CENWS-OD-TS **18 September 2000**
Dredged Material Management Office

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER DMMP EVALUATION PROCEDURES FOR THE HYLEBOS WATERWAY/BLAIR WATERWAY SLIP ONE PROJECT FOR DISPOSAL AT THE COMMENCEMENT BAY OPEN WATER DISPOSAL SITE.

1. The Port of Tacoma and Occidental Chemical are proposing to dredge portions of the Hylebos Waterway as part of the design and implementation of clean-up activities in the waterway. As part of the clean-up activities, the Port and Occidental tested sediment in portions of the Waterway for suitability for open-water disposal. The proposed dredging is in three locations in the waterway – at the mouth, near Murray-Pacific and at the Wasser-Winters site. In addition, the Port is proposing to dredge portions of Slip One in the Blair Waterway, with the intention of using the Slip as a nearshore fill area for contaminated sediments. Volume of the proposed dredged material is approximately 500,000 cubic yards. 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 the Commencement Bay open-water disposal site.

2. Slip One in the Blair Waterway is ranked "low" based on guidance provided in the PSDDA User's Manual (February 2000) for sediment testing in the Blair waterway. The Hylebos Waterway is high-ranked based on multiple historic sources of contamination. The agencies reviewed chemical and biological data collected during the Remedial Investigation of the Hylebos Waterway. Based on this information, the area near the mouth (including the Chinook Marina) is ranked low-moderate, with the exception of the area near the Port Industrial Yard, which remains high-ranked. The Murray Pacific and Wasser-Winter areas are ranked high. Based on the review of existing data, the agencies determined that additional sampling in the Chinook Marina area was warranted, and two additional samples were required.

3. A sampling and analysis plan was completed for this project and approved by the PSDDA agencies on 6 December and 10 December 1999. Sampling for this project was performed from 10-19 December 1999.

SAP approval date	6 &10 December 1999
Sampling dates	10-19 December 1999
Data Report submittal date	June 2000

Recency determination dates

High ranked	10 December 2001
Low-Moderate and Low Ranked	10 December 2004 – 2006

4. Core surface samples were taken from a total of 90 locations. Subsurface cores were taken at 15 locations. Surface samples were composited for 28 analyses. Subsurface samples were composited for four analyses. See Table 1 for the sampling and compositing scheme. Two DMMUs (C-7 and C-8) were not sampled due to limited access to the sampling stations specified in the sampling and analysis plan. These DMMUs are assumed to be unsuitable for open-water disposal.

5. In the mouth of the waterway (including Chinook Marina), nine of eighteen DMMUs had no SL exceedances (DMMUs C-1, C-3, C-5, C-6, C-13, C-14, C-15, C-42, and C-44). All detection limits were below screening level. DMMU C-4 had 15 exceedances of DMMP 1999 maximum levels, as well as two bioaccumulation trigger exceedances and four additional SL exceedances. In addition, six detection limits were above SL for this sample. Sample C-4 was determined unsuitable for open-water disposal without additional biological testing. The remaining 8 DMMUs with SL exceedances from the mouth of the Hylebos were submitted for biological testing (C-2, C-9, C10A, C-11, C-12, C-16, C-17, C-43). Six DMMU failed bioassays (C-9, C10A, C-11, C-12, C-16, C-17) and are unsuitable for open-water disposal. Five DMMUs exceeded bioaccumulation triggers or had detection limits above the bioaccumulation triggers. Bioaccumulation testing was not completed, since each of these composites failed acute bioassays.

6. At Murray Pacific, all DMMU had exceedances of 1999 DMMP screening levels. All 9 DMMUs from Murray Pacific (C-18 through C-25, and C-27) were submitted for biological testing, Six DMMUs exceeded bioaccumulation triggers or had detection limits above the bioaccumulation trigger. Bioaccumulation testing was not completed, since each of these composites failed acute bioassays.

