CENWS-OD-TS **1 August 2002**
Dredged Material Management Office

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER DMMP EVALUATION PROCEDURES FOR THE US COAST GUARD PIER 36 DREDGING PROJECT (2002- 2-00859, DAIS # CGP36-1-B-F-172) WITH PROPOSED DISPOSAL AT THE ELLIOTT BAY OPEN WATER DISPOSAL SITE.

1. The US Coast Guard proposes to dredge 23,200 cubic yards of material from its Alpha Berth at Pier 36, Seattle Washington. The following summary reflects the DMMP agencies (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the disposal of the material at a PSDDA open-water disposal site.

2. The ranking for this area is "high" based on the guidance found in the PSDDA User's Manual (2000) and the PSDDA Management Plan Report, Phase II, Page A-11 (1989).

3. A sampling and analysis plan was completed for this project and approved by the DMMP agencies on 27 February 2001. Sampling for this project was performed on 15-19 March 2001. All sampling was performed in accordance with the approved sampling plan, with the exception that boring locations B-1 and B-2 were moved due to Pier damage caused by the February 2001Nisqually earthquake. Boring relocation was approved by the DMMP prior to sampling.

SAP Submittal date

SAP approval date	27 February 2001
Sampling date	15-19 March 2001
Data Report submittal date	December 2001
Recency determination dates	15 March 2003

4. Samples were taken at four locations. Two samples were composited for each analysis for two surface DMMUs (1, 2) and four subsurface DMMUs (3, 4, 5, 6). The sampling and compositing plan and sampling depths are reported in Table 1.

5. All DMMU had exceedances of 2001 DMMP screening levels for the standard list of chemicals of concern. DMMU 1 had exceedances of the DMMP maximum level for

mercury, pyrene, benzo(a)pyrene, and total DDT. DMMU 2 had ML exceedances for acenaphthene, pyrene, benzo(a)anthracene, pyrene, and benzo(a)pyrene. Screening level, bioaccumulation trigger and maximum level exceedances are detailed in Table 2. DMMU 3 exceeded the ML for ethylbenzene and total xylene.

6. DMMU 1 and 2 were analyzed for porewater tributyltin. Both exceeded the screening level, triggering the requirement for bioaccumulation testing.

7. Due to multiple maximum level and bioaccumulation trigger exceedances, the Coast Guard chose not to pursue bioassay testing on DMMUs 1, 2 and 3. Bioassays were conducted on DMMUs 4, 5, and 6, including the amphipod 10-day acute toxicity test, using *Rhepoxinius abronius*, the sediment larval test, using *Dendraster excentricus*, and the *Neanthes* 20-day growth test. Tests were conducted according to PSEP (1995), as modified by the DMMP program.

8. Reference sediment for use in the bioassays was collected from Carr Inlet. Control sediment for the amphipod test was obtained from West Beach. Amphipod organisms were obtained from West Beach. *Dendraster* organisms were obtained from M-Rep in Carlsbad CA. *Neanthes* organisms were obtained from Dr. Don Reish, Long Beach California.

9. Bioassay results are listed in Table 3. No hits were observed in the bioassays, and all bioassays generally met performance standards. The sediment larval test did not have a seawater control run in conjunction with the bioassay. The DMMP agencies agreed that using the initial count (in effect, a control mortality of zero) would be a conservative interpretation of the test results.

10. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were generally followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program. Based on the results of the chemical and biological testing, the consensus determination of the DMMP agencies is that approximately 10,400 cubic yards of material is not suitable for in-water disposal. Approximately 12,800 cubic yards from the Coast Guard Pier 36 project is suitable for disposal at the Elliott Bay open-water disposal site.

11. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open water disposal site. It does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process, including both vertical and horizontal buffers for the unsuitable material. A final decision will be made after full consideration of agency and public input, and after an alternatives analysis is done under section 404 (b) 1 of the Clean Water Act.

US Coast Guard
Pier 36

Concur:

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Date

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Table 1. Sampling and Compositing Plan

DMMU	Sample Station	Sample Interval
DMMU 1	B-1	0 to 4 ft
	B-2	0 to 4 ft
DMMU2	B-3	0 to 4 ft
	B-4	0 to 4 ft
DMMU 3	B-1	4 to 29 ft
	B-2	4 to 29 ft
DMMU 4	B-3	4 to 19ft
	B-4	4 to 19 ft
DMMU 5	B-1	29 to 35 ft
	B-2	29 to 35 ft
DMMU 6	B-3	19 to35 ft
	B-4	19 to 35 ft

Table 2. SDM summary of chemical and biological testing results for US Coast Guard, Pier 36, DY2002.

