CENPS-OP-DMMO

MEMORANDUM FOR RECORD

16 February 1993

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED FOR THE WEYERHAEUSER BAY CITY DOCK PROJECT (OYB-2-014739 / OYB-2-011975) FOR DISPOSAL AT EITHER THE SOUTH JETTY OR POINT CHEHALIS OPEN-WATER ESTUARINE SITES, OR AT THE 3.9 MILE OCEAN DISPOSAL SITE.

1. Weyerhaeuser is proposing to maintenance dredge approximately 10,000 cubic yards of sediments from its Bay City Dock. The Corps indicated in a letter to Weyerhaeuser dated June 22, 1992 that the existing permit (OYB-2-014739 / OYB-2-011975) would be extended two years until June 22, 1993. At that time they would have to apply for a new maintenance dredging permit. The agencies with jurisdiction over dredging and disposal (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) previously established requirements for sampling and testing of the proposed dredged sediments in a letter from the Corps' Dredged Material Management Office (DMMO) dated 14 February 1992. This letter advised Weyerhaeuser of the requirement to characterize maintenance dredged material prior to 1993 dredging. A sampling and analysis plan (SAP) was submitted by Parametrix, Inc. to the DMMO on 11 December 1992 for review and approval by the Agencies. Additional coordination took place by phone between Mr. Steve Barnowe-meyer and DMMO to flush out the generic testing requirements discussed in the SAP. Parametrix, Inc.(Mr. Steve Cappellino) submitted a SAP for review and approval by the Agencies in December 1992. The Agencies approved the SAP on December 23, 1992.

2. The following summary reflects the regulatory agencies' suitability determination for the 10,000 cubic yards of material proposed for maintenace dredging from its Bay City Dock to be disposed of at either the Pt. Chehalis or South Jetty estuarine sites, or at the 3.9 mile Ocean Disposal site. The determination of suitability is based on the acceptability of the sampling plan and test data contained in the February 1993 Parametrix Data Summary Report.

3. Under the "Interim Evaluation Guidelines for Testing Sediments Proposed for Dredging from Regulated Projects in Grays Harbor and Willapa Bay (16 July 1992)", the Weyerhaeuser Bay City Dock is ranked low-moderate. Under these guidelines one dredged material management unit (DMMU) was characterized similar to the 1991/1992 sediment characterization. DMMU C1 consisted of composited sediments from four sampling locations adjacent to the dock at the same locations previously sampled.

4. The chemistry data indicated that five detected exceedances of the PSDDA (Puget Sound Dredged Disposal Analysis) screening levels (SL) occurred for C1 (Table 1). There were no bioaccumulation trigger (BT) or maximum level (ML) exceedances. PSDDA SLs are used in

Puget Sound to establish a concern for biological effects; any exceedance of a screening level results in the requirement to conduct standard biological testing. In the context of Grays Harbor/Willipa Bay Interim testing guidelines, which stipulate that PSDDA SLs will be used as an interim yardstick until separate evaluation procedures for Grays Harbor are finalized and adopted.

Table 1. Chemicals of concern exceeding PSDDA screening levels at the Bay City Dock.

DY92 Sediment Guideline Values					
Chemical-of-Concern	SL	BT	ML	C1 (rep 1)	C1 (rep 2)
Acenaphthene	63	--	630	130	97
Fluorene	64	--	640	85	75
2-Methylnaphthalene	67	--	670	76	56
Total LPAH	610	--	6100	655	566
Dibenzofuran	54	--	540	69	56

5. Dioxins and furans were quantitated for C1 by Weyerhaeuser's Chemical Testing Laboratory. The most toxic congener, 2,3,7,8-tetrachloro-dibenzo-p-dioxin, was undetected at 0.25 parts and 0.41 per trillion (ppt). The total toxic equivalent concentration (TEC) of all dioxins and furans (detected and undetected) was 7.3 and 4.6 ppt (Table 2).

Table 2. Quantitation of dioxin congenors at the Bay City Dock.

