517 f		05/23/98	MAK
7060	Arsenic, Total	17 e	05/19/98	05/22/98	LCP
7131	Cadmium, Total	1.89 e	05/19/98	05/27/98	LCP
6010	Chromium, Total	41 e	05/19/98	05/21/98	LMV
6010	Copper, Total	286 e	05/19/98	05/27/98	LMV
7471	Mercury, Total	3.63 e	05/29/98	06/02/98	RMT
6010	Nickel, Total	24.4 e	05/19/98	05/27/98	LMV
6010	Lead, Total	152 e	05/19/98	05/21/98	LMV
6010	Zinc, Total	307 e	05/19/98	05/27/98	LMV
9060	Total Organic Carbon	6239 f		05/19/98	MAK

Comments/Notes

f = mg/Kg dry weight

e = mg/Kg as received

< Last Page > Submitted By :

David R. Zuber

ATTACHMENT 6
PAH REPORT

QUALIFIERS FOR ORGANICS DATA

ND	Not Detected: no peak found
J	<MRL: value is below the minimum reporting limit
D	Dilution value: value is from a dilution analysis
E	Estimated value: value is from a response which is greater than 10% above the corresponding high standard in the calibration.
I	Interference: value is either estimated or not determined due to an interference.
&	QC result out of acceptance range: QC result is below or above the QC criteria
D,L	Dilution value: value is from a dilution analysis
B	Blank detected: value reported is found in the blank and is less than 5x the value in the blank.

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1145
Data Table: PAH_Main - Surrogate Corrected

Field ID	MF-1(S)	MF-1(M)	MF-C(3-8.4)	MF-1(B)
Sample Site	Salem	Salem	Salem	Salem
Lab ID	98D1097	98D1098	98D1099	98D1100
Lab Batch	B0002	B0002	B0002	B0002
File	DY8472.D	DY8475.D	DZ4820.D	DZ4821.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	23.7 g	20 g	24.7 g	24.9 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/27/98	05/27/98	05/29/98	05/29/98
Min Reporting Limit	4.2	5	4	4
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PAH				
Naphthalene	15	3.4 J	2.2 J	2.8 J
2-Methylnaphthalene	6.7	ND	1.2 J	1.7 J
1-Methylnaphthalene	4.2	ND	0.66 J	0.56 J
2,6-Dimethylnaphthalene	3.3 J	ND	ND	ND
Acenaphthylene	6.5	ND	ND	ND
Acenaphthene	7.4	ND	ND	ND
Biphenyl	2.4 J	ND	ND	ND
Fluorene	13	ND	ND	ND
Anthracene	29	ND	0.2 J	ND
Phenanthrene	83	1.7 JB	0.95 JB	1.2 JB
1-Methylphenanthrene	21	ND	ND	ND
Dibenzothiophene	8	ND	ND	ND
Fluoranthene	140	1.1 J	0.69 J	0.35 J
Pyrene	170	0.8 J	0.56 J	0.27 J
Benzo[a]anthracene	100	ND	ND	ND
Chrysene	88	ND	ND	ND
Benzo[b]fluoranthene	140	ND	0.49 J	ND
Benzo[k]fluoranthene	53	ND	ND	ND
Benzo[e]pyrene	71	ND	ND	ND
Benzo[a]pyrene	100	ND	ND	ND
Perylene	25	150	60	0.81 J
Indeno[1,2,3-c,d]pyrene	59	ND	ND	ND
Dibenzo[a,h]anthracene	9.6	ND	ND	ND
Benzo[g,h,i]perylene	59	ND	ND	ND

Total Priority Pollutants	1100	7	5.1	4.6
%%d8-Naphthalene	40	41	35	40
%%d10-Acenaphthene	57	58	44	46
%%d10-Phenanthrene	66	66	59	63
%%d12-Benzo[a]pyrene	73	65	63	48

J = < MRL
ND = Not Detected, no peak found

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_Main - Surrogate Corrected

Field ID Sample Site	MT-1(S) Salem	MT-1(B) Salem	SP-1(0-2) Salem	SP-1(2-4) Salem
Lab ID	98D1101	98D1102	98D1103	98D1104PCA
Lab Batch	B0002	B0002	B0002	B0002
File	DZ4822.D	DZ4823.D	DZ4824.D	DY8593.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	24.4 g	21.5 g	15.7 g	13 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/29/98	05/29/98	05/29/98	06/04/98
Min Reporting Limit	4.1	4.6	6.4	7.7
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PAH				
Naphthalene	5.8	2.7 J	58	3.9 J
2-Methylnaphthalene	4.7	1.1 J	49	2.1 J
1-Methylnaphthalene	2.3 J	0.68 J	28	1.9 J
2,6-Dimethylnaphthalene	1.8 J	ND	23	1.10
Acenaphthylene	3 J	ND	35	1.9 J
Acenaphthene	1.4 J	ND	16	4.8 J
Biphenyl	1.3 J	ND	12	1.7 J
Fluorene	3 J	ND	35	1.9 J
Anthracene	5.4	0.35 J	69	4.2 J
Phenanthrene	16	1.4 JB	210	8.4
1-Methylphenanthrene	3.6 J	0.19 J	48	2.9 J
Dibenzothiophene	1.5 J	ND	21	0.93 J
Fluoranthene	29	0.89 J	410	14
Pyrene	33	0.62 J	420	17
Benzo[a]anthracene	15	ND	200	9.6
Chrysene	16	ND	220	8.5
Benzo[b]fluoranthene	21	0.43 J	280	11
Benzo[k]fluoranthene	7	0.1 J	84	3.4 J
Benzo[e]pyrene	13	ND	160	8.4
Benzo[a]pyrene	14	ND	200	10
Perylene	4.5	77	120	360
Indeno[1,2,3,-c,d]pyrene	10	ND	130	6 J
Dibenzo[a,h]anthracene	2.1 J	ND	24	1.8 J
Benzo[g,h,i]perylene	12	0.68 JB	130	5.6 J
Total Priority Pollutants	190	7.2	2500	110
%%d8-Naphthalene	48	45	41	36
%%d10-Acenaphthene	60	62	57	52
%%d10-Phenanthrene	82	72	71	55
%%d12-Benzo[a]pyrene	76	73	70	50

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1145
Data Table: PAH_Main - Surrogate Corrected

Field ID Sample Site	SP-1(4-6) Salem	SP-A(6-21) Salem	SP-1(6-B) Salem	SP-2(0-2) Salem
Lab ID	98D1105	98D1106	98D1107	98D1108
Lab Batch	B0002	B0002	B0002	B0002
File	DZ4826.D	DZ4827.D	DZ4828.D	DZ4831.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	12.8 g	26.1 g	21.2 g	21.5 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/29/98	05/29/98	05/29/98	05/29/98
Min Reporting Limit	7.8	3.8	4.7	4.6
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PAH				
Naphthalene	5.4 J	1.8 J	2.7 J	11
2-Methylnaphthalene	2.9 J	1.5 J	1.3 J	11
1-Methylnaphthalene	2 J	0.67 J	0.72 J	6.6
2,6-Dimethylnaphthalene	1.2 J	ND	ND	5.2
Acenaphthylene	1.2 J	ND	ND	4.6
Acenaphthene	4.7 J	ND	ND	3 J
Biphenyl	1.1 J	ND	ND	2.8 J
Fluorene	1.8 J	ND	ND	6.6
Anthracene	2.5 J	0.1 J	0.29 J	12
Phenanthrene	7.2 J	1.2 JB	2 JB	33
1-Methylphenanthrene	2 J	0.15 J	0.2 J	8.1
Dibenzothiophene	ND	ND	ND	3.8 J
Fluoranthene	12	0.63 J	0.9 J	68
Pyrene	12	0.54 J	0.72 J	73
Benzo[a]anthracene	6.6 J	ND	ND	30
Chrysene	6.5 J	0.32 J	0.55 J	41
Benzo[b]fluoranthene	8.6	0.44 J	0.55 J	38
Benzo[k]fluoranthene	2.3 J	ND	ND	14
Benzo[e]pyrene	4.7 J	0.34 J	0.48 J	24
Benzo[a]pyrene	5 J	0.25 J	0.2 J	27
Perylene	440	6.6	180	10
Indeno[1,2,3,-c,d]pyrene	4.4 J	ND	ND	16
Dibenzo[a,h]anthracene	0.65 J	ND	ND	2.7 J
Benzo[g,h,i]perylene	4.1 JB	0.34 JB	0.41 JB	17
Total Priority Pollutants	85	5.6	8.3	400
%d8-Naphthalene	35	40	36	37
%d10-Acenaphthene	55	46	58	50
%d10-Phenanthrene	65	59	78	63
%d12-Benzo[a]pyrene	68	44	71	59

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1145
Data Table: PAH_Main - Surrogate Corrected

Field ID Sample Site	SP-2(2-4) Salem	SP-2(4-6) Salem	SP-2(6-B) Salem	NEP-1 Salem
Lab ID	98D1109	98D1110	98D1111PCA	98D1112
Lab Batch	B0002	B0002	B0002	B0002
File	DZ4829.D	DZ4832.D	DY8591.D	DZ4834.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	24 g	24 g	24.2 g	16.6 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/29/98	05/29/98	06/04/98	05/29/98
Min Reporting Limit	4.2	4.2	8.3	6
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PAH				
Naphthalene	2.2 J	1.9 J	1.2 J	78
2-Methylnaphthalene	1.3 J	1 J	0.91 J	70
1-Methylnaphthalene	0.75 J	0.57 J	0.6 J	41
2,6-Dimethylnaphthalene	ND	ND	ND	28
Acenaphthylene	ND	ND	ND	51
Acenaphthene	ND	ND	ND	34
Biphenyl	ND	ND	0.57 J	22
Fluorene	ND	ND	0.36 J	70
Anthracene	0.37 J	0.16 J	0.19 J	130
Phenanthrene	1.9 JB	1.1 JB	1.4 J	290
1-Methylphenanthrene	0.31 J	0.16 J	0.23 J	63
Dibenzothiophene	ND	ND	ND	36
Fluoranthene	2.4 J	0.65 J	0.38 J	640 L
Pyrene	2.2 J	0.6 J	0.44 J	770
Benzo[a]anthracene	1.8 J	ND	ND	360
Chrysene	1.5 J	ND	0.42 J	390
Benzo[b]fluoranthene	1.4 J	0.42 J	0.36 J	420
Benzo[k]fluoranthene	0.4 J	0.062 J	0.12 J	120
Benzo[e]pyrene	1.1 J	0.22 J	0.26 J	260
Benzo[a]pyrene	1.2 J	0.18 J	ND	300
Perylene	1.7 J	26	26	130
Indeno[1,2,3, -c,d]pyrene	0.78 J	ND	ND	200
Dibenzo[a,h]anthracene	ND	ND	ND	34
Benzo[g,h,i]perylene	0.73 JB	0.24 JB	ND	190
Total Priority Pollutants	17	5.3	4.9	4100
%%d8-Naphthalene	44	41	40	65
%%d10-Acenaphthene	48	49	47	88
%%d10-Phenanthrene	62	60	52	99
%%d12-Benzo[a]pyrene	45	54	53	85

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_Main - Surrogate Corrected

Field ID	NEP-2	NEP-3
Sample Site	Salem	Salem
Lab ID	98D1113	98D1114
Lab Batch	B0002	B0002
File	DZ4835.D	DZ4836.D
Sample Type	SAMP	SAMP
Matrix	Sediment	Sediment
Sample Size	11.5 g	14.8 g
Weight Basis	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB
Field Date	NA	NA
Extract Date	05/07/98	05/07/98
Analysis Date	05/29/98	05/29/98
Min Reporting Limit	8.7	6.8
Units	ug/Kg	ug/Kg

PAH		
Naphthalene	420	180
2-Methylnaphthalene	270	130
1-Methylnaphthalene	200	77
2,6-Dimethylnaphthalene	110	57
Acenaphthylene	110	66
Acenaphthene	220	74
Biphenyl	78	34
Fluorene	300	100
Anthracene	620	180
Phenanthrene	1000	520
1-Methylphenanthrene	220	100
Dibenzothiophene	150	62
Fluoranthene	2500 L	1100
Pyrene	1800 L	980
Benzo[a]anthracene	1100	390
Chrysene	1200	480
Benzo[b]fluoranthene	1400	550
Benzo[k]fluoranthene	380	180
Benzo[e]pyrene	700	370
Benzo[a]pyrene	880	430
Perylene	260	200
Indeno[1,2,3,-c,d]pyrene	580	280
Dibenzo[a,h]anthracene	120	67
Benzo[g,h,i]perylene	480	280
Total Priority Pollutants	13000	5800
%d8-Naphthalene	45	41
%d10-Acenaphthene	60	65
%d10-Phenanthrene	68	71
%d12-Benzo[a]pyrene	64	60

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_IRM - Surrogate Corrected

Field ID	SRM 1491				SRM 1491			
Sample Site	NA				NA			
Lab ID	BL36				BL36			
Lab Batch	B0002				B0002			
File	DY8464.D				DZ4818.D			
Sample Type	QC				QC			
Matrix	Rm				Rm			
Sample Size	0.1 mL				0.1 mL			
Weight Basis	VOLUME				VOLUME			
Associated Blank	NA				NA			
Field Date	NA				NA			
Extract Date	NA				NA			
Analysis Date	05/26/98				05/28/98			
Min Reporting Limit	250				250			
Units	ug/L	T	%D	Q	ug/L	T	%D	Q
PAH								
Naphthalene	6500	6900	5.8		6500	6900	5.8	
2-Methylnaphthalene	8300	8300	0		8300	8300	0	
1-Methylnaphthalene	8500	8300	-2.4		8200	8300	-1.2	
2,6-Dimethylnaphthalene	7300	7200	-1.4		7500	7200	-4.2	
Acenaphthylene	6800	7000	2.8		7000	7000	0	
Acenaphthene	6800	7300	6.8		7000	7300	4.1	
Biphenyl	7100	7000	-1.4		7100	7000	-1.4	
Fluorene	6800	7300	6.8		6900	7300	5.5	
Anthracene	8800	7800	-13		9000	7800	-15	
Phenanthrene	6900	7000	1.4		6900	7000	1.4	
1-Methylphenanthrene	6800	7000	2.8		6800	7000	2.8	
Dibenzothiophene	ND				ND			
Fluoranthene	5800	5900	1.7		5800	5900	1.7	
Pyrene	5900	5900	0		5900	5900	0	
Benzo[a]anthracene	3600	3600	0		3500	3600	2.8	
Chrysene	7100	7000	-1.4		7000	7000	0	
Benzo[b]fluoranthene	5100	5200	1.9		4800	5200	7.7	
Benzo[k]fluoranthene	5800	5600	-3.6		5800	5600	-3.6	
Benzo[e]pyrene	5800	5600	-3.6		5700	5600	-1.8	
Benzo[a]pyrene	7200	6800	-5.9		7800	6800	-15	
Perylene	7900	7100	-11		7700	7100	-8.4	
Indeno[1,2,3,-c,d]pyrene	5600	6300	11		5600	6300	11	
Dibenzo[a,h]anthracene	5200	5200	0		4800	5200	7.7	
Benzo[g,h,i]perylene	5400	5300	-1.9		5000	5300	5.7	
Total Priority Pollutants	NA				NA			
%%d8-Naphthalene	97				93			
%%d10-Acenaphthene	93				90			
%%d10-Phenanthrene	90				91			
%%d12-Benzo[a]pyrene	88				87			

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_IRM - Surrogate Corrected

Field ID	SRM 1491
Sample Site	NA
Lab ID	BL58
Lab Batch	B0002
File	DY8567.D
Sample Type	QC
Matrix	Rm
Sample Size	0.1 mL
Weight Basis	VOLUME
Associated Blank	NA
Field Date	NA
Extract Date	NA
Analysis Date	06/02/98
Min Reporting Limit	250
Units	ug/L

T %D Q

PAH			
Naphthalene	6500	6900	5.8
2-Methylnaphthalene	8400	8300	-1.2
1-Methylnaphthalene	8500	8300	-2.4
2,6-Dimethylnaphthalene	7500	7200	-4.2
Acenaphthylene	6900	7000	1.4
Acenaphthene	6800	7300	6.8
Biphenyl	7100	7000	-1.4
Fluorene	6800	7300	6.8
Anthracene	8900	7800	-14
Phenanthrene	6900	7000	1.4
1-Methylphenanthrene	6800	7000	2.8
Dibenzothiophene	ND		
Fluoranthene	5800	5900	1.7
Pyrene	5800	5900	1.7
Benzo[a]anthracene	3600	3600	0
Chrysene	7200	7000	-2.8
Benzo[b]fluoranthene	5000	5200	3.8
Benzo[k]fluoranthene	5500	5600	1.8
Benzo[e]pyrene	5600	5600	0
Benzo[a]pyrene	7300	6800	-7.4
Perylene	7800	7100	-9.8
Indeno[1,2,3,-c,d]pyrene	5800	6300	7.9
Dibenzo[a,h]anthracene	4900	5200	5.8
Benzo[g,h,i]perylene	5000	5300	5.7

Total Priority Pollutants NA

%%d8-Naphthalene	96
%%d10-Acenaphthene	92
%%d10-Phenanthrene	90
%%d12-Benzo[a]pyrene	93

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1145
Data Table: PAH_NSC - Surrogate Corrected