				DMMU ID:	C-1		C-2		C-3		C-4		C-5		C-6
				Rank:	H		H		H		H		H		H
CHEMICAL NAME	Units	SL	BT	ML	Conc.	VQ	Conc	VQ	Conc	VQ	Conc	VQ	Conc.	VQ	Conc.
Lead	mg/kg	450		1,200	621										
Mercury	mg/kg	0.41	1.5	2.3	**2.930**		0.700								
Zinc	mg/kg	410		3,800	516										
TBT ion (porewater)	ug/L	0.15	0.15		**0.24**		**0.26**								
Naphthalene	ug/kg	2,100		2,400	1,500										
Acenaphthylene	ug/kg	560		1,300	870		750								
Acenaphthene	ug/kg	500		2,000	1,600		**2,800**								
Fluorene	ug/kg	540		3,600	1,400		1,700								
Phenanthrene	ug/kg	1,500		21,000	3,500		11,000								
Anthracene	ug/kg	960		13,000	2,400		2,900								
2-Methylnaphthalene	ug/kg	670		1,900	770										
Total LPAHs	ug/kg	5,200		29,000	11,070		20,120								
Fluoranthene	ug/kg	1,700	4,600	30,000	3,500		13,000								
Pyrene	ug/kg	2,600		16,000	**23,000**		**34,000**				6,800				
Benzo(a)anthracene	ug/kg	1,300		5,100	3,100		**7,200**								
Chrysene	ug/kg	1,400		21,000	3,600		8,200								
Benzo(b) fluoranthene	ug/kg				6,500		8,200								
Benzo(k)fluoranthese	ug/kg				4,300		7,300								
Total Benzofluoranthenes	ug/kg				10,800		15,500								
Benzo(a)pyrene	ug/kg	1,600		3,600	**5,200**		**9,800**								
Indeno(1,2,3-c,d)pyrene	ug/kg	600		4,400	1,300		200								
Dibenzo(a,h)anthracene	ug/kg	230		1,900	440		510								
Benzo(g,h,I)perylene	ug/kg	670		3,200	980		1,500								
Total HPAHs	ug/kg	12,000		69,000	63,720		107,210								
Hexaclorobenzene (HCB)	ug/kg	22	168	230	59	u									
2-Methylphenol	ug/kg	63		77	76	u									
2,4-Dimethylphenol	ug/kg	29		210	76	u	59	u	89				210		130
Ethylbenzene	ug/kg	10	27	50					**200**						
Total Zylene (sum of o,m,p)	ug/kg	40		160					**212**						
Total DDT	ug/kg	6.9	50	69	**150**		54								
Total Solids	%				49.5		44.7		73.8		71.0		77.0		78.5
Total Volatile Solids	%				11.0		9.6		2.8		2.2		1.6		0.8
Total Organic Carbon	%				4.2		3.7		1.2		1.2		0.5		0.2
Total Ammonia	mg/kg				15.0		11.0		16.0		10.0		11		15
Total Sulfides	mg/kg				2,600		250		3,200		290		35		24
Gravel	%				15.8		8.8		0.9		4.0		0.1		0.1
Sand	%				55.6		48.3		86.6		71.5		84.6		36.1
Silt	%				28.6		29.4		9.9		19.1		12.0		52.1
Clay	%				15.8		13.5		2.5		5.3		3.4		11.7
Fines (percent silt + clay)	%				44.4		42.9		12.4		24.4		15.4		64.8
preferred reference match:	%														
Rhepoxinius abronius															
Dendraster excentricus															
Neanthes arenaceodentata hits:															
Bioassay Determination: (P/F)					NA		NA		NA		P		P		P
BTs exceeded:					yes		yes		yes		no		no		no
Bioaccumulation conducted:					no		no		no						
Bioaccumulation Determination:															
ML Rule exceeded:					yes		yes		yes						
PSDDA Determination:					F		F		F		P		P		P
DMMU Volume:	cy				3,300		3,400		3,700		3,000		2,600		7,200
DMMU ID:					C-1		C-2		C-3		C-4		C-5		C-6

