

5 April 1993

SUBJECT: DECISION ON THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER PSDDA GUIDELINES FOR THE US ARMY CORPS OF ENGINEERS EVERETT DOWNSTREAM SETTLING BASIN AND RIVER CHANNEL MAINTENANCE DREDGING PROJECT FOR DISPOSAL AT THE PSDDA PORT GARDNER OPEN-WATER NONDISPERSIVE SITE.

1. The Corps of Engineers proposes to dredge 462,243 cubic yards of sediments from the Everett Downstream Settling Basin and River Channel. The following summary reflects the PSDDA agencies' (Corps, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) suitability determination for disposal of this material at the PSDDA Port Gardner open-water nondispersive site.
2. The PSDDA agencies ranked the project area "moderate", based on the guidance provided in the PSDDA Management Plan Report, Phase II (page A-10) for subtidal areas of the Snohomish River.
3. A partial characterization (PC) was performed for the project sediments in the fall of 1992. For the 187,000 cubic yards of surface sediment (0-4 feet) the PSDDA partial characterization guidelines (EPTA II-63) required the analysis of five uncomposited samples to downrank the project to "low-moderate". Five 4-foot core sections were taken from the surface stratum and analyzed for all PSDDA chemicals-of-concern. There were no exceedances of any PSDDA screening levels. Based on these results, the PSDDA agencies downranked the project to "low-moderate" for full characterization.
4. A sampling and analysis plan was developed for full characterization and approved by the PSDDA agencies 11 December 1993.
5. Twelve dredged material management units (DMMUs) were characterized. Sediments from 28 sampling locations were composited into seven surface (C1 through C7) and five subsurface (C8 through C12) lab samples.
6. The chemistry data indicated that a single detected exceedance of the Dredging Year 1993 PSDDA screening levels (SL) occurred for each of C4, C8 and C11. Anthracene was detected at 140 ug/kg (SL = 130 ug/kg) for both C4 and C11. For C8, 4-methylphenol was detected at 150 ug/kg (SL = 120 ug/kg). There were no SL exceedances for any of the other DMMUs. There were no detection limits reported above SL for any DMMU.
7. The SL exceedance for C4, C8 and C11 triggered the requirement for biological testing under the tiered testing approach. The amphipod 10-day acute toxicity test, echinoderm sediment larval combined mortality and abnormality (effective mortality) test, the *Neanthes* 20-day biomass test, and the Microtox bacterial luminescence test were conducted. PSDDA

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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.

8. 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 Seattle Aquarium. Two reference sediments (all bioassays) were used, one from Carr Inlet (62 percent fines) for comparison with C8 (48 percent fines) and one from West Beach (6 percent fines) for comparison with the coarse-grained sediments C4 and C11 (14 and 11 percent fines respectively).

9. There were no hits for the sediment larval or Microtox bioassays. PSDDA performance standards were met for the seawater control and reference samples during the sediment larval test. In the Microtox bioassay, the test sediments C4, C8 and C11 all exhibited blank-corrected light enhancement which is treated as a nontoxic response. The Carr Inlet reference sediment also exhibited blank-corrected light enhancement. Two West Beach sediments were run and both of these exhibited significant light diminution.

10. In the amphipod bioassay, the performance standards for both the control and reference sediments were met. There were no hits for C4 or C11. For C8 the observed mortality was 40 percent. However, high aqueous ammonia concentrations were detected in C8 at both the beginning (5.9 mg/l) and end (14.2 mg/l) of the test. Elevated levels of ammonia and high fines content have been associated with toxicity in *Rhepoxynius abronius* in past PSDDA testing. Although the mechanism is not completely understood, there is reason-to-believe that the toxicity exhibited for C8 may have been induced by the combination of high fines and ammonia.

The 1988 amphipod Apparent Effects Threshold (AET) for 4-methylphenol is 3600 ug/kg which is an order of magnitude greater than the concentration detected in C8. Based on the combination of high fines and ammonia measured for C8 and the relatively low concentration of 4-methylphenol, the PSDDA agencies set aside the amphipod results for C8.