Field ID	North Slope Crude			North Slope Crude		
Sample Site	Oil	NA		Oil	NA	
Lab ID	BK53			BK53		
Lab Batch	B0002			B0002		
File	DY8465.D			DZ4819.D		
Sample Type	QC			QC		
Matrix	Oil			Oil		
Sample Size	5.01 mg			5.01 mg		
Weight Basis	OIL			OIL		
Associated Blank	NA			NA		
Field Date	NA			NA		
Extract Date	NA			NA		
Analysis Date	05/26/98			05/28/98		
Min Reporting Limit	5			5		
Units	mg/Kg	T	%D	Q	mg/Kg	T %D Q
PAH						
Naphthalene	750	750	0		740	750 1.3
2-Methylnaphthalene	1600 E				1200 E	
1-Methylnaphthalene	1200 E				1000 E	
2,6-Dimethylnaphthalene	450				540	
Acenaphthylene	ND				ND	
Acenaphthene	ND				ND	
Biphenyl	230	220	-4.5		220	220 0
Fluorene	100	94	-6.4		93	94 1.1
Anthracene	ND				ND	
Phenanthrene	270	260	-3.8		270	260 -3.8
1-Methylphenanthrene	180				190	
Dibenzothiophene	230	240	4.2		230	240 4.2
Fluoranthene	ND				ND	
Pyrene	14	14	0		14	14 0
Benzo[a]anthracene	ND				ND	
Chrysene	52	49	-6.1		46	49 6.1
Benzo[b]fluoranthene	5.4	6.6	18		5.4	6.6 18
Benzo[k]fluoranthene	ND				ND	
Benzo[e]pyrene	12	12	0		11	12 8.3
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	3.1 J				3.1 J	
Total Priority Pollutants	NA			NA		
%%d8-Naphthalene	100			99		
%%d10-Acenaphthene	93			99		
%%d10-Phenanthrene	92			95		
%%d12-Benzo[a]pyrene	103			99		

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_NSC - Surrogate Corrected

Field ID	North Slope Crude			
Sample Site	Oil			
	NA			
Lab ID	BK53			
Lab Batch	B0002			
File	DY8567.D			
Sample Type	QC			
Matrix	Oil			
Sample Size	5.01 mg			
Weight Basis	OIL			
Associated Blank	NA			
Field Date	NA			
Extract Date	NA			
Analysis Date	06/03/98			
Min Reporting Limit	5			
Units	mg/Kg	T	%D	Q

PAH				
Naphthalene	750	750	0	
2-Methylnaphthalene	1500 E			
1-Methylnaphthalene	1200 E			
2,6-Dimethylnaphthalene	580			
Acenaphthylene	ND			
Acenaphthene	ND			
Biphenyl	230	220	-4.5	
Fluorene	97	94	-3.2	
Anthracene	ND			
Phenanthrene	280	260	-7.7	
1-Methylphenanthrene	200			
Dibenzothiophene	230	240	4.2	
Fluoranthene	ND			
Pyrene	13	14	7.1	
Benzo[a]anthracene	ND			
Chrysene	45	49	8.2	
Benzo[b]fluoranthene	5.5	6.6	17	
Benzo[k]fluoranthene	ND			
Benzo[e]pyrene	11	12	8.3	
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			

Total Priority Pollutants NA

%%d8-Naphthalene	101
%%d10-Acenaphthene	97
%%d10-Phenanthrene	96
%%d12-Benzo[a]pyrene	101

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_BSD - Surrogate Corrected

Field ID	BS-S-56PB	BS-S-57BS			
Sample Site	NA	NA			
Lab ID	BS-S-56PB	BS-S-57BS			
Lab Batch	B0002	B0002			
File	DY8466.D	DY8467.D			
Sample Type	QC	QC			
Matrix	Sediment	Sediment			
Sample Size	20 g	20 g			
Weight Basis	DRY	DRY			
Associated Blank	NA	BS-S-56PB			
Field Date	NA	NA			
Extract Date	05/07/98	05/07/98			
Analysis Date	05/26/98	05/26/98			
Min Reporting Limit	5	5			
Units	ug/Kg	ug/Kg	T	%R	Q
PAH					
Naphthalene	ND	47	50	94	
2-Methylnaphthalene	ND	ND			
1-Methylnaphthalene	ND	ND			
2,6-Dimethylnaphthalene	ND	ND			
Acenaphthylene	ND	42	50	84	
Acenaphthene	ND	45	50	90	
Biphenyl	ND	ND			
Fluorene	ND	49	50	98	
Anthracene	ND	30	50	60	
Phenanthrene	1.3 J	46	50	89	
1-Methylphenanthrene	ND	ND			
Dibenzothiophene	ND	ND			
Fluoranthene	ND	53	50	106	
Pyrene	ND	51	50	102	
Benzo[a]anthracene	ND	56	50	112	
Chrysene	ND	58	50	116	
Benzo[b]fluoranthene	ND	58	50	116	
Benzo[k]fluoranthene	ND	60	50	120	
Benzo[e]pyrene	ND	ND			
Benzo[a]pyrene	ND	56	50	112	
Perylene	ND	ND			
Indeno[1,2,3,-c,d]pyrene	ND	94	50	188	&
Dibenzo[a,h]anthracene	ND	91	50	182	&
Benzo[g,h,i]perylene	4.6 J	97	50	185	&
Total Priority Pollutants	NA	NA			
%d8-Naphthalene	62	45			
%d10-Acenaphthene	59	47			
%d10-Phenanthrene	65	57			
%d12-Benzo[a]pyrene	24 &	32 &			

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_MSD - Surrogate Corrected

Field ID Sample Site	MF-1(S) Salem	MF-1(S) Salem			
Lab ID	98D1097	98D1097MS			
Lab Batch	B0002	B0002			
File	DY8472.D	DY8473.D			
Sample Type	SAMP	SAMP			
Matrix	Sediment	Sediment			
Sample Size	23.7 g	22.4 g			
Weight Basis	DRY	DRY			
Associated Blank	BS-S-56PB	BS-S-56PB			
Field Date	NA	NA			
Extract Date	05/07/98	05/07/98			
Analysis Date	05/27/98	05/27/98			
Min Reporting Limit	4.2	4.5			
Units	ug/Kg	ug/Kg	T	%R	Q
PAH					
Naphthalene	15	58	45	96	
2-Methylnaphthalene	6.7	8.4			
1-Methylnaphthalene	4.2	4.9			
2,6-Dimethylnaphthalene	3.3 J	3.7 J			
Acenaphthylene	6.5	49	45	94	
Acenaphthene	7.4	51	45	97	
Biphenyl	2.4 J	3.3 J			
Fluorene	13	63	45	111	
Anthracene	29	78	45	109	
Phenanthrene	83	160	45	171	&
1-Methylphenanthrene	21	19			
Dibenzothiophene	8	8.7			
Fluoranthene	140	250	45	244	&
Pyrene	170	260	45	200	&
Benzo[a]anthracene	100	170	45	156	&
Chrysene	88	140	45	116	
Benzo[b]fluoranthene	140	200	45	133	
Benzo[k]fluoranthene	53	93	45	89	
Benzo[e]pyrene	71	78			
Benzo[a]pyrene	100	160	45	133	
Perylene	25	27			
Indeno[1,2,3,-c,d]pyrene	59	100	45	91	
Dibenzo[a,h]anthracene	9.6	49	45	88	
Benzo[g,h,i]perylene	59	100	45	91	
Total Priority Pollutants	1100	NA			
%d8-Naphthalene	40	41			
%d10-Acenaphthene	57	57			
%d10-Phenanthrene	66	69			
%d12-Benzo[a]pyrene	73	73			

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1145

Data Table: PAH_MSD - Surrogate Corrected

Field ID	MF-1(S)
Sample Site	Salem
Lab ID	98D1097MSD
Lab Batch	B0002
File	DY8474.D
Sample Type	SAMP
Matrix	Sediment
Sample Size	22.4 g
Weight Basis	DRY
Associated Blank	BS-S-56PB
Field Date	NA
Extract Date	05/07/98
Analysis Date	05/27/98
Min Reporting Limit	4.5
Units	ug/Kg

T %R Q RPD Q

PAH					
Naphthalene	54	45	87	9.8	
2-Methylnaphthalene	9.7				
1-Methylnaphthalene	8.1				
2,6-Dimethylnaphthalene	4.6				
Acenaphthylene	46	45	88	6.6	
Acenaphthene	43	45	79	20	
Biphenyl	3 J				
Fluorene	54	45	91	20	
Anthracene	62	45	73	40	&
Phenanthrene	96	45	29	& 140	&
1-Methylphenanthrene	18				
Dibenzothiophene	5.6				
Fluoranthene	170	45	67	110	&
Pyrene	190	45	44	130	&
Benzo[a]anthracene	130	45	67	80	&
Chrysene	120	45	71	48	&
Benzo[b]fluoranthene	150	45	22	& 140	&
Benzo[k]fluoranthene	86	45	73	20	
Benzo[e]pyrene	64				
Benzo[a]pyrene	130	45	67	66	&
Perylene	24				
Indeno[1,2,3,-c,d]pyrene	93	45	76	18	
Dibenzo[a,h]anthracene	50	45	90	2.2	
Benzo[g,h,i]perylene	94	45	78	15	

Total Priority Pollutants NA

%d8-Naphthalene	44
%d10-Acenaphthene	63
%d10-Phenanthrene	72
%d12-Benzo[a]pyrene	72

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1145
Data Table: PAH_SRM - Surrogate Corrected

Field ID	SRM 1941a			
Sample Site	NA			
Lab ID	BS-S-58SRM			
Lab Batch	B0002			
File	DY8468.D			
Sample Type	QC			
Matrix	Sediment			
Sample Size	4.91 g			
Weight Basis	DRY			
Associated Blank	BS-S-56PB			
Field Date	NA			
Extract Date	05/07/98			
Analysis Date	05/26/98			
Min Reporting Limit	20			
Units	ug/Kg	T	%D	Q

PAH				
Naphthalene	530	1000	47	&
2-Methylnaphthalene	190			
1-Methylnaphthalene	100			
2,6-Dimethylnaphthalene	57			
Acenaphthylene	62			
Acenaphthene	31			
Biphenyl	62			
Fluorene	61	97	37	&
Anthracene	150	180	17	
Phenanthrene	350	490	28	
1-Methylphenanthrene	77			
Dibenzothiophene	45			
Fluoranthene	860	980	12	
Pyrene	710	810	12	
Benzo[a]anthracene	410	430	4.6	
Chrysene	510	590	14	
Benzo[b]fluoranthene	1100	980	-12	
Benzo[k]fluoranthene	320	360	11	
Benzo[e]pyrene	560	550	-1.8	
Benzo[a]pyrene	530	630	16	
Perylene	360	450	20	
Indeno[1,2,3-c,d]pyrene	530	500	-6	
Dibenzo[a,h]anthracene	95	74	-28	
Benzo[g,h,i]perylene	440	520	15	

Total Priority Pollutants NA

%%d8-Naphthalene	48
%%d10-Acenaphthene	60
%%d10-Phenanthrene	75
%%d12-Benzo[a]pyrene	71

ATTACHMENT 7
PCB/PESTICIDES REPORT

QUALIFIERS FOR ORGANICS DATA

ND	Not Detected: no peak found
J	<MRL: value is below the minimum reporting limit
D	Dilution value: value is from a dilution analysis
E	Estimated value: value is from a response which is greater than 10% above the corresponding high standard in the calibration.
I	Interference: value is either estimated or not determined due to an interference.
&	QC result out of acceptance range: QC result is below or above the QC criteria
D,L	Dilution value: value is from a dilution analysis
B	Blank detected: value reported is found in the blank and is less than 5x the value in the blank.

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	LC-B	WP-A	TP-A	WH-A
Sample Site	Gloucester	Gloucester	Gloucester	Gloucester
Lab ID	98D1094	98D1095	98D1096	98D1115
Lab Batch	B0002	B0002	B0002	B0002
File	05209818.D	05209819.D	05209820.D	05209847.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	14.5 g	25 g	24.6 g	23.5 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/21/98	05/21/98	05/21/98	05/23/98
Min Reporting Limit	1.4	0.8	0.81	0.85
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PCBs				
8 - 2,4'-Dichlorobiphenyl	2.1	ND	ND	ND
18 - 2,2',5'-Trichlorobiphenyl	ND	ND	ND	ND
28 - 2,4,4'-Trichlorobiphenyl	9.8	ND	ND	0.68 J
44 - 2,2',3,5'-Tetrachlorobiphenyl	11	ND	ND	0.5 J
52 - 2,2',5,5'-Tetrachlorobiphenyl	15	ND	ND	0.87 J
66 - 2,3',4,4'-Tetrachlorobiphenyl	13	ND	ND	0.92
101 - 2,2',4,5,5'-Pentachlorobiphenyl	20	ND	ND	0.89 J
105 - 2,3,3',4,4'-Pentachlorobiphenyl	10	ND	ND	0.3 J
118 - 2,3',4,4',5'-Pentachlorobiphenyl	23	ND	0.044 J	1.1
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	4.5	ND	ND	0.35 J
138 - 2,2',3,4,4',6'-Hexachlorobiphenyl	20	0.2 J	0.26 J	1.1
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	24	ND	0.037 J	0.93
170 - 2,2',3,3',4,4',5'-Heptachlorobiphenyl	21	ND	ND	4.1
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	7.7	ND	ND	0.42 J
187 - 2,2',3,4',5,5',6'-Heptachlorobiphenyl	14	ND	ND	2.5
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	4.8	ND	ND	ND
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1.5 J	ND	ND	0.087 J
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	3	ND	ND	0.084 J
Pesticides				
Aldrin	ND	ND	ND	ND
alpha-Chlordane	2.3	ND	ND	ND
gamma-Chlordane	2.7	ND	0.023 J	0.33 J
2,4'-DDT	ND	ND	ND	ND
4,4'-DDT	ND	ND	ND	ND
2,4'-DDE	ND	ND	ND	ND
4,4'-DDE	10	ND	ND	2.3
2,4'-DDD	18	ND	ND	4.3
4,4'-DDD	91	0.046 J	0.11 J	13
Dieldrin	5.2	ND	ND	0.21 J
Methoxychlor	5.8	ND	ND	0.89 J
Endosulfan I	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND
Endrin	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND
alpha-hexachlorocyclohexane	ND	ND	ND	ND
beta-hexachlorocyclohexane	ND	ND	ND	ND
delta-hexachlorocyclohexane	0.18 J	ND	ND	0.11 J
lindane	ND	ND	ND	ND
trans-Nonachlor	2 J	ND	ND	0.11 J
Toxaphene	ND	ND	ND	ND
%Dibromo-octafluoro-biphenyl	68	63	63	88
%103 - 2,2',4,5',6-Pentachlorobiphenyl	66	69	73	92
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	76	69	83	102

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB_Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	MF-1(S)	MF-1(M)	MF-C(3-8.4)	MF-1(B)
Sample Site	Salem	Salem	Salem	Salem
Lab ID	98D1097	98D1098	98D1099	98D1100
Lab Batch	B0002	B0002	B0002	B0002
File	05209821.D	05209827.D	05209828.D	05209829.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	23.7 g	20 g	24.7 g	24.9 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/21/98	05/22/98	05/22/98	05/22/98
Min Reporting Limit	0.84	1	0.81	0.8
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PCBs

8 - 2,4'-Dichlorobiphenyl	ND	ND	ND	ND
18 - 2,2',5'-Trichlorobiphenyl	ND	0.037 J	ND	ND
28 - 2,4,4'-Trichlorobiphenyl	ND	ND	ND	ND
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND	ND	ND
52 - 2,2',5,5'-Tetrachlorobiphenyl	ND	ND	ND	ND
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND	ND	ND
101 - 2,2',4,5,5'-Pentachlorobiphenyl	0.081 J	ND	ND	ND
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND	ND	ND	ND
118 - 2,3',4,4',5-Pentachlorobiphenyl	ND	ND	ND	ND
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	ND	ND	ND
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.36 J	0.18 J	0.2 J	0.3 J
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	0.091 J	ND	ND	ND
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	ND	ND	ND	ND
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.066 J	ND	ND	ND
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	0.84	ND	ND	ND
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND	ND	ND
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ND	ND	ND	ND
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	0.05 J	ND	ND	ND

Pesticides

Aldrin	ND	ND	ND	ND
alpha-Chlordane	ND	ND	ND	ND
gamma-Chlordane	ND	ND	ND	ND
2,4'-DDT	0.14 J	ND	ND	ND
4,4'-DDT	ND	ND	ND	ND
2,4'-DDE	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND
2,4'-DDD	ND	ND	ND	ND
4,4'-DDD	0.36 J	ND	ND	ND
Dieldrin	ND	ND	ND	ND
Methoxychlor	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	0.062 J
Endosulfan II	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND
Endrin	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide	0.11 J	ND	ND	0.013 J
alpha-hexachlorocyclohexane	ND	0.073 J	ND	ND
beta-hexachlorocyclohexane	ND	ND	ND	ND
delta-hexachlorocyclohexane	ND	ND	ND	ND
lindane	ND	0.03 J	ND	ND
trans-Nonachlor	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND

%Dibromo-octafluoro-biphenyl	63	67	58	62
%103 - 2,2',4,5',6-Pentachlorobiphenyl	70	73	70	74
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	77	81	77	79

