CENPS-OP-DMMO

MEMORANDUM FOR RECORD 22 May 1991

SUBJECT: DECISION ON THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER PSDDA CRITERIA FOR THE ANCHOR COVE MARINA DREDGING PROJECT (OYB-2-013519) TO BE DISPOSED OF AT THE ROSARIO STRAIT OPEN-WATER DISPOSAL SITE.

1. The following summary reflects the PSDDA 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 15,400 cubic yards of material proposed for dredging from the Anchor Cove Marina project site for disposal at the Rosario Strait open-water site.

2. The project area was ranked "moderate". A single dredged material management unit, comprised of sediment collected from four sampling locations, was characterized. Chemical analysis resulted in thirteen exceedances of PSDDA screening levels. These consisted of cadmium, seven individual PAHs, total LPAH, total HPAH, dibenzofuran, 1,2,4-trichlorobenzene and benzyl alcohol. The latter two were detection limit exceedances only. See Attachment 1 for screening level exceedances.

3. The screening level exceedances triggered the need for biological testing under tiered testing guidelines. Due to problems with chemical testing turnaround, the applicant's consultant, Rittenhouse-Zeman and Associates, petitioned the PSDDA agencies for a time extension (beyond the established 42-day biological testing holding time limit) to conduct bioassays. Permission was granted. Four bioassays were conducted: 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. The control sediment was collected from West Beach (Whidbey Island) and the reference sediment came from Samish Bay.

4. The Microtox and amphipod bioassays commenced on day 42 and 43 respectively and had no hits. The Neanthes bioassay, due to the time required to obtain the cultured test organisms, did not commence until day 52. At test termination, the mesh of the screen used to separate worms from sediment was too large and worms were inadvertently lost. This resulted in a retest commencing on day 73. There were no hits in this test.

5. The echinoderm bioassay commenced on day 42. The test sediment and reference sediment each exhibited similar effective mortalities (46.8 and 46.5 percent respectively). The reference sediment failed to meet its performance standard of less than or equal to twenty percent over seawater control. The PSDDA agencies, based on best professional judgement, may set aside test results or require a retest when performance standards are exceeded. In this case, the grain-size match between these two sediments was a poor one. The test sediment contained 50 percent fines while the reference sediment contained 88 percent fines. Based on the poor grain-size match, the unknown differential effect of the higher proportion of fines in the reference, and the more restrictive interpretation guidelines in effect for the Rosario Strait dispersive site, the PSDDA agencies decided not to set aside the data, but rather to require that the echinoderm bioassay be run again.

6. Sediments were collected from three of the original four sampling locations at the Anchor Cove Marina. The retest was conducted within the same batch as Round 1 of the Corps of Engineers' Bellingham Operations and Maintenance dredging project. Three different reference sediments were collected from Sequim Bay. This batch of echinoderm tests exhibited generally high mortalities for both test and reference sediments, ranging from 25.2 to 99.2 percent for the test sediments and 46.5 to 81.6 percent for the reference sediments. The Anchor Cove sediment exhibited 94.2 percent effective mortality.

Ammonia toxicity was strongly implicated in this bioassay with both bulk and water column ammonia statistically correlated with effective mortality for the Bellingham test sediments. The measured water column ammonia concentrations for the Anchor Cove sediment at test initiation and termination were 0.79 and 0.94 mg/l respectively. These were among the highest in the batch. Sulfides were also implicated, with a statistically significant correlation existing between bulk sulfides and effective mortality in the Bellingham samples. Again, the Anchor Cove sediment had one of the highest sulfides levels at 1560 mg/kg. Due to these quality assurance problems (and additional problems with the amphipod test for the Bellingham samples), the PSDDA agencies decided that the echinoderm test should be rerun for the Bellingham samples. See Attachment 2 for a complete summary of Bellingham test data.

7. Parametrix, Inc., the biological testing subcontractor for Anchor Cove, proactively reran the Anchor Cove test sediment for a third time. This time the test sediment was run in the same batch as Round 2 of the Corps' Bellingham O&M project (the Round 1 Bellingham samples were not retested in this round but in Round 3 of Bellingham bioassay testing). Aeration was used in an attempt to ameliorate the effects of ammonia and sulfides. Two reference sediments were collected from Samish Bay. In this batch, both the test and reference sediment effective mortalities were significantly lower than in Round 1, although the reference sediment mortalities were still above the performance standard limit. Test sediments ranged from 19.7 to 56.3 percent effective mortality. The reference sediments ranged from 30.1 to 31.3 percent effective mortality. The Anchor Cove test sediment exhibited 34.8 percent effective mortality.

A third round of bioassay testing was conducted for the Bellingham O&M project in which the Round 1 Bellingham samples were retested. Two Jetty Island reference sediments were run within this round and exhibited 7.2 and 26.1 percent effective mortalities. The grain sizes of the Samish Bay and Jetty Island references, from Bellingham Rounds 2 and 3 respectively, effectively bracketed the test sediment grain sizes of the samples tested in Bellingham Round 2 (including the Anchor Cove sediment). As a result the PSDDA agencies decided to pool the data for these four reference sediments and use a mean effective mortality of 23.9 percent to interpret the Bellingham Round 2 results. This number still exceeds the performance standard for reference sediments and best professional judgement was exercised in using this number for interpretation.

The Anchor Cove sediment effective mortality of 34.8 percent was not significantly different from the mean reference sediment and therefore was a non-hit for the echinoderm test. There were, therefore, no hits for any of the four bioassays.

8. In summary, the PSDDA-approved sampling and testing plan was followed, and quality assurance/quality control guidelines specified by PSDDA were generally complied with. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the PSDDA program. Based on the results of chemical and biological testing, the PSDDA agencies found all 15,400 cubic yards of material from the Anchor Cove Marina suitable for unconfined open-water disposal at the Rosario Strait dispersive site.

Concur:

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ATTACHMENT 1

ANCHOR COVE MARINA
OYB-2-013519

Chemical	Reported Concentration	PSDDA Guideline Values SL	BT	ML
Metals (mg/kg):			98	
Cadmium	1.02	0.96	(5.1)	9.6
Organics (ug/kg):				
Acenaphthene	180	63	(500)	630
Fluorene	140	64	(540)	640
Phenanthrene	700	320	(1,500)	3,200
Anthracene	250	130	(960)	1,300
Total LPAH	1371	610	(5,200)	6,100
Fluoranthene	980	630	(1,700)	4,600	6,300
Pyrene	830	430	(2,600)	7,300
Indeno(1,2,3-cd)pyrene	210	69	(600)	5,200
Total HPAH	4117	1800	(12,000)	51,000
Dibenzofuran	120	54	(540)	540
1,2,4-Trichlorobenzene	12 U	6.4	(31)	64
Benzyl alcohol	15 U	10	(57)	73

U = undetected