11. In the *Neanthes* biomass test, the West Beach control sediment met its performance standard with only 4 percent mortality. The West Beach reference sediment met its performance standard with 93 percent of the control sediment biomass. DMMUs C4 and C11 had 90 percent and 106 percent of the control sediment biomass respectively, obviating the need for comparison to reference. Therefore there were no hits for C4 or C11 in the biomass test.

The Carr Inlet reference sediment ended with only 57 percent of the control sediment biomass, thus failing to meet its performance standard of 80 percent of control. It also had relatively high mortality for this test (16 percent). DMMU C8 outperformed the Carr Inlet

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reference sediment with 113 percent of the reference biomass; C8 ended with 64 percent of the control sediment biomass.

As in the amphipod test, a high ammonia level was detected in C8 at the beginning of the bioassay (5.6 mg/l). Ammonia levels were not measured at the end of the test. Moore and Dillon (1992) found that ammonia-induced effects in the *Neanthes* biomass test begin in the 10-20 mg/l range. If the ammonia level for C8 in the biomass test at termination was similar to that measured in the amphipod test (14.2 mg/l) at termination, then it is possible that ammonia may have played a role in the diminution in C8 biomass relative to the West Beach control.

Based on the failure of the Carr Inlet reference sediment to meet its performance standard, the outperformance of Carr Inlet by C8 and the high ammonia level detected in C8 at the beginning of the test, the PSDDA agencies set aside the results of this bioassay for C8.

12. The detected concentration of 4-methylphenol for C8 was 150 ug/kg. The State of Washington Sediment Quality Standard (SQS) for 4-methylphenol is 670 ug/kg. Because of the relatively low concentration of 4-methylphenol and the mitigating circumstances described previously for both the amphipod and *Neanthes* biomass tests, the PSDDA agencies used best professional judgement and determined that C8 is suitable for open-water disposal.

13. 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 the chemical and biological testing, the following consensus decision was made by the PSDDA agencies:

All 462,243 cubic yards proposed for dredging from the Everett Downstream Settling Basin and River Channel are suitable for disposal at the Port Gardner open-water nondispersive site.

14. The chemical quality of the proposed dredged material was also evaluated for potential beneficial use projects. All chemical concentrations were compared to the State of Washington SQS. There were no detected exceedances by any chemical of any SQS. There were some carbon-normalized detection limit exceedances of the SQS for 1,2,4-trichlorobenzene, hexachlorobenzene and hexachlorobutadiene. Although the detection limits for these chemicals were relatively low and well below PSDDA screening levels, the total organic carbon measured for project sediments was also low, thereby driving the carbon-normalized detection limits above the SQS for these chemicals. These chemicals have been identified by the PSDDA agencies in the past as problem chemicals relative to detection limits. In this case the PSDDA agencies used best professional judgement in determining that all project sediments are chemically suitable for use in beneficial uses projects.

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15. Based on the "low-moderate" ranking for this project and the lack of major sources of contamination, under PSDDA recency guidelines the data collected for the full characterization of project sediments are valid for 5-7 years after the sampling date. If a "changed condition" (eg. after a spill event) occurs between the date of this suitability determination and the time of dredging, the PSDDA agencies will determine whether additional sampling and testing are required prior to dredging.

16. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open-water disposal site. This suitability determination does not constitute final agency approval of the project.