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB_Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	MT-1(S)	MT-1(B)	SP-1(0-2)	SP-1(2-4)
Sample Site	Salem	Salem	Salem	Salem
Lab ID	98D1101	98D1102	98D1103	98D1104
Lab Batch	B0002	B0002	B0002	B0002
File	05209830.D	05209831.D	05209832.D	05209833.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	24.4 g	21.5 g	15.7 g	13 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/22/98	05/22/98	05/22/98	05/22/98
Min Reporting Limit	0.82	0.93	1.3	1.5
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PCBs				
8 - 2,4'-Dichlorobiphenyl	ND	ND	ND	ND
18 - 2,2',5'-Trichlorobiphenyl	ND	0.056 J	ND	0.16 J
28 - 2,4,4'-Trichlorobiphenyl	ND	ND	0.47 J	ND
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND	0.28 J	ND
52 - 2,2',5,5'-Tetrachlorobiphenyl	0.057 J	ND	1.2 J	ND
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND	4	ND
101 - 2,2',4,5,5'-Pentachlorobiphenyl	0.11 J	ND	3.6	ND
105 - 2,3,3',4,4'-Pentachlorobiphenyl	0.037 J	ND	1.8	ND
118 - 2,3',4,4',5-Pentachlorobiphenyl	0.21 J	ND	4.9	ND
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	ND	1.3	ND
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.41 J	0.14 J	6.8	0.22 J
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	0.23 J	ND	8.2	ND
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	0.47 J	ND	8.2	ND
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.086 J	ND	2.6	ND
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	0.22 J	ND	5.4	ND
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND	ND	ND
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.03 J	ND	0.56 J	ND
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	0.034 J	ND	0.77 J	ND
Pesticides				
Aldrin	ND	ND	ND	ND
alpha-Chlordane	ND	ND	0.73 J	ND
gamma-Chlordane	0.028 J	ND	0.91 J	ND
2,4'-DDT	ND	ND	ND	ND
4,4'-DDT	ND	0.044 J	0.91 J	0.17 J
2,4'-DDE	ND	ND	ND	ND
4,4'-DDE	0.15 J	ND	5.1	ND
2,4'-DDD	0.13 J	ND	2.7	ND
4,4'-DDD	0.54 J	ND	12	ND
Dieldrin	0.013 J	ND	0.44 J	ND
Methoxychlor	ND	ND	2.1	ND
Endosulfan I	ND	ND	ND	ND
Endosulfan II	ND	ND	2.6	ND
Endosulfan Sulfate	ND	ND	ND	ND
Endrin	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND
Heptachlor	0.0098 J	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND
alpha-hexachlorocyclohexane	ND	0.063 J	ND	ND
beta-hexachlorocyclohexane	ND	ND	ND	ND
delta-hexachlorocyclohexane	ND	ND	0.084 J	0.075 J
lindane	0.018 J	0.034 J	0.23 J	0.12 J
trans-Nonachlor	ND	ND	0.62 J	ND
Toxaphene	ND	ND	ND	ND
%Dibromo-octafluoro-biphenyl	84	72	67	53
%103 - 2,2',4,5',6-Pentachlorobiphenyl	91	79	77	63
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	100	87	89	67

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB_Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	SP-1(4-6)	SP-A(6-21)	SP-1(6-B)	SP-2(0-2)
Sample Site	Salem	Salem	Salem	Salem
Lab ID	98D1105	98D1106	98D1107	98D1108
Lab Batch	B0002	B0002	B0002	B0002
File	05209834.D	05209835.D	05209839.D	05209840.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	12.8 g	26.1 g	21.2 g	21.5 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/22/98	05/22/98	05/22/98	05/23/98
Min Reporting Limit	1.6	0.77	0.94	0.93
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PCBs

8 - 2,4'-Dichlorobiphenyl	ND	ND	ND	ND
18 - 2,2',5'-Trichlorobiphenyl	0.16 J	ND	0.053 J	0.058 J
28 - 2,4,4'-Trichlorobiphenyl	ND	ND	ND	0.078 J
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND	ND	0.064 J
52 - 2,2',5,5'-Tetrachlorobiphenyl	ND	ND	ND	0.28 J
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND	ND	0.87 J
101 - 2,2',4,5,5'-Pentachlorobiphenyl	ND	ND	ND	0.8 J
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND	ND	ND	0.4 J
118 - 2,3',4,4',5-Pentachlorobiphenyl	ND	ND	ND	1.1
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	ND	ND	0.28 J
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.36 J	0.15 J	0.32 J	1.7
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	0.27 J	ND	ND	1.6
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	ND	ND	ND	1.1
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.056 J	ND	ND	0.46 J
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	ND	ND	ND	0.71 J
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND	ND	ND
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.038 J	ND	ND	0.067 J
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	ND	ND	ND	0.058 J

Pesticides

Aldrin	ND	ND	ND	ND
alpha-Chlordane	ND	ND	ND	ND
gamma-Chlordane	ND	ND	ND	0.14 J
2,4'-DDT	ND	ND	ND	ND
4,4'-DDT	ND	ND	ND	ND
2,4'-DDE	ND	ND	ND	ND
4,4'-DDE	0.27 J	ND	ND	1.2
2,4'-DDD	ND	ND	ND	0.78 J
4,4'-DDD	0.19 J	ND	0.075 J	3.3
Dieldrin	ND	ND	ND	0.13 J
Methoxychlor	ND	ND	ND	0.2 J
Endosulfan I	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND
Endrin	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND
alpha-hexachlorocyclohexane	ND	ND	ND	ND
beta-hexachlorocyclohexane	ND	ND	ND	ND
delta-hexachlorocyclohexane	0.23 J	ND	ND	0.072 J
lindane	0.092 J	ND	0.025 J	0.071 J
trans-Nonachlor	ND	ND	ND	0.088 J
Toxaphene	ND	ND	ND	ND

%Dibromo-octafluoro-biphenyl	62	54	71	60
%103 - 2,2',4,5',6-Pentachlorobiphenyl	73	62	81	69
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	83	79	93	75

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB_Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	SP-2(2-4)	SP-2(4-6)	SP-2(6-8)	NEP-1
Sample Site	Salem	Salem	Salem	Salem
Lab ID	98D1109	98D1110	98D1111	98D1112
Lab Batch	B0002	B0002	B0002	B0002
File	05209841.D	05209842.D	05209843.D	05209844.D
Sample Type	SAMP	SAMP	SAMP	SAMP
Matrix	Sediment	Sediment	Sediment	Sediment
Sample Size	25.4 g	24 g	24.2 g	16.6 g
Weight Basis	DRY	DRY	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB	BS-S-56PB	BS-S-56PB
Field Date	NA	NA	NA	NA
Extract Date	05/07/98	05/07/98	05/07/98	05/07/98
Analysis Date	05/23/98	05/23/98	05/23/98	05/23/98
Min Reporting Limit	0.79	0.83	1.6	1.2
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg

PCBs

8 - 2,4'-Dichlorobiphenyl	ND	ND	ND	ND
18 - 2,2',5'-Trichlorobiphenyl	ND	ND	ND	ND
28 - 2,4',4'-Trichlorobiphenyl	ND	ND	ND	ND
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND	ND	0.82 J
52 - 2,2',5,5'-Tetrachlorobiphenyl	ND	ND	ND	0.68 J
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND	ND	2.4
101 - 2,2',4,5,5'-Pentachlorobiphenyl	ND	ND	ND	5.4
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND	ND	ND	5
118 - 2,3',4,4',5-Pentachlorobiphenyl	ND	ND	ND	2.4
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	ND	ND	6.3
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.19 J	0.069 J	ND	2
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	ND	ND	ND	8.7
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	ND	ND	ND	10
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	ND	ND	ND	10
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	ND	ND	ND	3.2
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND	ND	7.1
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ND	ND	ND	2.2
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	ND	ND	0.2 J	0.73 J
				0.93 J

Pesticides

Aldrin	ND	ND	ND	ND
alpha-Chlordane	ND	ND	ND	ND
gamma-Chlordane	ND	ND	ND	ND
2,4'-DDT	ND	ND	ND	1.4
4,4'-DDT	0.037 J	ND	ND	2.8
2,4'-DDE	ND	ND	ND	20
4,4'-DDE	ND	ND	ND	ND
2,4'-DDD	ND	ND	ND	6.7
4,4'-DDD	0.09 J	ND	ND	3
Dieldrin	ND	ND	ND	15
Methoxychlor	ND	ND	ND	1.2
Endosulfan I	ND	ND	ND	4.1
Endosulfan II	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	2
Endrin	ND	ND	0.072 J	ND
Endrin Aldehyde	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND
alpha-hexachlorocyclohexane	ND	ND	ND	0.11 J
beta-hexachlorocyclohexane	ND	ND	ND	ND
delta-hexachlorocyclohexane	0.051 J	0.038 J	ND	ND
lindane	0.019 J	ND	ND	0.18 J
trans-Nonachlor	ND	ND	ND	ND
Toxaphene	ND	ND	ND	1.2
				ND
%Dibromo-octafluoro-biphenyl	60	58	55	99
%103 - 2,2',4,5',6-Pentachlorobiphenyl	68	68	71	105
%198 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl	75	78	74	115

Project Title : Sediment Testing for Massachusetts Coastal Zone Management

Data Package: 1137

Data Table: PCB_Main - Surrogate Corrected
FINAL PCB/PESTICIDE DATA

Field ID	NEP-2	NEP-3
Sample Site	Salem	Salem
Lab ID	98D1113	98D1114
Lab Batch	B0002	B0002
File	05209845.D	05209846.D
Sample Type	SAMP	SAMP
Matrix	Sediment	Sediment
Sample Size	11.5 g	14.8 g
Weight Basis	DRY	DRY
Associated Blank	BS-S-56PB	BS-S-56PB
Field Date	NA	NA
Extract Date	05/07/98	05/07/98
Analysis Date	05/23/98	05/23/98
Min Reporting Limit	1.7	1.4
Units	ug/Kg	ug/Kg

PCBs

8 - 2,4'-Dichlorobiphenyl	ND	0.15 J
18 - 2,2',5'-Trichlorobiphenyl	ND	0.65 J
28 - 2,4,4'-Trichlorobiphenyl	1.2 J	1.8
44 - 2,2',3,5'-Tetrachlorobiphenyl	0.44 J	2.8
52 - 2,2',5,5'-Tetrachlorobiphenyl	2.6	8.9
66 - 2,3',4,4'-Tetrachlorobiphenyl	2.3	3.1
101 - 2,2',4,5,5'-Pentachlorobiphenyl	6.1	11
105 - 2,3,3',4,4'-Pentachlorobiphenyl	3.4	5.7
118 - 2,3',4,4',5'-Pentachlorobiphenyl	9.7	15
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	3.4	5.3
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	13	20
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	14	23
170 - 2,2',3,3',4,4',5'-Heptachlorobiphenyl	27	18
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	5.8	8
187 - 2,2',3,4',5,5',6'-Heptachlorobiphenyl	11	14
195 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ND	4.2
206 - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl	0.8 J	1.2 J
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	1.5 J	1.4

Pesticides

Aldrin	ND	ND
alpha-Chlordane	1.1 J	2.1
gamma-Chlordane	1.1 J	2.7
2,4'-DDT	2.7	ND
4,4'-DDT	ND	2.3
2,4'-DDE	ND	ND
4,4'-DDE	6.8	16
2,4'-DDD	3.7	9.1
4,4'-DDD	16	52
Dieldrin	0.43 J	2
Methoxychlor	4.8	5.3
Endosulfan I	ND	ND
Endosulfan II	ND	2.6
Endosulfan Sulfate	ND	ND
Endrin	ND	ND
Endrin Aldehyde	ND	ND
Heptachlor	ND	ND
Heptachlor Epoxide	ND	ND
alpha-hexachlorocyclohexane	ND	ND
beta-hexachlorocyclohexane	ND	ND
delta-hexachlorocyclohexane	0.26 J	0.42 J
lindane	ND	0.52 J
trans-Nonachlor	1.7 J	1.6
Toxaphene	ND	ND
%Dibromo-octafluoro-biphenyl	89	77
%103 - 2,2',4,5',6'-Pentachlorobiphenyl	92	81
%198 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl	96	90

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1137
Data Table: PCB_IRM - Surrogate Corrected

Field ID	IRM 1492/IRM 1493
Sample Site	NA
Lab ID	BL49
Lab Batch	B0002
File	05209814.D
Sample Type	SAMP
Matrix	Na
Sample Size	1 mL
Weight Basis	VOLUME
Associated Blank	NA
Field Date	NA
Extract Date	NA
Analysis Date	05/21/98
Min Reporting Limit	5
Units	mg/L

T %D Q

PCBs			
8 - 2,4'-Dichlorobiphenyl	22	20	-10
18 - 2,2',5'-Trichlorobiphenyl	22	20	-10
28 - 2,4,4'-Trichlorobiphenyl	22	20	-10
44 - 2,2',3,5'-Tetrachlorobiphenyl	23	20	-15
52 - 2,2',5,5'-Tetrachlorobiphenyl	22	20	-10
66 - 2,3',4,4'-Tetrachlorobiphenyl	23	20	-15
101 - 2,2',4,5,5'-Pentachlorobiphenyl	22	20	-10
105 - 2,3,3',4,4'-Pentachlorobiphenyl	22	20	-10
118 - 2,3',4,4',5-Pentachlorobiphenyl	23	20	-15
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	21	20	-5
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	22	20	-10
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	23	20	-15
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	21	20	-5
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	22	20	-10
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	22	20	-10
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	21	20	-5
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	19	20	5
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	21	20	-5
Pesticides			
Aldrin	17	20	15
alpha-Chlordane	20	20	0
gamma-Chlordane	ND		
2,4'-DDT	22	20	-10
4,4'-DDT	22	20	-10
2,4'-DDE	23	20	-15
4,4'-DDE	20	20	0
2,4'-DDD	20	20	0
4,4'-DDD	19	20	5
Dieldrin	21	20	-5
Methoxychlor	ND		
Endosulfan I	ND		
Endosulfan II	ND		
Endosulfan Sulfate	ND		
Endrin	ND		
Endrin Aldehyde	ND		
Heptachlor	21	20	-5
Heptachlor Epoxide	20	20	0
alpha-hexachlorocyclohexane	ND		
beta-hexachlorocyclohexane	ND		
delta-hexachlorocyclohexane	ND		
lindane	19	20	5
trans-Nonachlor	20	20	0
Toxaphene	ND		
%Dibromo-octafluoro-biphenyl	101		
%103 - 2,2',4,5',6-Pentachlorobiphenyl	91		
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	96		

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1137
Data Table: PCB_BSD - Surrogate Corrected

Field ID Sample Site	Procedural Blank NA	Blank Spike NA			
Lab ID	BS-S-56PB	BS-S-57BS			
Lab Batch	B0002	B0002			
File	05209815.D	05209816.D			
Sample Type	QC	QC			
Matrix	Sediment	Sediment			
Sample Size	20 g	20 g			
Weight Basis	DRY	DRY			
Associated Blank	NA	BS-S-56PB			
Field Date	NA	NA			
Extract Date	05/07/98	05/07/98			
Analysis Date	05/21/98	05/21/98			
Min Reporting Limit	1	1			
Units	ug/Kg	ug/Kg	T	%R	Q
PCBs					
8 - 2,4'-Dichlorobiphenyl	ND	4.9	5	98	
18 - 2,2',5'-Trichlorobiphenyl	ND	ND			
28 - 2,4,4'-Trichlorobiphenyl	ND	4.6	5	92	
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND			
52 - 2,2',5,5'-Tetrachlorobiphenyl	ND	5.1	5	102	
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND			
101 - 2,2',4,5,5'-Pentachlorobiphenyl	ND	5.7	5	114	
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND	ND			
118 - 2,3',4,4',5'-Pentachlorobiphenyl	ND	ND			
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	5.1	5	102	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	ND	0.15 J			
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	ND	6.3	5	126	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	ND	ND			
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	ND	5.7	5	114	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	ND	ND			
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND			
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ND	5.7	5	114	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	ND	5.2	5	104	
Pesticides					
Aldrin	ND	ND			
alpha-Chlordane	ND	ND			
gamma-Chlordane	ND	ND			
2,4'-DDT	ND	5.2	5	104	
4,4'-DDT	ND	ND			
2,4'-DDE	ND	ND			
4,4'-DDE	ND	ND			
2,4'-DDD	ND	0.33 J			
4,4'-DDD	ND	ND			
Dieldrin	ND	4.8	5	96	
Methoxychlor	ND	ND			
Endosulfan I	ND	ND			
Endosulfan II	ND	ND			
Endosulfan Sulfate	ND	ND			
Endrin	ND	0.068 J			
Endrin Aldehyde	ND	ND			
Heptachlor	ND	4.1	5	82	
Heptachlor Epoxide	ND	ND			
alpha-hexachlorocyclohexane	ND	ND			
beta-hexachlorocyclohexane	ND	ND			
delta-hexachlorocyclohexane	ND	ND			
lindane	ND	3.6	5	72	
trans-Nonachlor	ND	4.8	5	96	
Toxaphene	ND				
%Dibromo-octafluoro-biphenyl	64	52			
%103 - 2,2',4,5',6-Pentachlorobiphenyl	69	63			
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	78	70			

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1137
Data Table: PCB_MSD - Surrogate Corrected

Field ID	MF-1(S)	MF-1(S)			
Sample Site	Salem	Salem			
Lab ID	98D1097	98D1097MS			
Lab Batch	B0002	B0002			
File	05209821.D	05209822.D			
Sample Type	SAMP	QC			
Matrix	Sediment	Sediment			
Sample Size	23.7 g	22.4 g			
Weight Basis	DRY	DRY			
Associated Blank	BS-S-56PB	BS-S-56PB			
Field Date	NA	NA			
Extract Date	05/07/98	05/07/98			
Analysis Date	05/21/98	05/21/98			
Min Reporting Limit	0.84	0.89			
Units	ug/Kg	ug/Kg	T	%R	Q

PCBS

8 - 2,4'-Dichlorobiphenyl	ND	4.4	4.4	100
18 - 2,2',5'-Trichlorobiphenyl	ND	ND		
28 - 2,4,4'-Trichlorobiphenyl	ND	4.5	4.4	102
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND	ND		
52 - 2,2',5,5'-Tetrachlorobiphenyl	ND	4.3	4.4	98
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND	ND		
101 - 2,2',4,5,5'-Pentachlorobiphenyl	0.081 J	4.9	4.4	110
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND	ND		
118 - 2,3',4,4',5-Pentachlorobiphenyl	ND	ND		
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	ND	4.7	4.4	107
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.36 J	0.18 J		
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	0.091 J	5.6	4.4	125
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	ND	ND		
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.066 J	4.9	4.4	110
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	0.84	ND		
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND	ND		
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ND	4.7	4.4	107
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	0.05 J	4.7	4.4	106

