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NSY PORTSMOUTH
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LETTER AND COMMENTS FROM NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION REGARDING INTERIM OFFSHORE MONITORING PROGRAM ROUND 2 DATA PACKAGE FOR OPERABLE UNIT 4 (OU 4) NSY PORTSMOUTH ME

11/1/2000

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
National Ocean Service
Office of Ocean Resource Conservation and Assessment
Hazardous Materials Response and Assessment Division
c/o EPA Office of Site Remediation and Restoration (HIO)
1 Congress Street
Boston, MA 02114
1 November 2000

Ms. Meghan Cassidy
U.S. EPA Office of Site Remed. and Rest.
1 Congress Street
Stop#82
Boston, MA 02203

Mr. Fred Evans
Department of the Navy
Northern Division
10 Industrial Highway, Mail

Lester, PA 19113-2090

Dear Meghan and Fred:

Thank-you for the Interim Offshore Monitoring Program, Round 2 Data Package for Operable Unit 4 at the Portsmouth Naval Shipyard (PNS), Kittery, Maine. Prepared for Northern Division Naval Facilities Engineering Command, Lester PA by Tetra Tech NUS, Inc. King of Prussia, PA, October 2000.

Round 2 was conducted from May 2-7, and May 23, 2000, and included the collection of sediment, blue mussel (*Mytilus edulis*), and juvenile American lobster (*Homarus americanus*) from 14 monitoring stations around the PNS and four reference stations located in the Piscataqua River. In addition, sediment samples were collected from select monitoring stations for toxicity tests of the sediment porewater and sediment, and chemical analysis of the porewater. Sediment samples were collected from 0-10 cm for all analyses, and 0-2 cm for additional AVS-SEM analyses. Mussels were collected from each station, all within a 10-meter radius of the sediment sample.

This review provides some concluding remarks on the data as there was no discussion or conclusion sections in the data report. Summary statistics were developed for the major contaminants of concern from the data tables (primarily from the summary statistics tables). Because of the numerous contaminant sources from the PNS documented in prior reports, this review focuses on the locations around the PNS that the offshore data suggest may require remediation, without investigating source origins or transport mechanisms. The locations of the seeps previously identified were not included on the figures of the data report. The detailed analysis of the PAH patterns in sediment and mussel tissue completed for the earlier review (3/1/2000) were not repeated. A qualitative

comparison of the Round 2 and Round 1 PAH data indicated that the conclusions derived for the Round 1 data appear to be consistent with the Round 2 data.

COMMENTS

Each of the major contaminant groups was evaluated by comparing the mean concentrations measured from the monitoring stations (MS) to the means measured at the reference stations (RS) from both the sediment, and lobster mussel tissue data. Selected parameters that appeared to have the greatest difference between the monitoring and reference station means were compiled in a summary table (Table 1). The maximum measured concentrations, and the location of the highest measured values, were also compiled on the table. Concluding remarks are provided below for each contaminant category. In addition, a comparison between the results of the Round 1 sampling and Round 2 sampling was conducted and a brief summary of the toxicity testing results and porewater analysis is presented.

POLYAROMATIC HYDROCARBONS (PAHS)

Mean sediment concentrations of eight PAH compounds (acenaphthene, acenaphthylene, fluorine, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, pyrene, and fluoranthene) were higher than the corresponding ER-L values. The maximum concentrations of all these compounds exceeded the corresponding ER-M values (Table 1).

The PAH concentrations measured in mussel tissues collected from monitoring stations were similar to the concentrations measured at the reference locations. Mean concentrations of benzo(a)anthracene, pyrene, and fluoranthene measured at monitoring stations were slightly higher than the means measured in mussels collected from reference locations (Table 1).

Finally, the PAH concentrations measured in lobster tissues were similar at the monitoring stations and reference locations. Mean concentrations of acenaphthylene and fluoranthene were slightly higher than mean concentrations of these compounds measured at reference locations (Table 1).