	Congener/Isomers	C1-rep 1 (ng/kg) (TEC)	C1-rep 2 (ng/kg) (TEC)	Toxic Equivalency Factor (TEF)
Dioxins	2,3,7,8-TCDD	0.25u (0.125)	0.41u (0.205)	1.0
	1,2,3,7,8-PeCDD	0.41u (.103)	0.41u (0.103)	0.5
	2,3,7,8-HxCDDs	15.05 (1.505)	10.4 (1.04)	0.1
	1,2,3,4,6,7,8-HpCDD	309 (3.09)	171 (1.71)	0.01
	OCDD	1533 (1.533)	820 (0.82)	0.001
Furans	2,3,7,8-TCDF	2.62 (0.262)	2.13 (0.213)	0.1
	1,2,3,7,8-PeCDF	0.28u (0.007)	0.24u (0.006)	0.05
	2,3,4,7,8-PeCDF	0.25u (0.0625)	0.22u (0.055)	0.5
	2,3,7,8-HxCDF	1.23 (0.123)	0.92[1] (0.092)	0.1
	2,3,7,8-HpCDFs	46.0 (0.46)	31.5 (0.315)	0.01
	OCDF	38.4 (0.038)	21.4 (0.021)	0.001
	Total TEC:	7.309	5.58	

In the toxicity equivalency approach in which TECs are calculated, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) that include substitution with chlorine at the 2, 3, 7, and 8 positions are assigned a toxicity equivalency

[1] value calculated based on summing congenors at 1/2 detection limit

factor (TEF). The TEF is used to calculate TECs relative to 2,3,7,8-TCDD, the most toxic member of the group of PCDDs and PCDFs.

The TEC approach is used to estimate the potential toxicity to mammals of PCDDs and PCDFs bioaccumulated in mammal tissue. It has limited applicability to sediment because it does not consider the relative bioavailability of the congeners. Accordingly, TEC overstates toxicity to mammals when applied to sediments. TEC as a toxicity measure does not apply to fish, shellfish or birds. However, TEC does allow for a quick comparison of this one measure of dioxin and furan toxicity among sediment samples.

Based on the regulatory agencies' present best professional judgement, the concentration of 2,3,7,8-TCDD and the calculated TEC are unlikely to be environmentally harmful for this project. The agencies' consensus is that the material is suitable for unconfined open-water disposal relative to these dioxin test results.

6. Weyerhaeuser elected to conduct bioassays concurrently with the chemical testing in order to save time. Biological testing of C1 was required due to the SL exceedances noted above, and was accomplished concurrently with the chemistry testing. The amphipod 10-day acute toxicity test, echinoderm sediment larval combined mortality and abnormality (effective mortality) test, the *Neanthes* 10-day acute toxicity test, and the Microtox bacterial luminescence test were conducted. PSDDA interpretation guidelines specified in the Phase II Management Plan Report (Sept 1989), modified by changes made at the second and fourth annual review meetings, were used to evaluate the bioassay data. The control sediment for the amphipod and *Neanthes* bioassays was collected at West Beach, while the seawater control for the sediment larval test came from the Duwamish Head. The reference sediment (all bioassays) came from Carr Inlet, at Station 2 (PTI, 1981, Reference Area Study).

7. Due to the high proportion of fines in the test sediment (89.5 percent), the regulatory agencies agreed to the use of Ampelisca abdita instead of Rhepoxynius abronius. The control sediment mortality was 11.5 percent, exceeding the control sediment mortality limit of 10 percent. Mortalities observed in the Carr 2 Reference and Bay City Dock tested sediment were 3.8 percent and 5.0 percent respectively making the control sediment exceedance inconsequential to the interpretation utilizing best professional judgement. No QA/QC problems were noted for the other bioassays.

8. In summary, all four bioassays passed PSDDA interpretation guidelines for unconfined open-water disposal. Summary results for the bioassays are depicted in Table 3.

Table 3. Bioassay Results Summary for the Bay City Dock Sediments.

Sample ID	Amphipod Mortality (%)	Echinoderm Combined Mortality (%)	10-day Neanthes Mortality (%)	Microtox Test (% Light Change)
Control	11.5	N/AP	6.0	N/AP
Carr 2 Reference	3.8	3.1	6.0	-18.97
C1 (Dock)	5.0	2.1	10.0	12.32

N/AP = Not Applicable

9. In summary, quality assurance/quality control guidelines specified by PSDDA were generally complied with. The data gathered were deemed sufficient and acceptable for regulatory decision-making. Based on the results of the chemical and biological testing, the following consensus decision was made by the regulatory agencies:

The 10,000 cubic yards proposed for dredging during February/March 1993 from the Weyerhaeuser Bay City Dock are suitable for open-water disposal at either the Pt. Chehalis or South Jetty estuarine disposal sites, or at the 3.9 mile ocean disposal site.