Pesticides

Aldrin	ND	ND		
alpha-Chlordane	ND	ND		
gamma-Chlordane	ND	ND		
2,4'-DDT	0.14 J	5.1	4.4	113
4,4'-DDT	ND	ND		
2,4'-DDE	ND	ND		
4,4'-DDE	ND	ND		
2,4'-DDD	ND	ND		
4,4'-DDD	0.36 J	ND		
Dieldrin	ND	4	4.4	91
Methoxychlor	ND	ND		
Endosulfan I	ND	ND		
Endosulfan II	ND	ND		
Endosulfan Sulfate	ND	ND		
Endrin	ND	0.064 J		
Endrin Aldehyde	ND	ND		
Heptachlor	ND	3.9	4.4	89
Heptachlor Epoxide	0.11 J	ND		
alpha-hexachlorocyclohexane	ND	ND		
beta-hexachlorocyclohexane	ND	ND		
delta-hexachlorocyclohexane	ND	ND		
lindane	ND	3.2	4.4	73
trans-Nonachlor	ND	4.2	4.4	95
Toxaphene	ND	ND		

%Dibromo-octafluoro-biphenyl	63	65
%103 - 2,2',4,5',6-Pentachlorobiphenyl	70	77
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl	77	86

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1137
Data Table: PCB_MSD - Surrogate Corrected

Field ID	MF-1(S)
Sample Site	Salem
Lab ID	98D1097MSD
Lab Batch	B0002
File	05209826.D
Sample Type	QC
Matrix	Sediment
Sample Size	22.4 g
Weight Basis	DRY
Associated Blank	BS-S-56PB
Field Date	NA
Extract Date	05/07/98
Analysis Date	05/22/98
Min Reporting Limit	0.89
Units	ug/Kg

T %R Q RPD Q

PCBs					
8 - 2,4'-Dichlorobiphenyl	4.7	4.5	104	3.9	
18 - 2,2',5'-Trichlorobiphenyl	ND				
28 - 2,4,4'-Trichlorobiphenyl	4.7	4.5	104	1.9	
44 - 2,2',3,5'-Tetrachlorobiphenyl	ND				
52 - 2,2',5,5'-Tetrachlorobiphenyl	4.7	4.5	104	5.9	
66 - 2,3',4,4'-Tetrachlorobiphenyl	ND				
101 - 2,2',4,5,5'-Pentachlorobiphenyl	5	4.5	109	0.91	
105 - 2,3,3',4,4'-Pentachlorobiphenyl	ND				
118 - 2,3',4,4',5'-Pentachlorobiphenyl	ND				
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	4.8	4.5	107	0	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	0.23 J				
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	5.8	4.5	127	1.6	
170 - 2,2',3,3',4,4',5'-Heptachlorobiphenyl	ND				
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	5	4.5	110	0	
187 - 2,2',3,4',5,5',6'-Heptachlorobiphenyl	ND				
195 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ND				
206 - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl	5.1	4.5	113	5.4	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.8	4.5	106	0	

Pesticides					
Aldrin	ND				
alpha-Chlordane	ND				
gamma-Chlordane	0.094 J				
2,4'-DDT	5.1	4.5	110	2.7	
4,4'-DDT	ND				
2,4'-DDE	ND				
4,4'-DDE	ND				
2,4'-DDD	ND				
4,4'-DDD	ND				
Dieldrin	4	4.5	89	2.2	
Methoxychlor	ND				
Endosulfan I	ND				
Endosulfan II	ND				
Endosulfan Sulfate	ND				
Endrin	0.087 J				
Endrin Aldehyde	ND				
Heptachlor	4.1	4.5	91	2.2	
Heptachlor Epoxide	ND				
alpha-hexachlorocyclohexane	ND				
beta-hexachlorocyclohexane	ND				
delta-hexachlorocyclohexane	ND				
lindane	3.4	4.5	76	4	
trans-Nonachlor	4.3	4.5	96	1	
Toxaphene	ND				

%Dibromo-octafluoro-biphenyl 67
%103 - 2,2',4,5',6'-Pentachlorobiphenyl 70
%198 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl 82

Project Title : Sediment Testing for Massachusetts Coastal Zone Management
Data Package: 1137
Data Table: PCB_SRM - Surrogate Corrected

Field ID	Standard			
Sample Site	Reference Material			
	NA			
Lab ID	BS-S-58SRM			
Lab Batch	B0002			
File	05209817.D			
Sample Type	QC			
Matrix	Sediment			
Sample Size	4.91 g			
Weight Basis	DRY			
Associated Blank	NA			
Field Date	NA			
Extract Date	05/07/98			
Analysis Date	05/21/98			
Min Reporting Limit	4.1			
Units	ug/Kg	T	%D	Q

PCBs				
8 - 2,4'-Dichlorobiphenyl	1.1 J			
18 - 2,2',5'-Trichlorobiphenyl	2 J			
28 - 2,4,4'-Trichlorobiphenyl	6.2			
44 - 2,2',3,5'-Tetrachlorobiphenyl	5.2	4.8	-8.3	
52 - 2,2',5,5'-Tetrachlorobiphenyl	7.9	6.9	-14	
66 - 2,3',4,4'-Tetrachlorobiphenyl	7.5	6.8	-10	
101 - 2,2',4,5,5'-Pentachlorobiphenyl	12	11	-9.1	
105 - 2,3,3',4,4'-Pentachlorobiphenyl	3.2 J	3.6	11	
118 - 2,3',4,4',5-Pentachlorobiphenyl	10	10	0	
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl	2.2 J	1.9	-16	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl	16	13	-23	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl	18	18	0	
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl	3.3 J	3	-10	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl	7.3	5.8	-26	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl	16			
195 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ND			
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3.4 J	3.7	8.1	
209 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	9	8.3	-8.4	

Pesticides				
Aldrin	ND			
alpha-Chlordane	2.8 J	2.3	-22	
gamma-Chlordane	1.7 J			
2,4'-DDT	1.2 J			
4,4'-DDT	ND			
2,4'-DDE	1.1 J	0.73	-51	&
4,4'-DDE	7	6.6	-6.1	
2,4'-DDD	1.3 J			
4,4'-DDD	5.8	5	-16	
Dieldrin	1.9 J			
Methoxychlor	4.6			
Endosulfan I	ND			
Endosulfan II	ND			
Endosulfan Sulfate	ND			
Endrin				
Endrin Aldehyde				
Heptachlor	ND			
Heptachlor Epoxide	4.2			
alpha-hexachlorocyclohexane	ND			
beta-hexachlorocyclohexane	ND			
delta-hexachlorocyclohexane	ND			
lindane	ND			
trans-Nonachlor	1.4 J	1.2	-17	
Toxaphene	ND			

%Dibromo-octafluoro-biphenyl 74
%103 - 2,2',4,5',6-Pentachlorobiphenyl 75
%198 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl 88

Maguire Group Inc.
Architects/Engineers/Planners
One Court Street
New Britain, CT 06051
Telephone: 860 / 224-9141
Fax: 860 / 224-9147

September 29, 1998

Mr. Deerin Babb-Brott
Massachusetts Office of Coastal Zone Management
100 Cambridge Street, 20th floor
Boston, MA 02202



RE: SALEM SEDIMENT DATA COMPARISON TO UPLAND CRITERIA
MGI #14912

Dear Deerin:

I have compared the Salem sediment data to the Massachusetts upland disposal criteria, S1, in the attached data sheets. Please note that there are many constituents we tested for that do not have an upland criteria. For example, there are no upland criteria for the PCB congeners although there are upland criteria for various aroclor mixtures. Unfortunately, there is no way to convert PCB congeners to aroclors in sediment, so we cannot determine compliance with the PCB criteria.

Of the eighteen (18) samples analyzed, only one (1) sample, NEP-2, had chemical concentrations that exceed the S1 criteria for one or more chemicals. In sample NEP-2, two PAH compounds exceeded the S1 criteria. Sample NEP-3 had a chromium value of 1,000 ppm which equals the S1 criteria.

There were no exceedances of the metals or pesticide criteria.

I hope that this information is useful in analyzing upland disposal alternatives in Salem. I will be conducting a similar analysis for Fall River and New Bedford sediments.

Let me know if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen L. Lecco". The signature is fluid and cursive, with a small "like" written below it.

Stephen L. Lecco
Senior Environmental Scientist

cc: Joe Freeman, Jim Gallagher

**ATTACHMENT 8
SAMPLING REPORT**

FINAL REPORT
SEDIMENT CORE SAMPLING PROGRAM
SALEM HARBOR, MASSACHUSETTS
MASSACHUSETTS DREDGED MATERIAL
MANAGEMENT PLAN PHASE II
OSI PROJECT NO. 98ES023

Prepared For: The Maguire Group of Connecticut
One Court Street
New Britain, CT 06051

Prepared By: Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475

15-May-98

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APPENDICES

A - Equipment Specification Sheets

FINAL REPORT
SEDIMENT CORE SAMPLING PROGRAM
SALEM HARBOR, MASSACHUSETTS
MASSACHUSETTS DREDGED MATERIAL
MANAGEMENT PLAN PHASE II

1.0 INTRODUCTION

During the period from March 20 to March 28, 1998, Ocean Surveys, Inc. (OSI) conducted a sediment sampling program in Salem Harbor, Massachusetts. The program was performed for the Maguire Group, Inc. of Connecticut in support of environmental investigations for the Massachusetts Dredged Material Management Plan Phase II. A total of eighteen (18) samples were taken in Salem. Core lengths varied from 2.0 to 29.0 feet based on a program intended to sample to the design dredge depth.

2.0 EQUIPMENT AND PROCEDURES

2.1 Horizontal and Vertical Control

The accuracy of the coring vessel positioning system was checked against a USACE triangulation point located on Derby Wharf in Salem, Massachusetts. This triangulation point, a bronze disk stamped "triangulation pt #4", has the following NAD 1983 Massachusetts State Plane (Mainland 2001) coordinates:

N 3,014,772.36

E 821,840.48

All vessel positioning and position fixing was conducted within this grid system.

Water depth at each core location were determined by employing a lead line, and were corrected to the local MLW datum by applying NOAA predicted tides and local adjustments from MLLW to MLW. Using these MLW depths, corer penetration was calculated to reach the design dredge depth.

2.2 Vessel Navigation and Positioning

Vessel positioning was accomplished employing a Trimble 4000 Global Positioning System (GPS) receiver coupled with an Omnistar satellite differential correction receiver. This equipment was interfaced to an OSI Maretrack II Navigation and Data Logging System. The Trimble GPS uses the pseudo range correctors broadcast by the Omnistar system to produce differential GPS (DGPS) positions with a dynamic accuracy of better than two meters. The position accuracy of the DGPS system was verified daily by placing the system antenna over the USACE horizontal control point located on Derby Wharf. (Equipment specification sheets for the Trimble 4000 Global Positioning System, the Omnistar DGPS beacon receiver, OSI's Maretrack II Navigation and Data Logging System, and other major equipment systems utilized for this project are included in Appendix A.)

The "Maretrack II" system incorporates a portable personal computer supporting multiple input/output ports and color display monitors. "Maretrack II" receives vessel position information from the Trimble receiver and logs this information on computer disk. Prior to the survey, sample locations are prepared and graphically displayed on the computer video monitor. While sampling, the current position of the vessel is superimposed on the display, augmented by a text display of parameters such as vessel speed, heading, time, etc. The combination of a graphic display supported by numerical values provides real-time data to the helmsman as the vessel is maneuvered to each sample location.

2.3 Sediment Collection Operations

An OSI Model 1000 vibratory corer (VC) was employed to obtain sediment samples to the desired project depth. Core locations, water depths, and recovered core lengths for each station are included in Table 1.

Depending on the length of sample required at a given sampling station the Model 1000 VC was configured with a 4" diameter steel barrel up to 30' in length. A clean 3.5" ID Lexan (plastic) core liner is inserted into the steel barrel and allows for extraction of the intact continuous sample from the barrel when the corer is brought to the deck upon completion of the coring operation. In order to enhance sample acquisition and retention, the core barrel is fitted with both a cutting edge and a core-catcher.

Operationally, prior to deploying the corer the barrel and supporting crane cable are marked at 1' increments. The required sample depth at each site is then calculated from lead line readings and predicted tides and the corer lowered to the seafloor where it is vibrated to the required depth. Following recovery, the core liner is removed from the barrel, cut into manageable lengths, labeled, capped, and sealed. For this project the cores were delivered to a geologist on shore for splitting, description, and analysis.

TABLE 1

Sampling Location
Information for DMMP Phase 2
Salem, MA

Project Code	Sample Name	Proposed NAD83 FEET		Actual NAD83 FEET		Charted Depth (Ft) (MLW)	Project Depth (Ft) (MLW)	Core Length (Ft)	Date	Time	Measured Depth	Predicted Tide	Corrected Depth	Core Length Based on Measured Depth	Penetration (Ft)	Recovery (Ft)	% Recovery	Comments
		Northing	Eastng	Northing	Eastng													
S1B	NEP-A	3,015,526	823,915	3,015,505	823,921	33.0	34.0	1.0	20-Mar-98	12:54	36.5	4.4	32.1	1.9	2.0	2.0	100%	Location offset to find correct water depth
S1B	NEP-B	3,015,555	823,748	3,015,477	823,711	30.5	34.0	3.5	20-Mar-98	13:48	35.8	5.3	30.5	3.5	3.5	3.5	100%	Location offset to find correct water depth
S1B	NEP-C	3,015,899	823,866	3,015,950	823,816	33.5	34.0	0.5	20-Mar-98	16:04	40.0	8.0	32.0	2.0	2.0	2.0	100%	Location offset to find correct water depth
S1B	NEP-D	3,016,149	824,066	3,016,202	824,014	32.5	34.0	1.5	23-Mar-98	9:12	37.8	5.7	32.1	1.9	2.0	2.0	100%	Location offset to find correct water depth
S1B	NEP-E	3,015,860	824,555	3,015,910	824,586	29.5	34.0	4.5	23-Mar-98	10:48	32.6	3.2	29.4	4.6	4.6	4.5	98%	Location offset to find correct water depth
S1B	NEP-F	3,015,758	824,968	3,015,757	824,971	28.0	34.0	6.0	20-Mar-98	11:05	29.5	1.4	28.1	5.9	6.0	5.4	90%	
S8	MF-A	3,015,577	823,192	3,015,576	823,191	3.0	16.0	13.0	24-Mar-98	9:05	10.5	7.7	2.8	13.2	13.1	13.0	99%	
S8	MF-B	3,015,729	823,030	3,015,726	823,032	2.0	16.0	14.0	23-Mar-98	14:00	2.7	0.8	1.9	14.1	14.0	14.0	100%	
S8	MF-C	3,015,861	822,866	3,015,841	822,863	1.0	16.0	15.0	23-Mar-98	12:02	1.8	0.8	1.0	15.0	15.0	15.0	100%	
S8	MT-A	3,015,045	822,994	3,015,048	822,992	7.0	22.0	15.0	24-Mar-98	10:12	12.6	5.8	6.8	15.2	15.0	14.0	93%	
S8	MT-B	3,015,271	823,165	3,015,274	823,167	5.0	22.0	17.0	24-Mar-98	12:14	6.3	1.6	4.7	17.3	17.2	17.0	99%	
S8	MT-C	3,015,446	823,296	3,015,446	823,288	4.0	22.0	18.0	23-Mar-98	16:40	9.5	5.2	4.3	17.7	18.3	18.0	98%	
S8	SP-A	3,015,334	824,823	3,015,332	824,820	13.0	34.0	21.0	24-Mar-98	14:25	12.5	-0.2	12.7	20.7	21.0	21.0	100%	
S8	SP-B	3,015,318	824,368	3,015,319	824,370	7.0	34.0	27.0	26-Mar-98	13:50	7.8	1.4	6.4	27.6	27.0	27.0	100%	
S8	SP-C	3,015,371	823,871	3,015,372	823,870	8.0	34.0	26.0	26-Mar-98	8:50	14.4	6.6	7.8	26.2	26.0	26.0	100%	
S8	SP-D	3,015,401	823,561	3,015,402	823,561	9.0	34.0	25.0	28-Mar-98	9:00	18.2	9.1	9.1	24.9	25.0	25.0	100%	
S8	SP-E	3,015,136	823,418	3,015,135	823,417	5.0	34.0	29.0	25-Mar-98	9:17	13.9	9.0	4.9	29.1	29.0	29.0	100%	
S8	SP-F	3,014,931	823,237	3,014,930	823,238	7.0	34.0	27.0	26-Mar-98	9:00	16.4	9.8	6.6	27.4	27.0	27.0	100%	

ATTACHMENT 9
CORE LOGS

SALEM (SI-B)

BORING LOCATION <u>SEE PLAN</u>		DATE START/FINISH <u>3/20/98</u>		NEP-A	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSI</u>		PG. / OF /	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. OOSTINGA</u>		TOTAL DEPTH (FT) <u>2.4'</u>	
		<u>R. FORSTEN</u>			

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	2							0-0.6' ORGANIC SILT (OL), heterogeneous, non-plastic, < 5% fine sand, dark grey to black, trace roots, leaves 0.6-2.4' LEAN CLAY (CL), heterogeneous, medium plasticity, low toughness, none to low dilatancy, grey $S_r = 0.25 \times 0.2 = 0.05$ TSF
	4							BOTTOM OF CORE @ 2.4' Collected a composite sample of 0-2' at 1550. Discarded bottom 0.4' of core.