7. At Wasser-Winters, composite C-39 had no SL exceedances. DMMUs C-36 and C-37 from Wasser Winters were submitted for biological testing. One DMMU (C-37) exceeded the bioaccumulation trigger for TBT. Bioaccumulation testing was not completed, since this composite failed acute bioassays.

8. At Slip One, there were no exceedances of 1999 DMMP screening levels for the standard list of chemicals of concern for DMMUs C-40 and C-41.

9. Sixteen samples were tested for tributyltin, based on a reason to believe that TBT may be present in these sampling areas. Eight sample locations (C-10A, C-12, C-19, C-20, C-21, C-23, C-24 and C-37) exceeded the DMMP bioaccumulation trigger of 0.15 ug TBT/L in interstitial water. None of these DMMUs underwent bioaccumulation testing, since all failed acute bioassays.

10. For those samples undergoing biological testing, the amphipod 10-day acute toxicity test, using *Eohaustorius estuarius,* the *Neanthes* 20-day growth test, and the larval

bivalve test using *Mytilus galloprovinciallus* were conducted. Tests were conducted according to PSEP (1995), as modified by the DMMP program.

11. Reference sediment for use in the bioassays was collected from Carr Inlet. Two reference sediments were collected, one with 44 percent and one with 75 percent fine-grained sediment. Control sediment for the amphipod test was obtained from Northwest Aquatic Sciences, Newport OR as were amphipod organisms. *Neanthes* organisms were obtained from Dr. Don Reisch, Long Beach California. Bivalve organisms were obtained from Carlsbad Aqua Farms, CA. Seawater control was obtained from Burrard Inlet, British Columbia.

12. All reference and stations and negative controls met performance standard with the exception of reference sediment CR20A in the *Neanthes* juvenile polycheate bioassay. The mean individual growth rate failed to meet performance criteria. The negative control was used for comparison with bioassay results for the *Neanthes* test.

13. Bioassay results are summarized in Table 3. A summary of each DMMU's suitability is included in Table 4.

14. Four surface DMMUs (C-4, C-7, C-8 and C-9) failed to meet open-water disposal guidelines. No subsurface DMMUs were tested in these areas. Based on guidance in the Management Plan Report, Phase II (page A-17) and in the Evaluation Procedures Technical Appendix (Page I-14) the sediments to be exposed by dredging may be a concern and will need to be analyzed prior to dredging.

15. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were 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 345,000 cubic yards of material from the Hylebos Waterway and Slip One are suitable for disposal at the Commencement Bay open-water disposal site. Approximately 155,000 cubic yards is not suitable for placement at an open-water disposal site.

16. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open water disposal site or for beneficial use. It does not constitute final agency approval of the project. A dredging plan for this project, delineating the sequence in which the suitable and unsuitable material will be dredged must be completed as part of the final project approval process. 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.

Hylebos/Slip One PSDDA Characterization

Concur:

09/26/00
Date

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Table 1. Sampling/Compositing Scheme

DMMU Number	Surface/Subsurface	Sample Numbers
Mouth		
C-1	Surface	S-01, S-02, S-03, S-04
C-2	Surface	S-05, S-06, S-07, S-08
C-3	Surface	S-09, S-10, S-11, S-12
C-4	Surface	S-13, S-14
C-5	Surface	S-15, S-16
C-6	Surface	S-17, S-18, S-85
C-7	Surface	Not Sampled
C-8	Surface	Not Sampled
C-9	Surface	S-23, S-24, S-25
Chinook Marina		
C-10A	Surface	S-26A, S-27A, S-28A
C-11	Surface	S-30, S-31, S-32
C-12	Surface	S-34, S-35, S-36
C-13	Surface	S-38, S-39, S-40
C-14	Surface	S-41, S-42, S-43
C-15	Surface	S-44, S-45, S-46, S-47
C-16	Surface	S-48, S-49, S-50
C-17	Surface	S-51, S-52, S-53
C-42	Surface	S-29, S-33, S-37
C-43	Subsurface	S-26, S-27, S-28
C-44	Subsurface	S-34b, S-35b, S-36b
Murray-Pacific		
C-18	Surface	S-54, S-55, S-83
C-19	Surface	S-56, S-57, S-84
C-20	Surface	S-58, S-59, S-88
C-21	Surface	S-60, S-61, S-89
C-22	Surface	S-62, S-63, S-90
C-23	Surface	S-64, S-64, S-91
C-24	Surface	S-66, S-67, S-92
C-25	Surface	S-68, S-69< s-93
C-26	Subsurface (sulfides/VOA only)	S-54b
C-27	Subsurface	S-58b, S-59b, S-60b
C-28	Subsurface	Not sampled/Native
C-29	Subsurface	Not sampled/Native
C-30	Subsurface	Not sampled/Native
C-31	Subsurface	Not sampled/Native
C-32	Subsurface	Not sampled/Native
C-33	Subsurface	Not sampled/Native
C-34	Subsurface	Not sampled/Native
C-35	Subsurface	Not sampled/Native