PESTICIDES/PCBS

Sediment concentrations of DDT isomers and alpha- and gamma-chlordane were elevated at monitoring locations relative to reference locations. The mean sediment concentrations of p,p'-DDD, p,p'-DDE, and p,p' DDT, and chlordane exceed the corresponding ER-L values and the maximum concentrations of these compounds exceed the corresponding ER-M values. The maximum concentrations of the DDT isomers were measured at

stations MS-01,MS-04, and MS-08. The maximum sediment chlordane concentrations were measured at station MS-10 (Table 1).

Mean concentrations of PCBs congeners in sediments were generally elevated by an order of magnitude in comparison to reference levels. The highest concentrations (>10 ug/kg) were located at stations MS-03, MS-04, and MS-12. Maximum PCB congener concentrations in sediments were all below 100 (ug/kg). Mussel and lobster tissue samples also showed slightly elevated PCB congener concentrations relative to concentrations measured at reference locations (Table 1).

METALS

Mean sediment concentrations of Cu, Pb, Ni, and Zn measured at monitoring stations were higher than the ER-M values for those metals (Table 1). The maximum sediment concentrations of copper, nickel, and zinc were measured at station MS-04. The maximum sediment lead concentration was measured at station MS-11.

The mean metals concentrations measured in mussel, and lobster tissues in the monitoring stations were only slightly higher than the overall reference mean values.

COMPARISON OF ROUND 1 AND ROUND 2 DATA

The sediment and mussel tissue samples collected for Round 2 were compared to the concentrations reported for Round 1. In general, sediment and mussel tissue mean contaminant concentrations were very similar for the monitoring stations reported in Round 1 and Round 2. The mean sediment concentration of the PAH, fluorene was higher in Round 2 sampling than Round 1 and the mean sediment concentrations of DDT, copper, nickel, and zinc were lower.

Mean mussel tissue concentrations of the PAH compounds, most of the DDT isomers, and lead were considerably lower in the Round 2 sampling compared to the Round 1 results.

POREWATER AND SEDIMENT TOXICITY DATA

The cover letter for the sediment and porewater toxicity report presented in Appendix H, suggests that the most useful toxicity results were obtained for the sea urchin fertilization test. However, the results for this test are not discussed in the toxicity results report or presented in the tables. The other tests were compromised by effects due to grain size (sediment amphipod test) and porewater ammonia concentrations (sea urchin embryological development test). The fertilization test results should be presented in the body of the report and not buried in an appendix.

Please let me know if you have any questions.

Sincerely,

Kenneth Finkelstein, Ph.D.

cc: Patti Tyler (EPA)
Ken Munney (USF&WS)
Iver McLeod (MEDEP)

Table 1

Reference Stations					
Sediment		Mussel Tissue		Lobster Tissue	
Mean	SD	Mean	SD	Mean	SD
23	39	10	2.1	2	0.37
42	36	18	4.7	0.65	0.4
3.6	2.9	3.6	0.6	3.3	2.2
47	67	12	4.2	3.8	0.63
272	376	28	11.2	7.7	1.5
305	400	14	3.4	3.9	2.3
372	451	13	4.1	9.1	6.4
493	582	46	10.6	18	10
562	652	53	9.8	7.7	1.5
1.1	1.6	1.3	0.63	0.76	0.74
0.17	0.15	0.45	0.23	0.3	0.1
0.11	0.23	1.4	0.45	0.29	0.12
1	1.2	2.9	0.45	0.15	0.033
0.53	0.46	6	1.2	3	0.66
1.1	2.9	0.54	0.45	0.57	0.69
0.15	0.14	2.1	0.72	1.7	1.8
0.06	0.052	1.9	0.72	0.19	0.073
0.093	0.12	0.15	0.077	0.67	0.43
18	1.8	12	1.9	3.9	1.6
0.56	1.1	3.9	1.4	0.51	0.27
1.4	2.9	12	2		
0.27	0.34	2.3	0.64		
2.5	3.3				
0.59	0.62	10	1.7	1.5	1.2
0.29	0.23	2.2	0.77	1.3	1
0.18	0.19	0.93	0.84	0.31	0.16
0.16	0.21	0.24	0.033	0.31	0.18
0.43	0.34	0.42	0.18	0.42	0.21