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE RCD - LENGTH OF SOUND CORES > 4 IN. / LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLES.	UF - FIXED PISTON UC - OSTERBERG	NOTES:	PROJECT DATE <u>98105</u> <u>3/20/98</u>
GROUNDWATER		GEI Consultants, Inc.	

SALEM (S1-B)

BORING LOCATION <u>SEE PLAN</u>		DATE START/FINISH <u>3/20/98</u>		NEP-C	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSI</u>		PG. 1 OF 1	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. OOSTING</u> TOTAL DEPTH (FT) <u>2.4'</u>			
		<u>R. VAN ETREN</u>			

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	2							ORGANIC SILT (OL), homogeneous, non-plastic, black, hydrogen sulfide odor, trace fine sand top 0.6 ft very soft and wet and containing mussel shells $S_v = 0.05 \times 0.2 = 0.01$ TSF Bottom of core @ 2.4 ft Composited 0-2.0' into sample NEP-C @ 1805 Discarded bottom 0.4' of core.

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN.
TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER
PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC-RECOVERY LENGTH OF SAMPLE
ROD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED, %
S-SPLIT SPOON SAMPLE
U-UNDISTURBED SAMPLES, UF-FIXED PISTON
UC-OSTERBERG

☒ GROUNDWATER

NOTES:

PROJECT 98105
DATE 3/20/98

 GEI Consultants, Inc.

BORING LOCATION <u>SALEM HARBOR 51-B</u>	DATE START/FINISH <u>3/23/98 - 3/23/98</u>	NEP-D
GROUND ELEVATION (NGVD) <u> </u>	DRILLED BY <u>O.SI</u>	PG. 1 OF 1
GROUNDWATER EL. <u> </u> DATE <u> </u>	LOGGED BY <u>RVE/KEE</u> TOTAL DEPTH (FT) <u>2.0</u>	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	0.1					1 sample 0-2' whole core composite. OL Terned a grab sample.		0-2' organic soil (OL). Homogenous, nonplastic fines; silt. Trace of fine sand, or fine sand grain sized grit. Coal dust? Black, sulfidic. $S_v = 0.1 \times 0.2 = 0.02$ TSF Note: 1/2" size coal clinkers in top of core and at 6" fibrous wood ~ 3" long 1/8" thick at 1.4' in core. Bottom of core 2.0'
	0.5							
	1.0							
	1.5							
	2.0							

Sample 1.d.

(51-B) NEP-D, 0-2 @ 13:00
3/23/98

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN.
TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER
PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC - RECOVERY LENGTH OF SAMPLE
ROD - LENGTH OF SOUND CORES > 4 IN. / LENGTH CORED, %
S - SPLIT SPOON SAMPLE
U - UNDISTURBED SAMPLES,

UF - FIXED PISTON
UC - OSTERBERG

▽ GROUNDWATER

NOTES:

OSI Vibracore

Ma CZM

PROJECT 98105
DATE 3/25/98



GEI Consultants, Inc.

BORING LOCATION <u>SALEM HARBOUR SI-B</u>		DATE START/FINISH <u>3/23/98 - 3/23/98</u>		(SI-B)	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSI</u>		NEPE	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>RYE/GEI</u>		TOTAL DEPTH (FT) <u>4.5</u>	
PG. 1 OF 1					

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
0.1								0-0.6' Mussel shells (whole & fragments) ~10% by volume.
0.5								v. soft
1.0						(color) silt deposit @ 1.1'		0-4.5' Organic soil (OL). Homogeneous, nonplastic fines silt. <5% fine sand throughout. Black, sulfidic. 3 <2" layers of olive colored silt at 1.1, 2.3 and 2.8' in core.
1.5								OL
2.0						silt (olive)		Note - Top of core 0-0.6' very soft, unconsolidated
2.5								0.6-4.5 low toughness
3.0						silt (olive)		SV = 0.2 x 0.2 = 0.04 TSF
3.5						Sampled 0-4.5'		Dilatancy test (0.6-4.5) slow - none.
4.0								Sample - whole core composite 0-4.5'
4.5								1.D. (SI-B) NEPE, 0-4.5' @ 11:55 3/23/98
								Bottom of core 4.5'

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE RQD - LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLES, UG - GROUNDWATER	NOTES: OSI vibration	Mr. CZM PROJECT 98105 DATE 3/25/98 GEI Consultants, Inc.
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SALEM (S1-B)

BORING LOCATION <u>SEE PLAN</u>	DATE START/FINISH <u>3-20-98</u>	NEP-F
GROUND ELEVATION (NGVD) _____	DRILLED BY <u>DSI</u>	PG. 1 OF 1
GROUNDWATER EL. _____ DATE _____	LOGGED BY <u>S. DOSTING</u> TOTAL DEPTH (FT) <u>5.5</u> <u>R. VAN ETTEN</u>	

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0 - 4.3' ORGANIC SILT (OL), homogeneous, non plastic, black. Top 0.8 ft soft and wet $S_v = 0.1 \times 0.2 = 0.02$ TSF 4.3 - 5.0 transition from organic silt to clay 5.0 - 5.5' LEAN CLAY (CL), homogeneous high plasticity, grey $S_v = 0.28$ TSF
	2							
	4							
	6							bottom of core @ 5.5 ft collected composite sample of 0-5.5' @ 1730

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN.
TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER
PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC-RECOVERY LENGTH OF SAMPLE
ROD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED, %
S-SPLIT SPOON SAMPLE
U-UNDISTURBED SAMPLES,
UF-FIXED PISTON
UO-OSTERBERG

NOTES:

PROJECT 98105
DATE 3/20/98



GEI Consultants, Inc.

☒ GROUNDWATER

SALEM (5-8)

BORING LOCATION _____		DATE START/FINISH <u>core collected on 3/25/98</u> <u>core sampled on 3/25/98</u>		SP-A	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>DSI</u>			
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. OSTING</u> TOTAL DEPTH (FT) <u>21</u>		PG. 1 OF 1	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0-1.5 ORGANIC SILT (OL), homogeneous, non-plastic silt, ~5% fine sand, occasional shell fragments, wet and loose $S_v = 0.11 \times 0.2 = 0.022$ TSF
	5							1.5-5.5 ORGANIC SILT (OL) homogeneous, nonplastic, dark grey-brown, trace fine sand, ~5% clay fines, occasional shell fragments $S_v = 0.18 \times 0.2 = 0.036$ TSF
								5.5-6.3 ORGANIC SILT (OL) homogeneous, nonplastic, grey brown, very sticky, wet and loose
								6.3-7.0 SILT WITH SAND (OL), homogeneous, non plastic, ~25% sand, grey
	10							7.0-14.0 NARROWLY GRADED SAND (SP) mostly medium sand, occasional bands of fine sand, grey. 7.0-7.7' contains large clam shells $S_v = 0.4 \times 0.2 = 0.08$ TSF
	15							14.0-18.3 SILTY SAND (SM), mostly silt sand, ~20% silty fines, mostly in thin lenses throughout, top 1.5 ft is grey, then gradually becomes orange-brown to silty clay at 17.8', 17.9-18.3' is grey $S_v = 0.67$ TSF
	20							18.3-21.0 LEAN CLAY (CL) homogeneous, low to medium plasticity, medium consistency, grey $S_v = 0.64$ TSF
								Bottom of core @ 21.0' Samples collected: (5-8) SP-A, 0-2' @ 1145 (5-8) SP-A, 2-4' @ 1230 (5-8) SP-A, 4-6' @ 1245 (5-8) SP-A, 6-21' @ 1400

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES,	NOTES:	PROJECT <u>98105</u> DATE <u>3/25/98</u>
UF-FIXED PISTON UC-OSTERBERG GROUNDWATER		GEI Consultants, Inc.

(38)

BORING LOCATION <u>SALEM HARBOR 58</u>				DATE START/FINISH <u>03/26/98 - 03/27/98</u>				SP-B	
GROUND ELEVATION (NGVD) <u> </u>				DRILLED BY <u>OSI</u>					
GROUNDWATER EL. <u> </u> DATE <u> </u>				LOGGED BY <u>RJE/GEI</u> TOTAL DEPTH (FT) <u> </u>				PG. 1 OF 2	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
1		S1				S1 0-2' @ 10:20		4" piece of coral at top of core 0-1.1' Organic silt (OL) homogeneous non-plastic, olive-gray color. Sulfide odor. Shell fragments throughout 0-4' Trace of fine coarse sand. coarse sand subangular. v. soft.
2								1.1-2.0' Organic silt (OL) homogeneous non-plastic, black. Trace of fine sand. Slow dilatancy. v. soft.
3		S2				S2 2-4' @ 10:30		2-4' Organic silt (OL) homogeneous non-plastic, olive gray. soft (more fine than 2') slow dilatancy (shell fragments)
4								NOTE: plant roots in top 2' of core.
5		S3				S3 4-6' @ 11:00		4-8' OL same as above. Trace of fine sand. Shell fragments all up ~ 5'. sulfide odor
6								5v
7		S4						8-9.9' Organic silt homogeneous non-plastic (ML) 9.9-10.4' silt with sand. homogeneous non-plastic fines with 30% sand. Mostly med. sand. Gray, soft
8								10.4-11.9 silt (ML) with clayey fines - low plasticity med. toughness. Trace of sand gray soft. Shell fragments. Rapid dilatancy.
9								11.9-12.2 Organic soil with plant fragments brown collected separately
10								Tolerance data
11								0-1.1 inches 0.32 x 0.2
12								1.1-2 " 0.38 x 0.2
13								2-4 " 0.44 x 0.2
14								4-6 " 0.50 x 0.2
15								6-8 " 0.60 x 0.2
								12.2-12.9 silt with sand (SM) mostly fine med ~ 30% non-plastic fines gray

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE RQD - LENGTH OF SOUND CORES > 4 IN. / LENGTH CORED. % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLES. UF - FIXED PISTON UO - OSTERBERG ▽ GROUNDWATER	NOTES: OSI vibro.coru collected 3/26/98 sampled 3/27/98 Sampling design per SAT at 0-2, 2-4, 4-6, 6-8 ft	Mr CCM PROJECT 98105 DATE 3/27/98 GEI Consultants, Inc.
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BORING LOCATION <u>SALEM HARBOR 58</u>		DATE START/FINISH <u>03/26/98 - 03/27/98</u>		SP-B	
GROUND ELEVATION (NGVD) <u> </u>		DRILLED BY <u>OSI</u>			
GROUNDWATER EL. <u> </u> DATE <u> </u>		LOGGED BY <u>RVE/GEI</u>		TOTAL DEPTH (FT) <u>26.8</u>	
PG. 2 OF 2					

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
15								15- homogeneous CL clay, fine med. toughness, med. plasticity gray-brown
						Sample S4 6-26.8' @ 13.00		Tercones 1) 0.32 x 0.25 2) 0.33 x 0.25 ~~Tercones~~ 2nd glass fragments and chert throughout siltst - also in clay clay color? streaking
20								
25								
27								Bottom of core 26.8'

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED. % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES.	NOTES:	CZM PROJECT 98105 DATE 3/27/98
U-UNDISTURBED SAMPLES.	UF-FIXED PISTON UO-OSTERBERG	GEI Consultants, Inc.

☒ GROUNDWATER

(58)

BORING LOCATION <u>SALEM HARBOR 58</u>		DATE START/FINISH <u>3/26/98 - 3/27/98</u>		SP-B	
GROUND ELEVATION (NGVD) <u> </u>		DRILLED BY <u>OST</u>			
GROUNDWATER EL. <u> </u> DATE <u> </u>		LOGGED BY <u>RVE/GEI</u> TOTAL DEPTH (FT) <u>26.8'</u>		PG <u>2</u> OF <u>2</u>	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
15						S4 (CONT) 6-26.8' CL 12.9 - 26.8' lean clay (CL) homogeneous medium plasticity medium toughness, firm, gray clay. Color varies from gray to light brown. Silt also in clay. Eel grass fragments and rhizomes throughout. Sandy lens @ 13.7 - 15.1' ~50% fine med sand.		Toivone data (CONT.) $8-9.9' (CL) .54 \times 0.2 = 0.108$ $9.9-10.4' (ML) 0.3 \times 0.2 = 0.06$ $10.4-11.9' (ML) .63 \times 1 = .13$ $12.2-12.9' (SM) .33 \times 0.2 = 0.066$ $12.9-15.7' (CL) 0.55 \times 1 = 0.55$ $0.54 \times 1 = 0.54$ $15.7-26.8' (CL) 0.32 \times 2.5 = 0.80$ $0.32 \times 2.5 = 0.805$
20								
25								
26								
27								
						(58) SP-B 6-26.8' @ 13:00 3/27/98 " " 0-2' @ 10:20 " " 2-4' @ 10:30 (58) SP-B 4-6' @ 11:00		

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES > 4 IN. LENGTH CORED. % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES.	NOTES: OST Vibracorp collected 3/26/98 sampled 3/27/98	Ma CZM 98105 PROJECT DATE 3/27/98 GEI Consultants, Inc.
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TOTAL P.04

BORING LOCATION _____				DATE START/FINISH <u>CORE COLLECTED 3/23/98</u> <u>LOG SAMPLED 3/23/98</u>		SP-C	
GROUND ELEVATION (NGVD) _____				DRILLED BY <u>OSE</u>			
GROUNDWATER EL. _____ DATE _____				LOGGED BY <u>S. POSTING</u> TOTAL DEPTH (FT) <u>26.0</u>		PG. 1 OF 1	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	5						O L	0-17.4 ORGANIC SILT (OL), homogeneous non-plastic, <5% fine sand, trace shells top 0.4' plastic, below stiff clay $S_v = 0.65 \times 0.2 = 0.13 TSF$
	10							
	15							
	20							
							Frat	17.4-17.7 PEAT (OL) homogeneous, fibrous, brown
							C L	17.7-19.0 SANDY LEAN CLAY (CL), hetero- geneous, medium plastic, high toughness in 30% sand, occasional interbedded gravel with particle 1.5"
	25							19.0-26.0 LEAN CLAY (CL), homogeneous, medium plasticity medium toughness grey to brown $S_v = 0.6 TSF$
BOTTOM OF CORE @ 26.0'								
SAMPLES COLLECTED: (S-8) SP-C, 0-2' 1530 (S-8) SP-C, 2-4' 1540 (S-8) SP-C, 4-6' 1555 (S-8) SP-C, 6-26 1710								

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE RQD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES. U-UNDISTURBED SAMPLES.	NOTES:	PROJECT <u>98105</u> DATE <u>3/23/98</u> GEI Consultants, Inc.
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 UF-FIXED PISTON
 UO-OSTERBERG

GROUNDWATER

BORING LOCATION _____ GROUND ELEVATION (NGVD) _____ GROUNDWATER EL _____ DATE _____		DATE START/FINISH <u>CORE COLLECTED 5/27/98</u> <u>CORE SAMPLED 3/28/98</u> DRILLED BY <u>OSE.</u> LOGGED BY <u>S. OSTING</u> TOTAL DEPTH (FT) <u>24.6'</u>		SP-D PG. 1 OF 1
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EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0-1.4' ORGANIC SILT (OL) : homogeneous, non-plastic, ~10% fine-medium sand, very wet and soft, dark grey.
								1.4-2.6 ORGANIC SILT (OL) : homogeneous, non-plastic, ~10% sand, increasing sand content w/ depth, grey, $S_v = 0.15$ TSP
	5							2.6-4.6 NARROWLY GRADED SAND (SP) : mostly fine sand, ~10% silty fines, free shell fragments, $S_v = 0.17$ TSP
								4.6-11.3 similar to 1.4-2.6, $S_v = 0.15$ TSP
	10							11.3-12.1 NARROWLY GRADED SAND (SP) : mostly fine sand, few 1/2" pieces of gravel at fine silt/sand interface, grey, ~5% silty fines.
								12.1-13.1 CLAYEY SAND (SC) : mostly fine sand, ~25% medium plastic clay fines, grey, $S_v = 0.68$ TSP
	15							13.1-14.2 SILTY SAND WITH GRAVEL (SM) : ~50% fine to coarse subangular sand, ~40% silty and clay fines, ~10% subangular gravel, max. particle size ~2", grey.
								14.2-17.6 LEAN CLAY (CL) : homogeneous, medium plasticity, high toughness, grey brown, mottled, $S_v = 0.60 \pm 0.5$ TSP
	20							17.6-24.6 LEAN CLAY (CL) : homogeneous, medium plasticity, medium to low toughness, grey brown, $S_v = 0.45$ TSP
	25							BOTTOM OF CORE @ 24.6' SAMPLES COLLECTED: (S-8) SP-D 0-2' 0910 (S-8) SP-D 2-4' 6930 (S-8) SP-D 4-6' 1000 (S-8) SP-D 6-24.6' 1140

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE HQD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES.	UF-FIXED PISTON UO-OSTERBERG	NOTES: PROJECT 98105 DATE 3/28/98 GEI Consultants, Inc.
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BORING LOCATION _____		DATE START/FINISH <u>CORE COLLECTED 3/25/98</u> <u>CORE SAMPLED 3/26/98</u>		SP-E	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSE</u>			
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. OOSTERBERG</u>		TOTAL DEPTH (FT) <u>22'</u>	
				PG. 1 OF 1	

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0-1.7 ORGANIC SILT (OL), non-plastic, layered with lenses of sand, ~20% fine sand, trace shell fragments, grey brown, sulfur odor $S_v = 0.45 \times 0.2 = 0.09$ TSF 1.7-5.5 NARROWLY GRADED SAND (SP) mostly fine sand, 110% med. coarse sand, occasional gravel pieces, ~5% fines $S_v = 0.54 \times 0.2 = 0.108$ TSF 5.5-6.0 NARROWLY GRADED SAND (SP), mostly fine sand, 115% silty fines in lenses, orange brown $S_v = 0.15$ TSF 6.0-12.2 NARROWLY GRADED SAND (SP), mostly fine sand 10-20% silt + clay fines, increase in fines w/ depth, fines are in 1"-3" lenses, orange brown, occasional Fe + Mn staining $S_v = 0.2, 0.15$ TSF 12.1-15.1 LEAN CLAY WITH SAND (CL) homogeneous, medium plasticity, medium tough ness, ~30% sand in thin layers, grey $S_v = 0.49$ TSF 15.1-29.0 LEAN CLAY (CL), homogeneous, medium plasticity, medium tough ness, 10% sand in thin layers, grey $S_v = 0.63$ TSF BOTTOM OF BORING @ 29.0' SAMPLES COLLECTED: (S-8) SP-E, 0-2' @ 10.00 (S-8) SP-E, 2-4' @ 10.10 (S-8) SP-E, 4-6' @ 10.40 (S-8) SP-E, 6-29' @ 11.40
	5							
	10							
	15							
	20							
	25							

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES,	NOTES:	PROJECT <u>98105</u> DATE <u>3/26/98</u>
UF-FIXED PISTON UO-OSTERBERG GROUNDWATER		GEI Consultants, Inc.