Wasser-Winters		
C-36	Surface	S-70, S-71, S-72
C-37	Surface	S-72, S-73, S-95
C-38	Surface	Not Sampled
C-39	Subsurface	S-70b, S-71b, S-73b
Slip One		
C-40	Surface	S-76, S-77
C-41	Surface	S-78, S79, S-80

Table 2. Sediment Conventional Parameters - Mouth and Chinook Marina

Parameter	C-1	C-2	C-3	C-4	C-5	C-6	C-9	C-10A	C-11	C-12
Total Solids (%)	73	67	69	70	69	74	69	41	51	46
Total Organic Carbon (%)	1.4	1.4	0.98	1.3	1.2	1.1	0.95	3.6	2.5	2.4
Bulk Ammonia (mg/kg)	6.9	6.0	9.2	2.7	6.4	6.7	3.1	60	42	30
Total Sulfides (mg/kg)	12 E	440	190	170 E	420 E	860	1900	850	3200	2300
Grain-size										
gravel	4.7	0.1	6.6	0.5	3.7	1.1	4.1	0.2	3.1	1.3
sand	71	57	48	74	68	60	49	43	32	31
silt	15	31	33	17	20	29	33	47	43	48
clay	10.1	12	13	8.4	7.7	10.3	14	11	22	20

Parameter	C-13	C-14	C-15	C-16	C-17	C-42	C-43	C-44
Total Solids (%)	73	67	62	60	59	67	60	60
Total Organic Carbon (%)	0.95	1.3	1.5	1.8	1.9	1.5	2.3	1.5
Bulk Ammonia (mg/kg)	6.5	7.5	7.1	'7	6.6	4.1	36	33
Total Sulfides (mg/kg)	0.51U	240	1400	770	2500	4600	200	400
Grain-size								
gravel	0.0	3.5	0.2	1.1	0.8	0.9	5.5	4.0
sand	60	56	58	69	68	59	31	24
silt	29	26	30	22	22	28	36	43
clay	12	14	12	9	9	13	28	29

Table 2. Sediment Conventional Parameters - Murray Pacific, Wasser-Winters and Slip One

Parameter	C-18	C-19	C-20	C-21	C-22	C-23	C-24	C-25	C-27
Total Solids (%)	60	58	51	49	57	44	64	42	56
Total Organic Carbon (%)	2.8	3.7	4.1	9.7	3.9	7.0	2.6	6.8	4.6
Bulk Ammonia (mg/kg)	27	4.1	30	15	9.8	53	20	53	39
Total Sulfides (mg/kg)	690	520	2300	750	2000	400	2100	800	16
Grain-size									
gravel	0.3	11.5	0.1	6.7	2.8	6.7	0.8	2.0	1.8
sand	50	41	48	39	42	39	42	41	23
silt	36	30	43	32	46	32	40	40	49
clay	13	18	9	23	9	23	17	17	27