Concur:

17 Feb 93
Date

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Seattle District Corps of Engineers

22 February 1993
Date

Justine Smith
Environmental Protection Agency, Region X

25 February 1993
Date

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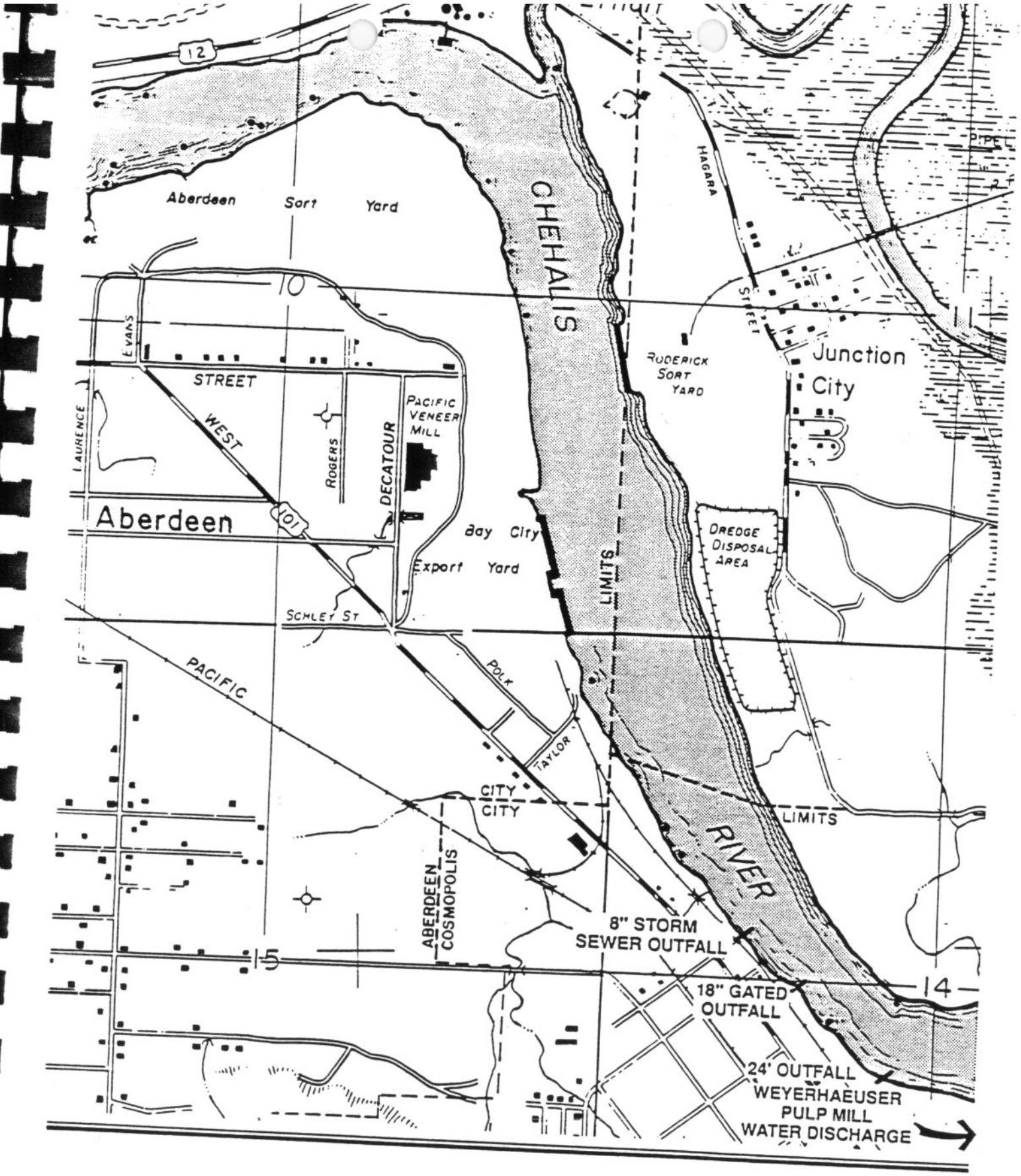