BORING LOCATION _____		DATE START/FINISH <u>core collected on 3/26/98</u> <u>core samples on 3/26/98</u>		SP-F	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSI</u>		PG. 1 OF 1	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>DOOSTING</u>		TOTAL DEPTH (FT) <u>27.0</u>	

EL FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0-0.5' ORGANIC SILT (CL). Homogeneous, non-plastic, black, very soft. 0.5-20.8 NARROWLY GRADED SAND (SP), mostly fine sand, ~10% silty fines in thin laminated layers, orange brown $S_v = 1.1, 1.3, 1.0$ TSF 7.0' 1" piece of coal in sand S P 20.8-27.0 LEAN CLAY WITH SAND (CL); layered, medium plasticity, medium to coarse, ~20% fine sand in 1-2" layers, grey S_v clay = 0.35 TSF S_v sand = 0.23 TSF C L SAMPLES COLLECTED: (S-8) SP-F, 0-2' @ 1400 (S-8) SP-F, 2-4' @ 1410 (S-8) SP-F, 4-6' @ 1445 (S-8) SP-F, 6-27' @ 1620
5								
10								
15								
20								
25								

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES, UF-FIXED PISTON UO-OSTERBERG	NOTES:	PROJECT <u>98105</u> DATE <u>3/26/98</u> GEI Consultants, Inc.
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(S-8) SALEM

BORING LOCATION <u>SEE PLAN</u>		DATE START/FINISH <u>core collected on 3/24/98</u> <u>core sampled on 3/25/98</u>		MF-A	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OST</u>		PG. / OF /	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. Dossing</u> TOTAL DEPTH (FT) <u>13'</u>			

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	5							0-1' ORGANIC SILT (OL), homogeneous, non-plastic, <5% fine sand, dark grey, occasional wood + shell fragment, sulfur odor $S_v = 0.27 \times 0.2 = 0.054$ TSF
								1-3' NARROWLY GRADED SAND (SP), mostly fine sand, ~10% organic silty fines, dark grey. $S_v = 0.15$ TSF
	10							3-13' ORGANIC SILT (OL), homogeneous, non-plastic, <5% fine sand, ~10% clay, occasional shell fragment, sulfur odor, dark grey. $S_v = 0.20$ TSF
	15							BOTTOM OF CORE @ 13' collected 2 chemical samples: (S-8) MF-A, 0-3' @ 1030 (S-8) MF-A, 3-13' @ 1045

BLOWS PER 6 IN. - 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE ROD - LENGTH OF SOUND CORES > 4 IN. / LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLES. U-OSTERBERG	NOTES:	PROJECT <u>98105</u> DATE <u>3/25/98</u> GEI Consultants, Inc.
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GROUNDWATER

Samples: (58) MF-B, 0-5.2' @ 08:45 on 3/24/78
 " " 5.2-11.4' @ 11:45 " " "
 " " 11.4-14' @ 12:00 " " 3/24/78.

(58)

BORING LOCATION <u>SALEM HARBOR 58</u>		DATE START/FINISH <u>3/23/98 - 3/23/98</u>		MF-C	
GROUND ELEVATION (NGVD) <u> </u>		DRILLED BY <u>OSI</u>			
GROUNDWATER EL. <u> </u> DATE <u> </u>		LOGGED BY <u>ME/GEI</u>		TOTAL DEPTH (FT) <u>15.0</u>	
PG. 1 OF 1					

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
0								0-0.9' Organic soil (OL) Homogeneous, nonplastic fines with trace of fine sand. Gray-black color, sulfidic, shell fragments.
1						Sampled 0-3'		0.9-3.0' Silty sand (SM). Mostly fine-medium sand, ~30% silty fines (ML/MH) of low plasticity. Homogeneous; dark gray. Sulfide odor.
2								
3								
4						Sampled 3.0-8.4'		3.0-8.4' Sandy lean clay (CL) Laminated. Clayey fines. ~30% fine-med. subangular sand. Little gravel. Gray. Med-low toughness. Medium plasticity. Slow dilatancy. Sand deposits tend to be in bands of high percentage.
5								
8								
8.5								
10						Sampled 8.4-15.0'		8.4-15.0' Clayey sand (SC) Laminated, narrowly graded fine sand with low plasticity clayey fines. Fines range from 20-60 percent. Brown.
								Torrance data: 0-0.9' (OL) $0.35 \times 0.2 = 0.07$ TSF 0.9-3.0' (SM) $0.27 \times 0.2 = 0.054$ " 3.0-8.4' (CL) $0.29 \times 1 = 0.29$ " 8.4-15.0' (SC) $0.25 \times 1 = 0.25$ TSF
								Samples: (58) MF-C, 0-3' @ 17.30 on 3/23/98 (58) MF-C, 3-8.4' @ 17.45 " " (58) MF-C, 8.4-15.0' @ 18.00 " " Bottom of core 15.0'
15								

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES,	NOTES: OSI vibracore	Mx. CZM PROJECT 98105 DATE 3/25/98
UF-FIXED PISTON UO-OSTERBERG GROUNDWATER		GEI Consultants, Inc.

BORING LOCATION <u>SALEM HARBOR 58</u>	DATE START/FINISH <u>03/24/98 - 03/24/98</u>	MT-A
GROUND ELEVATION (NGVD) <u>—</u>	DRILLED BY <u>OST</u>	PG. 1 OF 1
GROUNDWATER EL. <u>—</u> DATE <u>—</u>	LOGGED BY <u>RVE</u>	TOTAL DEPTH (FT) <u>13.9'</u>

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
	1							0-1.2' Organic soil (OL). Homogeneous nonplastic fines. Trace of fine sand. Black, solid, v. soft & unconsolidated
	2					1 sample whole core composite 0-13.9'		1.2-13.9' Sand (SP). Narrowly graded fine-medium sand. Mostly fine sand. 45% fines. Sand subangular. Brown.
	5							Torvane data. @ 3' $0.21 \times 0.2 = 0.042$ TSF @ 7.5' $0.2 \times 0.2 = 0.04$ TSF @ 12' $0.22 \times 0.2 = 0.044$ TSF
	10							Sample ID- (58) MT-A, 0-13.9' @ 15.50 3/24/98
	13							
	14							Bottom of core 13.9'
	15							

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN.
TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER
PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC-RECOVERY LENGTH OF SAMPLE
ROD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, %
S-SPLIT SPOON SAMPLE
U-UNDISTURBED SAMPLES.

UF-FIXED PISTON
UO-OSTERBERG

☒ GROUNDWATER

NOTES:

OST vibrator

Mr C/M

PROJECT 98105
DATE 3/24/98



GEI Consultants, Inc.

(5-8) SALEM

BORING LOCATION _____		DATE START/FINISH _____		MT-B	
GROUND ELEVATION (NGVD) _____		DRILLED BY <u>OSI</u>		PG. 1 OF 1	
GROUNDWATER EL. _____ DATE _____		LOGGED BY <u>S. OOSTING</u>		TOTAL DEPTH (FT) <u>17'</u>	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
								0-2' WIDELY GRADED SAND (SW), mostly medium sand, ~10% coarse sand, 15% fine sand, 25% fines, grey. $S_v = 0.16$ TSF
								2-4.2 NARROWLY GRADED SAND (SP), mostly fine sand, <5% fines, grey. $S_v = 0.17$ TSF
								4.2-5.3 similar to 2-4.2, except orange brown. $S_v = 0.20$ TSF
								5.3-5.8 SILTY SAND (SM), mostly fine sand, ~25% silty fines, orange brown. $S_v = 0.35$ TSF
								5.8-9.3 NARROWLY GRADED SAND (SP), mostly fine sand, <5% fines, grading from orange brown @ 5.8 to grey @ 9.3. $S_v = 0.25$ TSF
								9.3-9.5' CLAYEY SAND (SC), mostly fine sand, ~20% clayey fines, grey. $S_v = 0.35$ TSF
								9.5-14.1 NARROWLY GRADED SAND (SP), mostly fine sand, <5% fines, grading from grey to orange brown, Fe staining @ 13.4'. $S_v = 0.15$ TSF
								14.1-14.4' LEAN CLAY (CL), medium toughness, medium plasticity, orange brown
								14.4-16.5' NARROWLY GRADED SAND (SP), mostly fine sand, orange brown. $S_v = 0.16$ TSF
								16.5-17.0 LEAN CLAY (CL) medium toughness, medium plasticity, orange brown. $S_v = 0.44$ TSF
								Bottom of core @ 17'
								Collected one composite sample of entire core
								(5-8) MT-B 0-17' @ 0900

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE ROD-LENGTH OF SOUND CORES > 4 IN./LENGTH CORED, % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES,	NOTES: PROJECT 98105 DATE 3/25/98 GEI Consultants, Inc.
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U-UNDISTURBED SAMPLES, UF-FIXED PISTON
 UO-OSTERBERG
 GROUNDWATER

BORING LOCATION <u>SALEM HARBOR SR</u>		DATE START/FINISH <u>3/23/98 - 3/24/98</u>		MT-C	
GROUND ELEVATION (NGVD) <u>---</u>		DRILLED BY <u>OST</u>		PG. 1 OF 1	
GROUNDWATER EL. <u>---</u> DATE <u>---</u>		LOGGED BY <u>RYE/GEI</u>		TOTAL DEPTH (FT) <u>18.0</u>	

EL. FT.	DEPTH FT.	SAMPLE				REMARKS	GRAPHIC LOG	SOIL AND ROCK DESCRIPTIONS
		TYPE and NO.	BLOWS PER 6 IN.	PEN IN.	REC IN.			
1								0-0.8' organic soil (OL). Homogeneous, nonplastic fines. Shell fragments. Black, sulfidic, soft. $SV = 0.2 \times 0.2 = 0.04$ TSF
2						Sampled 0-5.3'		0.8-5.3' Silty sand (SM). Narrowly graded fine-med. sand with low plasticity fines (ML/MH) from 30-40%. Shell fragments throughout. Gray, H ₂ S. $SV = 0.15 \times 1 = 0.15$ TSF
3								
4								
5						Sampled 5.3-13.8'		5.3-13.8' Silt (ML). Very fine sand <5%. Homogeneous, low plasticity fines, low toughness, no dilatancy. Dark gray, H ₂ S odor. @13.8' color change to lighter gray. Percent sand content higher. Silt with sand (ML) Clayey fines banded in core at 16.4'-16.7'. $SV = 0.22 \times 1 = 0.22$ TSF
10								
15						Sampled 13.8-18'		13.8-18.0' Lean clay with sand (CL). Homogeneous. ~25% fine sand. Medium plasticity. Gray $SV_1 = 0.15 \times 1 = 0.15$ TSF $SV_2 = 0.18 \times 1 = 0.18$ TSF
18								Bottom of core 18.0'

Sample logs

(58) MT-C, 0-5.3' @ 13:45
3/24/98

(58) MFC, 5.3-13.8' @ 14:20

(58) MT-C, 13.8-18' @ 14:00

BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE A 2.0 IN. OD SPLIT SPOON SAMPLER PEN-PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC-RECOVERY LENGTH OF SAMPLE RQD-LENGTH OF SOUND CORES >4 IN./LENGTH CORED. % S-SPLIT SPOON SAMPLE U-UNDISTURBED SAMPLES. UF-FIXED PISTON UO-OSTERBERG	NOTES: OST vibracore collected 3/23/98 Sampled 3/24/98	M.C.Z.M. PROJECT 78105 DATE 3/25/98 GEI Consultants, Inc.
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GROUNDWATER

APPENDIX A

EQUIPMENT SPECIFICATIONS



4000RS™ & 4000DS™

DGPS Reference Surveyor and Differential Surveyor

The DGPS solution for real-time sub-meter accuracy utilizing L1 C/A code.

The 4000RS Reference Surveyor and 4000DS Differential Surveyor, built with Trimble's most advanced GPS processor, use carrier-smoothed C/A code measurements to achieve real-time DGPS sub-meter position accuracy. Both receivers feature 9-channels of continuous satellite tracking (12 channels optional), a lightweight, rugged, weatherproof housing, and low-power consumption for extended field operation time from batteries.

The 4000RS and 4000DS are ideal for hydrographic and navigation systems, vessel tracking and other dynamic

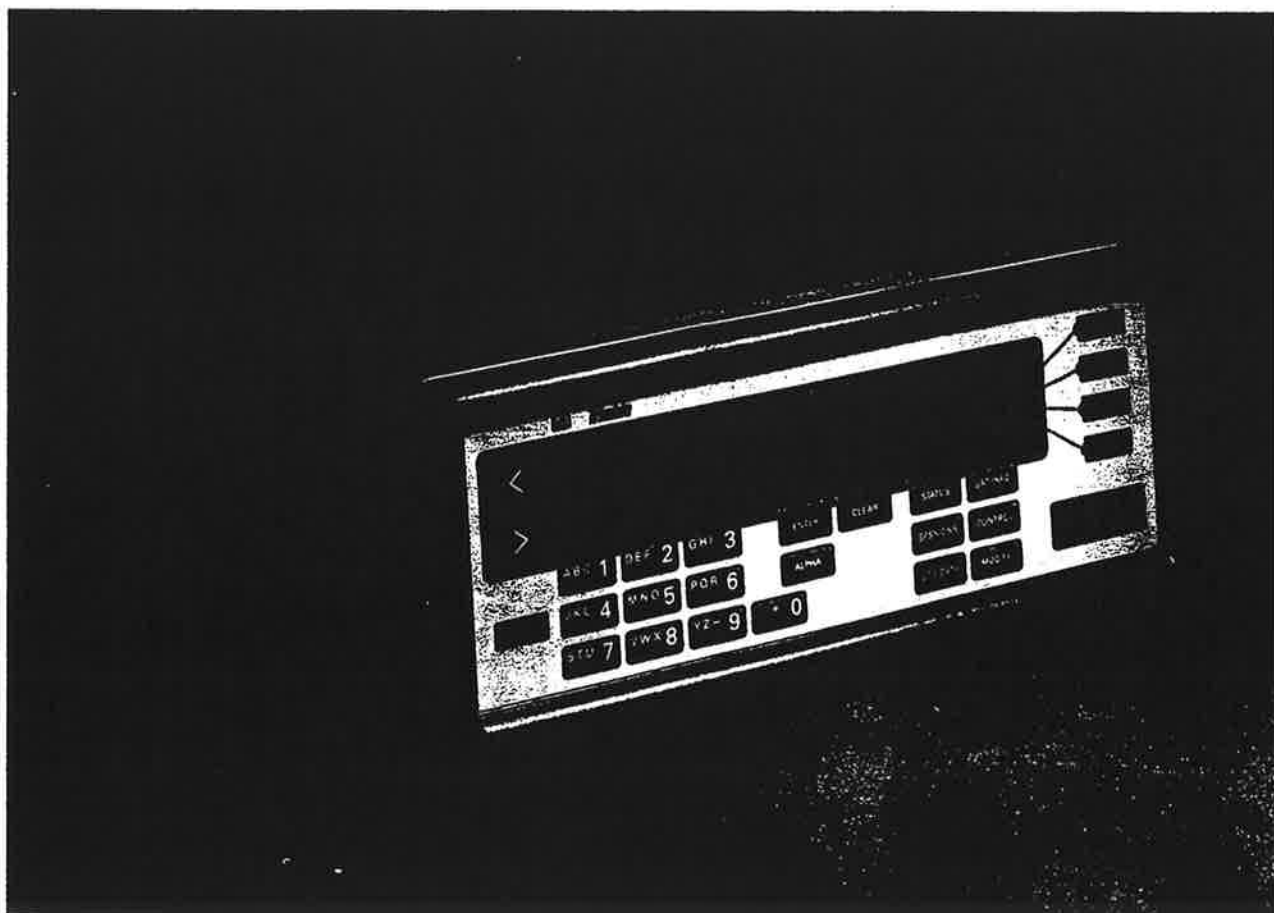
surveying applications. The 4000RS operates as an autonomous reference station, calculating DGPS corrections in the RTCM SC-104 standard format for transmission to mobile GPS receivers. Advanced carrier aided filtering and smoothing techniques applied to exceptionally low noise C/A code measurements are used to provide the highest performance available in GPS positioning.

The 4000DS is designed to use DGPS corrections in the RTCM SC-104 standard format broadcast by the 4000RS. The receiver applies the DGPS corrections to its precise C/A code measurements to generate real-time, sub-meter positions at up to a 2 Hz. rate — even under the most challenging operating conditions.