Parameter	C-36	C-37	C-39	C-40	C-41
Total Solids (%)	48	44	75	75	74
Total Organic Carbon (%)	2.2	3.7	0.73	0.53	0.63
Bulk Ammonia (mg/kg)	37	66	17	34	29
Total Sulfides (mg/kg)	640	2100	9.7	240	45
Grain-size					
gravel	0.6	2.5	2.7	4.4	7.8
sand	22	20	17	67	63
silt	56	52	53	19	19
clay	22	25	27	9	10

Table 3 – Bioassay Test Results

DMMU	Amphipod		Juvenile Polychaete		Larval Bivalve		DMMU
	One-hit	Two-hit	One-hit	Two-hit	One-hit	Two-hit	Pass/Fail
C-2	Pass	Pass	Pass	Pass	Pass	Pass	Pass
C-9	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-10A	Pass	Pass	Pass	Fail	Fail	Fail	Fail
C-11	Pass	Pass	Pass	Fail	Fail	Fail	Fail
C-12	Pass	Fail	Pass	Pass	Fail	Fail	Fail
C-16	Pass	Fail	Pass	Pass	Fail	Fail	Fail
C-17	Pass	Fail	Pass	Pass	Fail	Fail	Fail
C-43	Pass	Fail	Pass	Pass	Pass	Pass	Pass
C-18	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-19	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-20	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-21	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-22	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-23	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-24	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-25	Fail	Fail	Pass	Pass	Fail	Fail	Fail
C-27	Pass	Pass	Pass	Pass	Pass	Fail	Fail
C-36	Pass	Pass	Pass	Pass	Fail	Fail	Fail
C-37	Pass	Fail	Pass	Pass	Pass	Pass	Pass
C-43	Pass	Fail	Pass	Pass	Pass	Pass	Pass

Table 4. DMMU Suitability

DMMU	# Analytes Exceeding SL	# Analytes Exceeding BT	# Analytes Exceeding ML	Bioassay Results	Volume (CY)	Suitable for Open-Water
C-1	0	0	0	Not required	31,800	Yes
C-2	3	0	0	Pass	30,640	Yes
C-3	0	0	0	Not required	31,450	Yes
C-4	12(6)	2	15(2)	Not Tested	3,520	No
C-5	0	0	0	Not required	3,470	Yes
C-6	0	0	0	Not required	3,230	Yes
C-7	NA	NA	NA	Not tested	4,340	No
C-8	NA	NA	NA	Not tested	4,380	No
C-9	3	0	0	Fail	21,720	No
C-10A	8(2)	1	0	Fail	10,873	No
C-11	5(3)	1	0	Fail	21,623	No
C-12	6(3)	2	0	Fail	10,891	No
C-13	0	0	0	Not required	28,680	Yes
C-14	0	0	0	Not required	18,680	Yes
C-15	0	0	0	Not required	28,320	Yes
C-16	6(5)	2(2)	0	Fail	17,330	No
C-17	9(6)	0	0	Fail	20,900	No
C-18	3(1)	0	0	Fail	3,780	No
C-19	3(1)	1	0	Fail	3,240	No
C-20	5(10	1	0	Fail	3,470	No
C-21	8(4)	1	0	Fail	3,740	No
C-22	4(1)	0	0	Fail	3,700	No
C-23	6(5)	1	0	Fail	3,780	No
C-24	9	1	0	Fail	3,920	No
C-25	8(1)	1	0	Fail	3,890	No
C-27	5	0	0	Pass	35,280	Yes
C-36	2	0	0	Fail	3,140	No
C-37	2	1	0	Fail	3,360	No
C-39	0	0	0	Not required	12,000	Yes
C-40	0	0	0	Not required	31,050	Yes
C-41	0	0	0	Not required	39,950	Yes
C-42	0	0	0	Not required	25,000	Yes
C-43	1	0	0	Pass	10,873	Yes
C-44	0	0	0	Not required	10,891	Yes
Total Volume					492,911	

( ) indicates number of analytes included in the total where detection limits exceeded PSDDA guidelines