Table 1

			Monitoring Stations								
			Sediment			Mussel Tissue			Lobster Tissue		
	ER-L	ER-M	Mean	Max	Station	Mean	Max	Station	Mean	Max	Station
PAHs (ug/kg) - LMW											
Acenaphthene	16	500	138	2,682	M13	13	31	M13	2.4	4.6	M01
Acenaphthylene	44	640	103	544	M01	20	55	M13	1.3	7.7	M01
Biphenyl	na	na	14	186	M13	3.6	7.8	M12	1.8	3.6	M01
Fluorene	19	540	217	3,752	M13	14	37	M12	3.9	9.2	M01
Phenanthrene	240	1500	684	5,930	M01	38	130	M12	10	23	M01
PAHs (ug/kg) - HMW											
Benzo(a)anthracene	261	1600	634	3,120	M01	19	61	M13	5.6	18	M13
Benzo(a)pyrene	430	1600	704	3,840	M01	17	42	M13	8.5	19	M01
Pyrene	665	2600	1,007	5,690	M01	65	217	M13	23	76	M13
Fluoranthene	600	5100	1,116	6,550	M01	85	312	M13	27	111	M13
Pesticides (ug/kg)											
2,4-DDD	na	na	6.5	58	M01	2.7	16	M10	0.8	2.3	M02
2,4-DDE	na	na	0.48	3.4	M04	0.86	4.2	M02,M12	0.45	1.9	M11
2,4-DDT	na	na	2.9	37	M08	2	5.6	M10	0.25	0.79	M14
4,4-DDD	na	na	15	153	M01	5.3	29	M08	0.26	0.63	M08
4,4-DDE	na	na	8.1	138	M04	9.1	30	M01	2.7	7.4	M14
4,4-DDT	1.58 (a)	46.1(a)	20.5	285	M08	1	3.4	M08	2.8	7.6	M02
alpha-Chlordane	0.5 (b)	6 (b)	1.4	25	M10	2.9	15	M03	na	na	
gamma-Chlordane	0.5 (b)	6 (b)	1.2	35	M10	1.8	4.4	M10	0.18	0.3	M13
PCBs (ug/kg)											
PCB 126	na	na	0.69	10	M03	0.68	1.8	M05	0.9	5.1	M11
PCB138/160	na	na	8.2	89	M03	13	44	M03	4.9	10	M14
PCB149/123	na	na	4.3	47	M03	5	21	M03	0.77	4.9	M03
PCB-153/132	na	na	8.7	97	M03	11	24	M11,M13	na	na	
PCB 156	na	na	1.5	6	M04	1.4	4	M02,M13	0.5	1	M12
PCB170/190	na	na	14	63	M12	1.7	18	M09	na	na	
PCB-180	na	na	5.9	45	M03	7.1	18	M13	2.9	9.1	M03
PCB 187	na	na	3.8	25	M03	3.6	7.7	M12	2.4	6	M14
PCB195/208	na	na	1.3	5	M04	0.49	2.3	M11	0.45	2.2	M10
PCB 206	na	na	1.9	11	M04	0.26	0.32	M12	0.6	5.4	M10
PCB 209	na	na	1.2	13	M04	0.49	1.5	M01	0.46	0.65	M10
Metals (mg/kg)											

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Table 1

	Sed					Mussel					Lobster	
Copper	34	270	188	1,780	M04	10	28	M04	51		77	M11
Lead	47	218	120	554	M11	5.3	23	M11	0.87		11	M01
Nickel	21	52	48	193	M04	2.1	3.5	M03	0.45		1.1	M11
Zinc	150	410	241	1,510	M04	110	404	M10	104		137	M01

na- not available

- criteria for total DDT

eria for total chlordane

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Table 1

12	7.8	8.2	0.6	54	14
36	23	3	0.74	0.22	0.29
19	7.2	2	0.19	0.44	0.22
56	28	96	6.6	107	16