SCALE IN FEET

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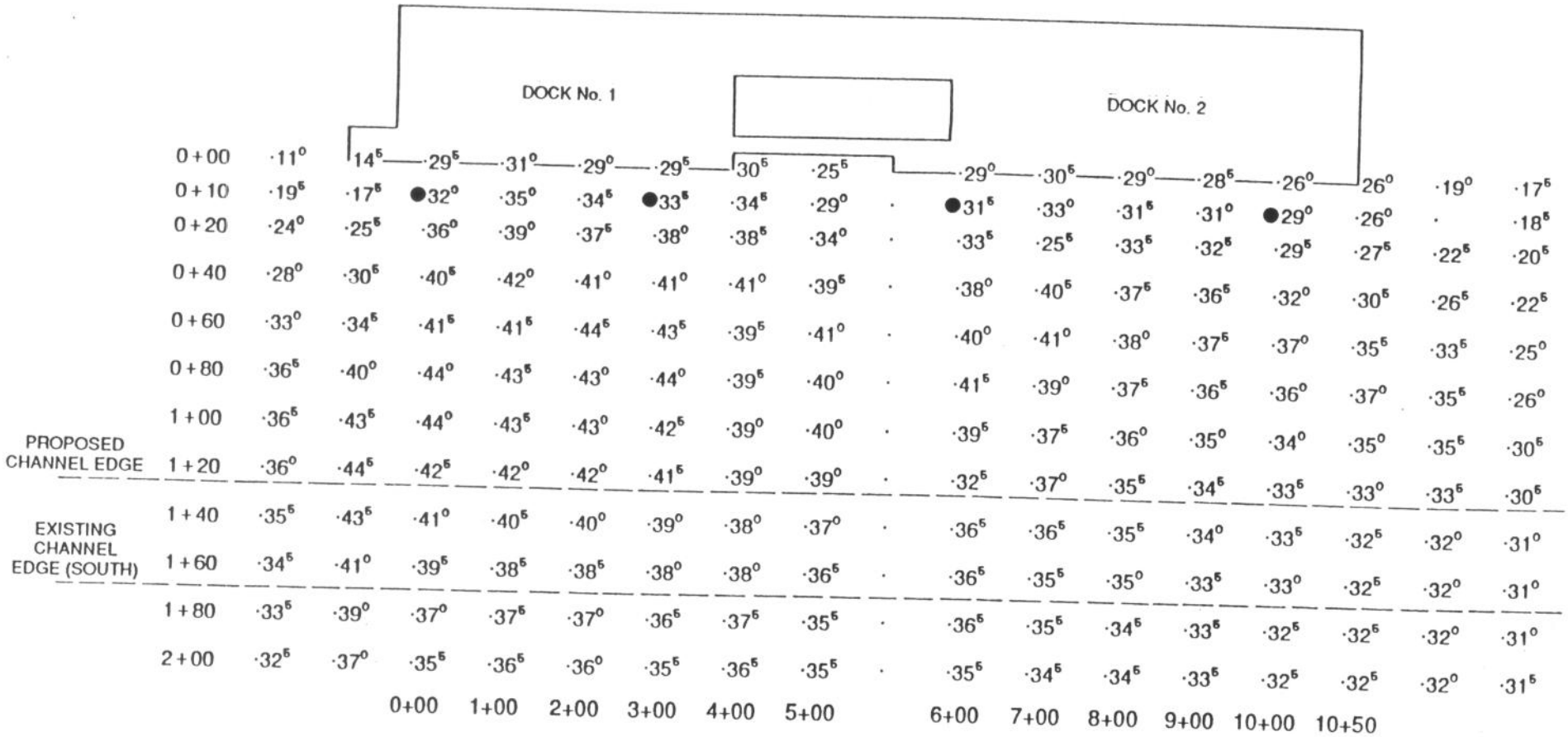
Figure 1.
Site Location and Sources of Pollution to Chehalis



● Sample Sites

Figure 2.
Sounding Grid and Proposed Sample Sites for the Weyerhaeuser Dock