The 4000DS receiver's standard

NMEA-0183 version 2 messages, navigation firmware, data and 1PPS outputs allow for optimal flexibility for system integration and interfacing with other instruments. The navigation functions enable waypoint-based route planning with displays for cross track error, steering indicator, and bearing and distance to next waypoint.

While operating, the 4000RS and 4000DS can output binary and ASCII data for archiving or post-mission analysis. In addition, the 4000RS can operate as a mobile receiver with the same features, functionality and options as the 4000DS. For optimum DGPS positioning, combine the receivers with any of Trimble's data communications systems and QA/QC firmware to ensure the integrity of positioning accuracy.



4000 RS™ & 4000 DS™

Differential GPS Reference Surveyor and Differential Surveyor

4000 RS Features

Autonomous operation; Filtered and carrier-smoothed RTCM differential corrections (versions 1.0 and 2.0); 0.5 second measurement rate; Data integrity provision; Data link flow control on RTCM port; Triple DC input; L1 geodetic antenna; 30m antenna cable; Automatic mode restoration after power-off; Dual RS-232 I/O ports for data recording; Low power; Lightweight; Portable; Environmentally protected; 1 PPS output; NMEA-0183 outputs; RTCM input and output; 1-year warranty.

4000 DS Features

Less than 1 meter accuracy with Trimble 4000RS; Real-time operation; 0.5 second measurement rate; Data integrity provision; Triple DC input; Compact dome antenna; 30m antenna cable; Automatic mode restoration after power off; Extra RS-232 I/O port for data recording; Low power; portable; Environmentally protected; 1 PPS output; Navigation firmware; NMEA-0183 outputs; Weighted least squares solution; RTCM input; 1-year warranty.

Options

- Firmware update service—4 years
- L1 carrier phase
- 12 channels
- Rack mount
- Event marker
- QA/QC firmware
- Internal memory for datalogging
- Extended hardware warranty
- 4 serial I/O ports

Optional Accessories

- L1 Geodetic antenna
- 30m antenna cable extension, with in-line amplifier
- Office support module: OSM or OSM II
- AC power adapter, 50-60 Hz, 120V or 240V
- Receiver transport case
- TRIMTALK Series radio links
- NavBeacon XL MSK receiver

Physical Characteristics

Size:	9.8"W x 11.0"D x 4.0"H (standard receiver) (24.8cm x 28.0cm x 10.2cm) 16.8"W x 16"D x 5.25"H (rack-mount receiver) (42.7cm x 40.6cm x 13.3cm)
Weight:	6 lbs. (2.7kg) standard receiver 15lbs. (6.8kg) rack-mount receiver 0.5 lbs. (0.2kg) compact dome antenna 5.7 lbs. (2.6kg) L1 geodetic antenna
Power:	Nominal 10.5 to 35 VDC, 7 watts
Operating temp:	-20°C to +55°C
Storage temp:	-30°C to +75°C
Humidity:	100% , fully sealed, buoyant (standard receiver) 95% non-condensing (rack-mount receiver)

Technical Specifications

4000 RS

Pseudorange correction

accuracy: Typically less than 30cm RMS; Low multipath environment

Compatibility:

Corrections may be applied to all differential-equipped GPS receivers

4000 DS

Accuracy:

Typically less than 1m RMS; Assumes at least five satellites and PDOP less than 4

Compatibility:

Accepts RTCM SC-104 corrections Version 1.0 or 2.0

4000 RS and 4000 DS

Tracking:

9 channels of L1 C/A

Start-up time:

Less than 2 minutes from power-on to tracking

Antenna:

External antenna with 30m RG213 cable

RS-232 data link rates:

50-57.6K baud

RTCM message output:

Types 1, 2, 3, 6, 9, 16

NMEA-0183:

ALM, BWC, GGA, GLL, GSA, GSV, RMB, RMC, VTG, WPL, XTE, ZDA

Ports:

Dual serial; Triple power inputs; Antenna; and 1PPS output

Display:

Backlit LCD with four lines of forty alphanumeric characters; Large, easy-to-read characters—2.8mm x 4.9mm; Total viewing area: 32cm²; Adjustable backlight and viewing angle

Keyboard:

Alphanumeric, function, and softkey entry



Trimble

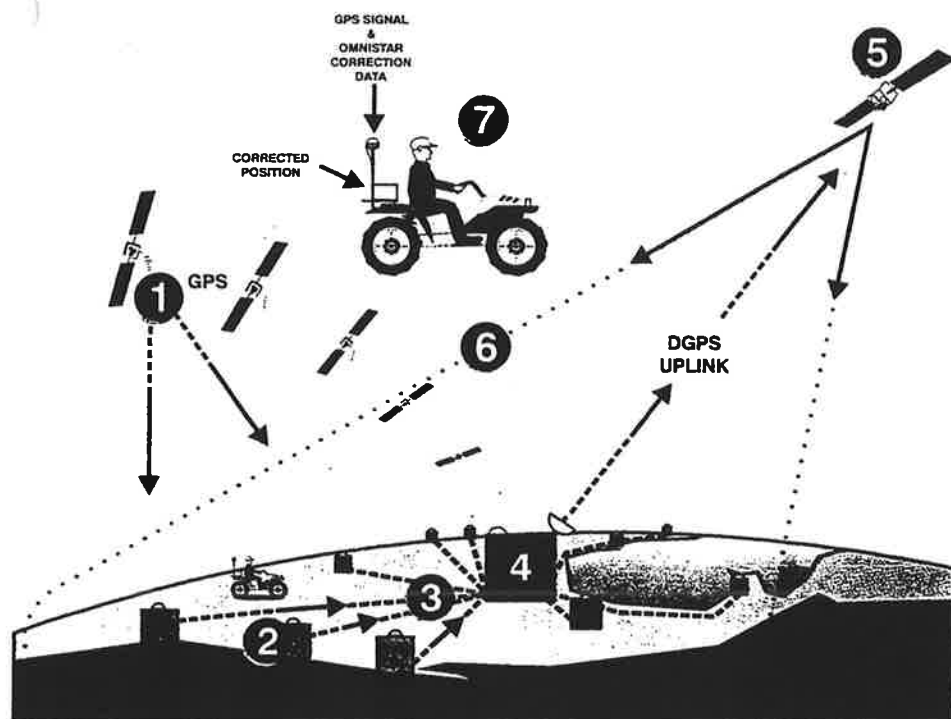
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Specifications subject to change without prior notice.

OMNISTAR™ 7000 DGPS



OMNISTAR's unique "Virtual Base Station" technology generates corrections optimized for the user's location. OMNISTAR™ receivers output both high quality RTCM-SC104 Version 2 corrections and differentially corrected Lat/Long in NMEA format. See specs for additional output information.

How it works...

1. GPS satellites 2. Multiple OMNISTAR™ GPS monitor sites 3. Send GPS corrections via lease line to 4. Houston Network Control Center where data corrections are checked and repackaged for uplink to 5. GE Spacenet 3 geostationary C-band satellite 6. GE Spacenet 3 broadcast footprint = OMNISTAR™ user area 7. Correction data are received and applied real-time

OMNISTAR™ is a real-time, wide area differential GPS service providing precise positioning throughout the continental U.S. and much of Canada and Mexico.

Direct broadcast from OMNISTAR's geostationary satellite transponder overcomes the coverage limitations of ground based reference stations.

OMNISTAR™ 7000 Standard Features

The OMNISTAR™ 7000 is a compact, robust position sensor designed specially for OEM's. Each 7000 unit contains a GPS Engine *plus* Satellite Differential Receiver *plus* Antennas.

The 7000 readily integrates into today's GIS and Precision Agriculture systems. A single cable is used for power and position data.

The precise real-time positioning data is obtained from OMNISTAR's nationwide direct satellite broadcast system using our proven multi-site solution.



OMNISTAR™ North American Coverage



OMNISTAR™ backpack configuration with palm top and OMNILOG software.

APPLICATIONS

- ★ Survey/Mapping
- ★ Yield Monitoring
- ★ Soil Sampling
- ★ Chemical Application
- ★ Resource Management
- ★ GIS/Utilities
- ★ Vehicle Location
- ★ Environmental

OMNISTAR

Model 7000 Specifications



OMNISTAR 7000 General Specifications

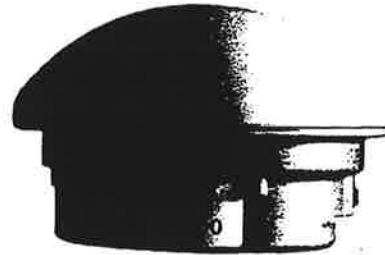
Frequency: Spread Spectrum
C - Band (3750/4250 MHZ)

Acquisition: Cold start <2.5 minutes 90%
Warm start <90 seconds 90%

Reacquisition <10 second with 5 second outage

Outputs: 1. RTCM-SC104 Version 2
2. NMEA sentences: GGA, GSA and RMC every second, others on request

Protocol: 4800,n,8,1



Receiver

Operating Temp: -20 to +70 degrees centigrade

Storage Temp: -55 to +105 degrees centigrade

Humidity: 95% R.H. @ +30 to +70 degrees centigrade

Shock: 25 g's for 5 m's duration

GPS

Integral GPS
Engine: Motorola Oncore 8 channel

Accuracy: Dependent on the GPS receiver, satellite geometry and local conditions. Nominal accuracy is 1 to 3 meters (1 sigma horizontal).

Physical Characteristics

Power: 12 volts DC

Power Consumption: 10 watts (860 ma @ 12 volts)

I/O Ports: Two RS232 tx,
One full RS232 port (tx/rx)
One CAN Bus
(Version 2.0B compatible)

Weight: 2 lbs. 12 oz.

Connector: Packard 10 pin automotive connector (Supplied)

Dimensions: Cylindrical
7.5 inches in diameter
4.5 inches in height

All specifications are subject to change without notice.

OMNISTAR™ is a Trademark and Service of OMNISTAR, INC.
A Member of the Fugro Group of Worldwide Companies

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OCEAN SURVEYS, INC.

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PNEUMATIC

VIBRATORY CORERS

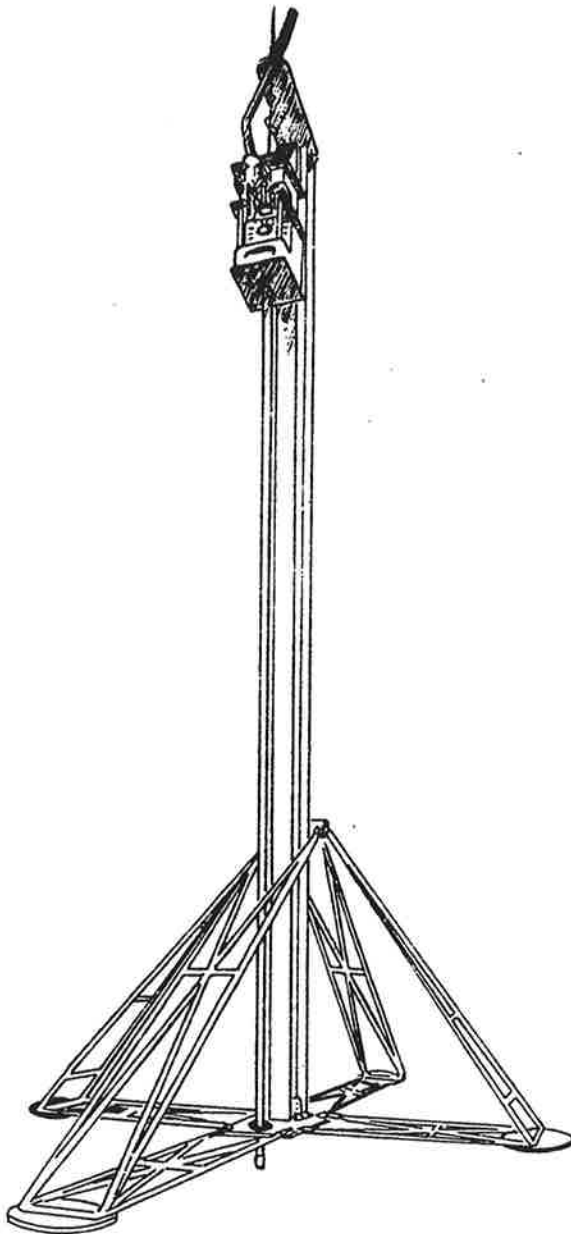
MODELS 1000, 1500, 2000

In addition to offering a full range of gravity coring services, Ocean Surveys, Inc. provides sampling of fine to coarse granular sediments in water depths to 300 feet employing the OSI series of pneumatic vibracorers. The series of vibratory corers are designed to be equipped with either 3" or 4" OD sampling barrels. Each core barrel is fitted with a nose cone (cutter), a mechanical core retainer, check-valve and a lexan liner in which the core sample is retrieved. The 4" OD sampling barrel uses a 3½" ID liner and the 3" barrel uses a 2-¾" ID liner.

In operation, the OSI corers employ an oscillating air-driven mass which generates axial forces causing the core head to oscillate vertically. These forces, together with the longitudinal impact created by the core head striking an anvil at the bottom of each stroke, are transmitted to the core barrel. As both the frequency and intensity of the core head forces are controllable, sampling operations may be "tuned" to achieve maximum subbottom core penetration, minimum sediment disturbance, and efficient sampling of sediments exhibiting a wide range of geotechnical properties.

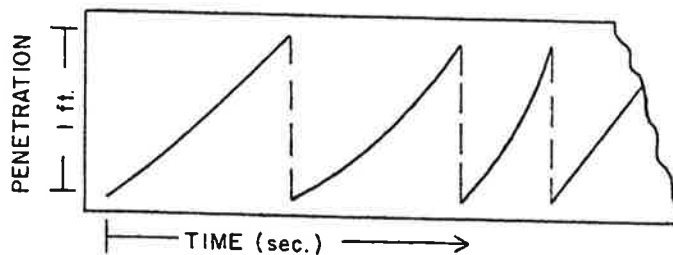
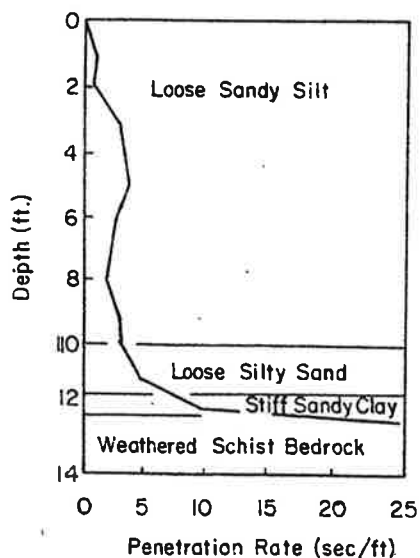
In sheltered water and for sampling low strength sediments, maximum efficiency can be achieved employing the corers as free-standing units. Offshore or in compact sediments, use of a bottom-standing frame is required. Core barrels are available in lengths up to 50

feet with removable plastic core liners up to 3-5/8" ID. Each of the OSI vibratory corers can be equipped with the additional capability of jetting to predetermined depths before coring commences which permits recovery of sequential core sections from subbottom depths in excess of those attainable by conventional vibratory coring approaches.



The coring rig can be handled with a crane or an A-frame and a winch mounted on a ship or barge. Twenty to 40 foot cores are generally taken in 15 to 45 minutes, which includes the time to lower the unit to the bottom, penetrate the sediment and return it to the vessel. The corer at left is returning from the sea floor with a 20 foot core.

Penetration of the core barrel into sediment as a function of time is recorded as shown above on a strip chart recorder on the support vessel.



Penetration rate is used to evaluate soil consistency in a similar fashion to a "blow count" obtained from conventional split spoon sampling and a penetration profile may be prepared (left).

OSI MODEL 1500 VIBRACORER SPECIFICATIONS

SPECIFICATIONS

Power System:

Engine: 4-cycl., air-cooled, diesel air compressor

Flow Capacity: 150 cfm @ 120 psi

Connecting Lines: Supply (Low Pressure): 1 in.
Return (Low Pressure): 1 inc.

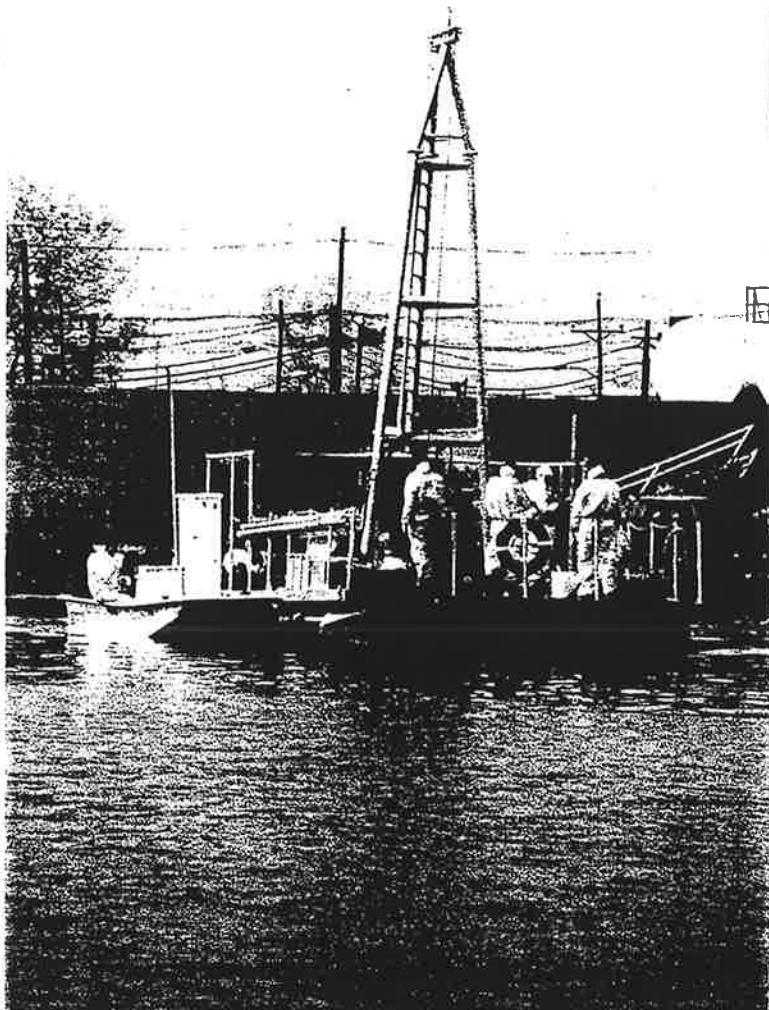
Core Barrel:

Lengths Available: 20 ft. std. (40 ft. available)

Outside Diameters: 3 to 4 in.