bold = ML exceedance

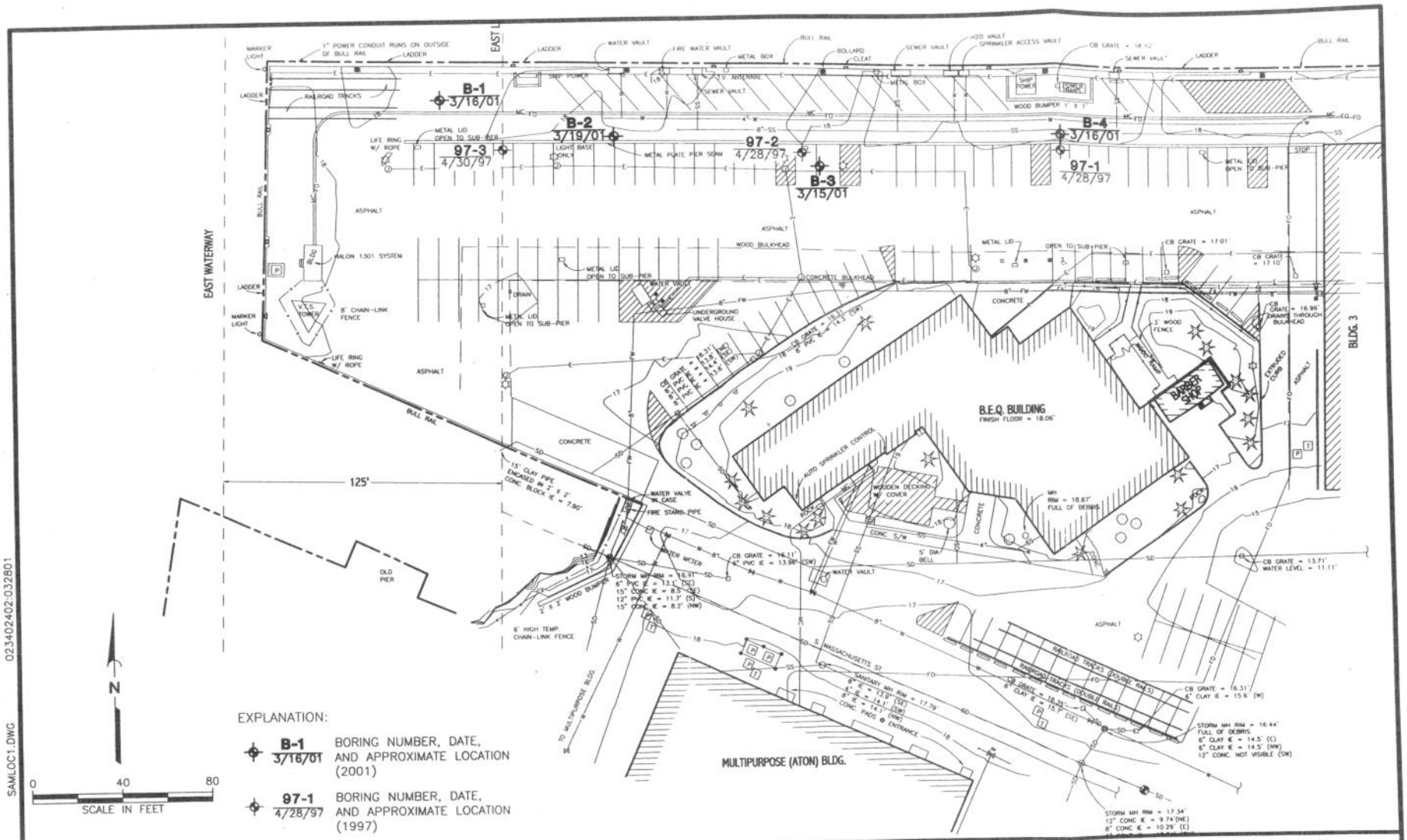
blue = BT exceedance

Table 3. Solid Phase Bioassay Results Summary for DMMU undergoing testing for US Coast Guard Pier 36.

Dredged Material Management Units (DMMU)	Amphipod Mortality % (*Rhepoxynius*)	Sediment Larval Test[1] (Sand Dollar: *Dendraster excentricus*)	20-day *Neanthes* growth, mg-ind-day (% reference), mortality %	DMMU Suitability	
		Mortality + Abnormality %		ND	D
Control	4	0[1]	initial wgt=0.6 mg-individual **1.00** mortality = 0%	NA	
Carr Inlet 1 (20% fines)	10	33.13	**0.78**[2] mortality = 8%	NA	
Carr Inlet 2 (52% fines)	0	34.32	**0.97** mortality = 16%	NA	
C4	11	56.68	**0.68** mortality = 0%	yes	yes
C5	6	29.00	**0.68** mortality = 16%	yes	yes
C6	4	32.99	**0.53** mortality = 4%	yes	yes
Positive Control (LC50/EC50) **TEST** **DAIS** (Mean ± SD)	$CdCl_2$ (mg/L) 0.67 (0.79 ± 0.48 DAIS)	$CdCl_2$ (mg/L) 12.15 (10.1 ± 6.5 DAIS for *Dendraster*)	$CdCl_2$ (mg/L) 9.9 (12.5 ± 5.4 DAIS)		

[1] A seawater control was not run with this bioassay. The DMMP agencies agreed to use the initial counts. All of the test values were normalized to the initial counts (in effect, a control mortality of zero) for decision-making.

[2] Failed to meet performance criteria



Reference: Drawing provided by ABAM, titled "ISC SEATTLE, SITE TOPO PIER 36A, Existing Conditions, Pier 36 West End" dated 2/20/97 sheet number C-1.

Geo Engineers

2001 SAMPLING LOCATIONS

FIGURE 5

SAMLOC1.DWG 023402402:032801

SLF:RJW