Inside Diameters: 2-3/4 in. to 3-5/8 in.

Liner: Plastic, removable in 20 ft. lengths



OSI's 34' x 16' pontoon boat alongside 20' open vessel. Pontoon boat features sections which fold up for trailering, a 4' x 5' moon pool through which sampling or measurement equipment are lowered, and a tower assembly for handling vibratory corers and other devices. Pontoon boat is capable of 15 kt speed and has a 75 mile range.

OSI has recently used the pontoon boat to obtain 200 cores which were up to 30 ft in length in support of a major environmental assessment project.



Salem Bio-Testing Plan

INTERAGENCY COORDINATION OF DRAFT SAMPLING PLAN

PROJECT LOCATION: Salem Harbor, Salem Massachusetts

SUBMITTED BY: U.S. Army Corps of Engineers (USACE)
Commonwealth of Massachusetts

DATE: 22 January 1998

THIS DRAFT SAMPLING PLAN IS BEING SENT TO THE FOLLOWING AGENCIES FOR REVIEW AND COMMENT:

<u>AGENCY</u>	<u>CONTACT</u>	<u>TEL #</u>
1. U. S. Environmental Protection Agency	Ms. Olga Quirin	(617) 565-4940
2. National Marine Fisheries Service	Mr. John Caskey	(508) 281-9328
3. U.S. Fish and Wildlife Service	Mr. Phillip Morrison	(603) 225-1467
4. Coastal Zone Management cc: State of Massachusetts / DEP	Mr. Deerin Babb-Rott Ms. Judy Perry	(617) 727- 9530 (617) 292-5696

The draft sampling plan for the above referenced project is being transmitted in accordance with our agreement on interagency technical coordination procedures for projects involving open water disposal of dredged materials. It is our understanding that project maps with the proposed sampling locations have been previously distributed to the agencies for review. The proposed project involves the dredging of approximately 748,000 cubic yards of material from Salem Harbor located in Salem, Massachusetts, with disposal at the Massachusetts Bay Disposal Site (MBDS).

Please respond with your comments to Mr. Jay Mackay at the USACE Engineering / Planning Division at (617) 647-8142.

DRAFT

CENAE-CO-R (1145-2-303B)

January 8, 1998

MEMORANDUM FOR: Charles Joyce and Mark Habel

SUBJECT: Sampling Plan for Salem Harbor, Massachusetts.

1. I have developed a sampling and testing plan for the above project. This plan is based on the plan developed by the Maguire Group, Inc., with input from the federal agencies, for the Massachusetts Coastal Zone Management CENAE and the Commonwealth of Massachusetts are proposing to dredge a total of approximately 748,000 cubic yards of material from six locations in Salem Harbor. This material is proposed to be mechanically dredged and suitable material disposed of at Massachusetts Bay Disposal Site (MBDS). Should unsuitable material be identified, further detailed studies for siting of appropriate disposal facilities would be pursued. These projects consist of both Federal and state activities for both new and improvement dredging.

The project consists of several sections, which are independent and may be done at different times. The sections are being combined in this sampling plan solely for efficiency and convenience. Maintenance dredging of the 32' Federal Channel would produce approximately 110,000 cu. yds. of material. Maintenance dredging of the state 32' turning basin, also referred to as the New England Power Basin, would produce approximately 25,000 cu. yds. of material. An extension to this basin, referred to as the Salem Port Development Project, is currently being studied as an improvement to the Federal project. It would be dredged to -32' and produce an additional 550,000 cu. yds. of dredge material. The preceding volume includes the 15' and 20' basins located west of the Salem Port Development Project which are proposed by the state as improvement dredging. The Federal 10', 8' and 6' South River Channels and 8' Derby Wharf Channel would undergo maintenance dredging and produce approximately 53,000 cu. yds. of dredge material for disposal. The State Channel to Palmer Cove is proposed for maintenance dredging to -5' mlw and would produce approximately 20,000 cu. yds. of material for disposal.

The Commonwealth, as part of their own dredged material management study efforts wishes to collect data on adjacent sites identified in their Phase I study as potential sites for a CAD cell. The state at this time proposes to conduct sampling and testing of the upper sediments in these areas along both sides of the outer reaches of the 32' Federal channel. This information is being sought for background in sediment composition. No definite proposals on CAD siting are being made at this time.

2. The Salem City Engineers' Office, the Salem Harbor Master,

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and the South Essex Sewerage District were contacted and none reported any recent spills of hazardous materials in Salem Harbor, other than small, boating related fuel spills. The sewer outfall is at Great Haste Island in the outer harbor. There are several storm water outfalls along the harbor front.

3. The sampling and testing in each area should comply with the following. Core samples should be taken to the proposed dredge depth or refusal. The cores should be inspected in the field for stratification. If the cores show significant stratification, subsamples should be made of each layer. Similar layers may be composited for chemical analysis.

Bulk sediment chemistry tests should be done on each sample according to the Guidance for Performing Tests on Dredged Material to be Disposed of in Open Waters, (draft, May 15, 1989). The test parameters should include all of the items on the attached sheet. These parameters are from Table 1A and Table 1B of the Guidance for Performing Tests on Dredged Material to be Disposed of in Open Waters. The detection limits and analytical methods should be those indicated. The Total Organic Carbon analysis (TOC) should be done in duplicate on each composited sample and a TOC Standard Reference Material (SRM) should be run with the sample batch.

4. The 32' Federal Channel should be sampled according to Plans I and II. Eight cores, labeled FC-A to FC-H, should be taken, individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be three composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

5. The 32' turning basin should be sampled according to Plan II. Six cores, labeled NEP-A to NEP-F, should be taken, individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be three composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

6. Salem Port Development Project should be sampled according to the attached Plan V. Six cores, labeled SP-A to SP-F, should be taken and divided into 0 to 2', 2' to 4', 4' to 6', and 6' to project depth layers. Each of these layers should be individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be twelve composite samples for bulk sediment chemistry analysis, more if the layers are incompatible.

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Plan V also shows the locations of the 13 probes and 4 vibracore borings that will be made at the direction of CENAE at the same time as the sediment samples. The purpose of these borings and probings is to characterize the material for construction purposes.

7. The 15' and 20' State basins should be sampled according to the attached Plan V. Six cores, labeled MT-A to MT-C and MF-A to MF-C, should be taken and be individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be two composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

8. The 10', 8' and 6' South River Channels and 8' Derby Wharf Channel should be sampled according to Plans III and IV. Nine cores, labeled SC-A to SC-I, should be taken and be individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be four composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

9. The Palmer Cove Channel should be sampled according to the attached Plan VI. Four cores, PC-A to PC-D, should be taken, individually analyzed for sediment grain size and the results reported to me before any compositing is performed. I will review the data and determine if compositing is appropriate. I anticipate that there will be two composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

10. The proposed CAD should be sampled according to the attached Plan VII. Three cores should be taken at each of the seven sampling sites, labeled ATC-A to ATC-G, and composited into a sample for bulk sediment chemistry. I anticipate that there will be seven composite samples for bulk sediment chemistry analysis; more if there is significant stratification.

11. On the above projects where compositing is dependent on a grain size analysis, if the testing laboratory is unable to have the grain size analysis done in a timely manner so that the bulk sediment chemistry analysis can be done before the expiration of the holding time, Mark Habel and I will go to the lab and visually inspect the cores and determine which cores can be composited. You or Forrest Knowles should query the lab at the time of sampling to determine if the lab can have the grain size analysis done in time.

13. If you have any questions, you may reach me at 78660.

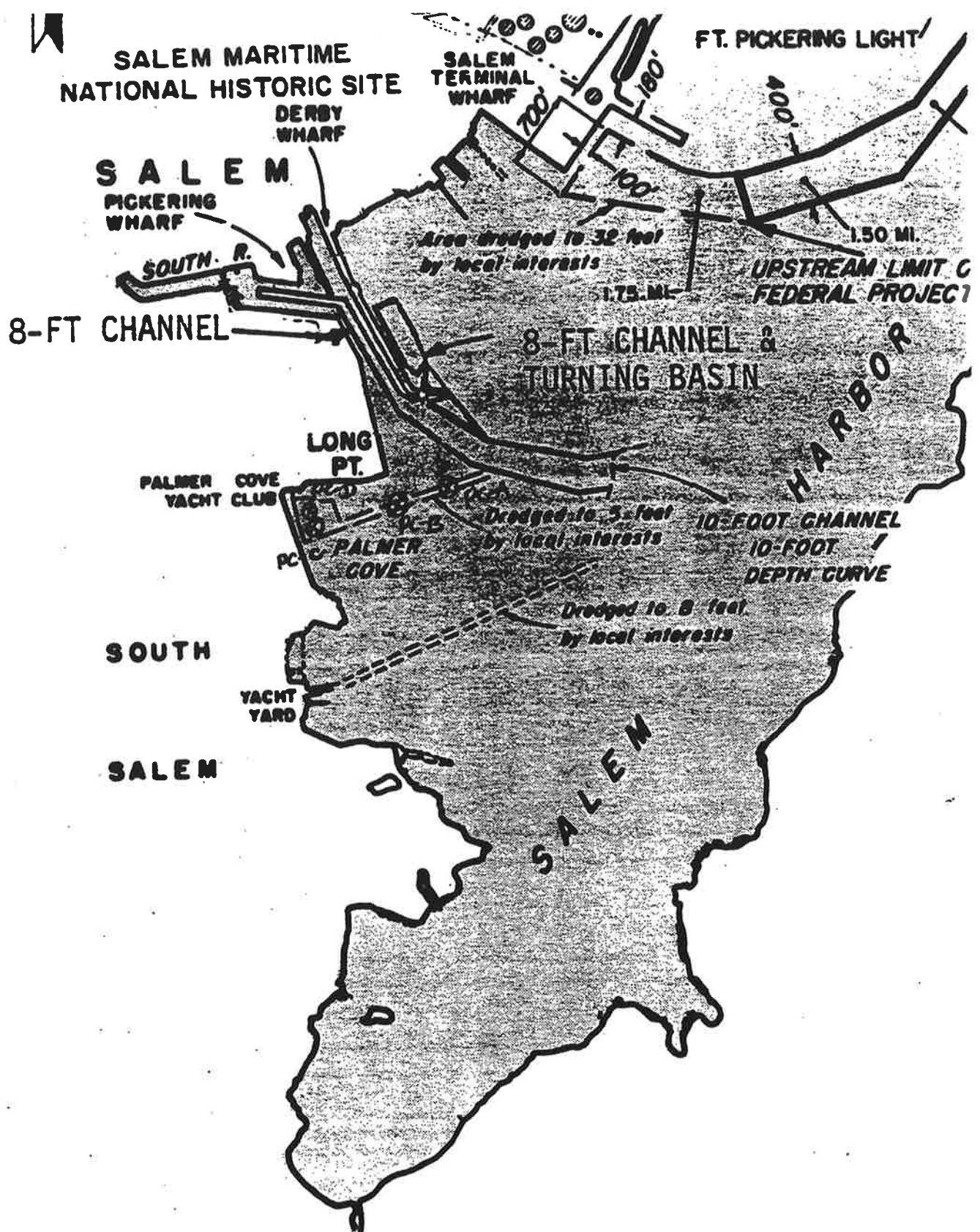
DRAFT

**PHILLIP NIMESKERN
Project Manager
Marine Analysis Unit**

DRAFT
BULK SEDIMENT TESTING PARAMETERS

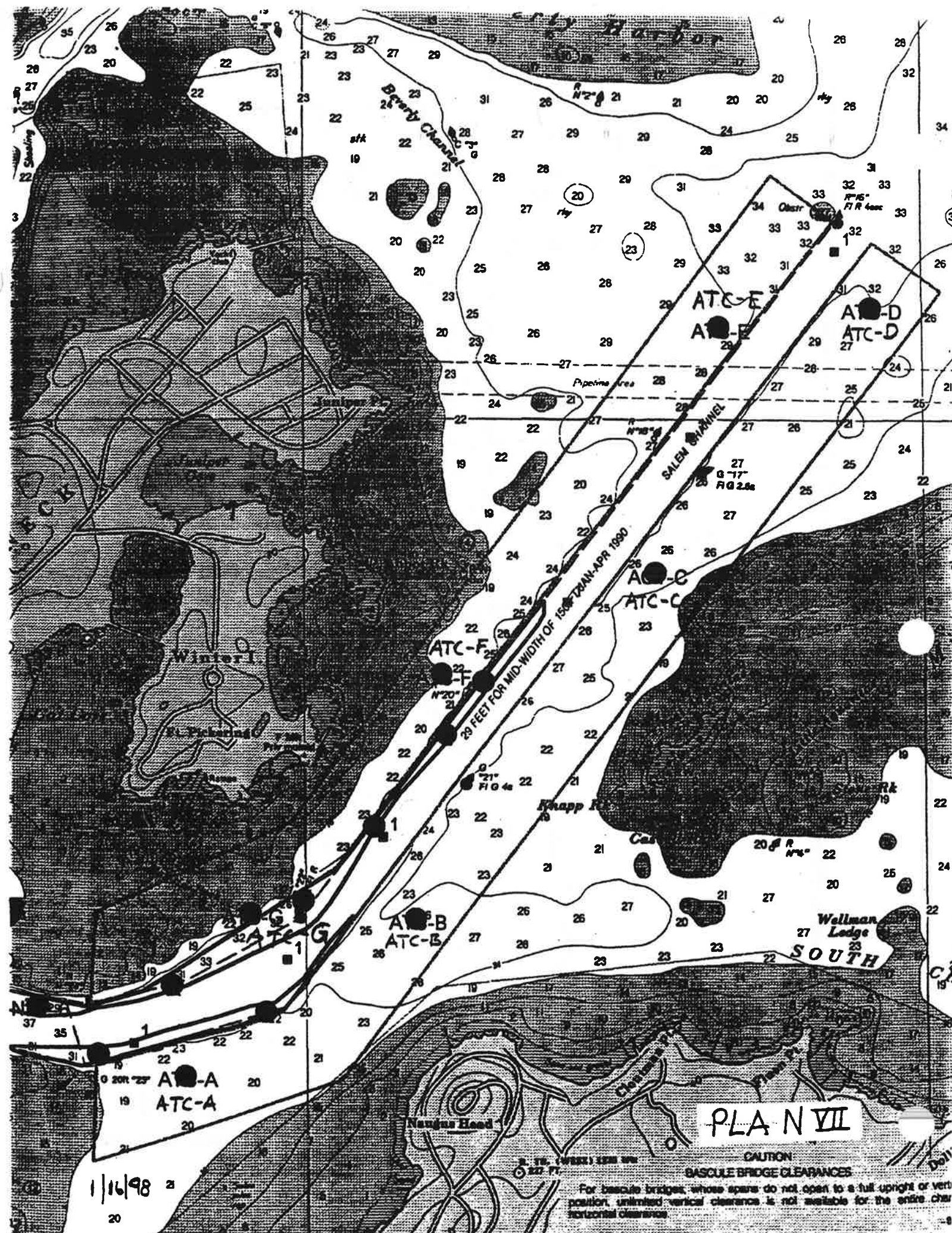
Parameter	Analytical Method	Detection Limit (ppm)
Metals		
Arsenic	7060,7061	0.5
Cadmium	7130,7131	0.1
Chromium	7190,7191	1.0
Copper	7210	1.0
Lead	7420,7421	1.0
Nickel	7520	1.0
Mercury	7471	0.02
Zinc	7950	1.0
PCBs (total)	8080	0.01
Pesticides	8080	0.02
Aldrin	Endosulfan I & II	
Chlordane	Endosulfan Sulfate	
DDT	Endrin	
DDE	Endrin Aldehyde	
DDD	Heptachlor	
Dieldrin	Heptachlor Epoxide	
Methoxychlor	Toxaphene	
alpha, beta, delta, and gamma	Hexachlorocyclohexane	
Polyaromatic Hydrocarbons (PAH's)	8100,8250,8270	0.02
Benzo(a)anthracene	Benzo(a)pyrene	
Chrysene	Fluoranthene	
Phenanthrene	Pyrene	
Acenaphthene	Acenaphthylene	
Anthracene	Biphenyl	
Benzo(b)fluoranthene	Benzo(k)fluoranthene	
Benzo(e)pyrene	Benzo(g,h,i)perylene	
Dibenzo(a,h)anthracene	Fluorene	
2,6-Dimethylnaphthylene	Indeno(1,2,3-cd)pyrene	
1-methylphenanthrene	1-methylnaphthalene	
2-methylnaphthalene	Naphthalene	
Perylene		
Total Organic Carbon	9060	0.01%
Percent Water		1.0%
Grain Size	Wet Sieve (#4,10,40,200)	

11/12/96



1/16/98

PLAN VI



PLAN VII

CAUTION
GASCUE BRIDGE CLEARANCES

For bascule bridges, whose spans do not open to a full upright or vertical position, unlimited vertical clearance is not available for the entire clear horizontal clearance.