Concur:

5 April 1993
Date

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Seattle District Corps of Engineers

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Date

David H. Fox
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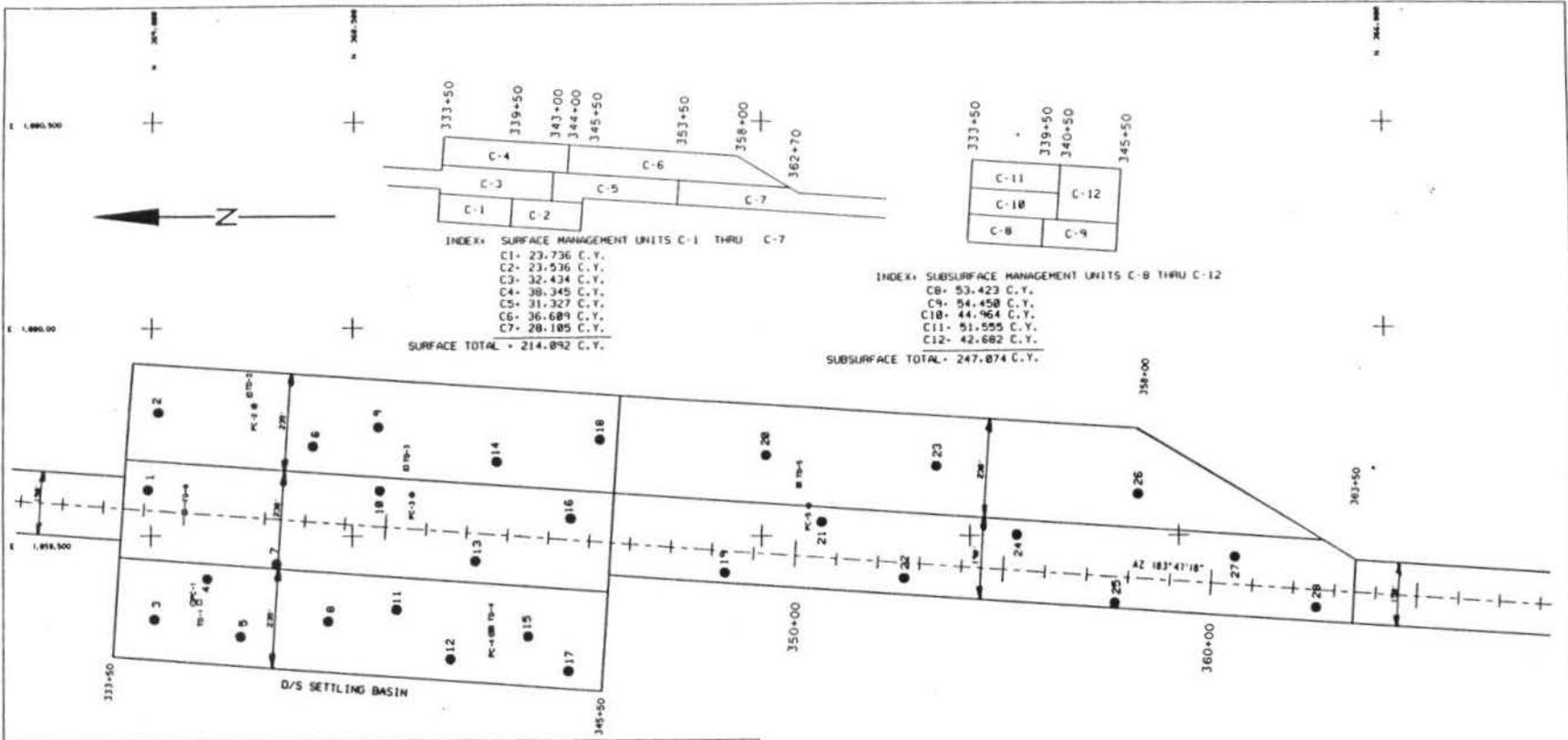
5 April, 1993
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Terry Williams/Tulalip Tribes
John Lunz/SAIC
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SHONISH RIVER & DOWNSTREAM BASIN SAMPLE NUMBER

PARTIAL CHARACTERIZATION	FULL CHARACTERIZATION																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
PC-1																												
PC-2																												
PC-3																												
PC-4																												
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PC-28																												

LEGEND

- PROPOSED FULL CHARACTERIZATION SAMPLE LOCATIONS (1 THRU 28)
- DUNE SAMPLES CLAMWELL TEST DREDGING (1 THRU 10 51)
- PARTIAL CHARACTERIZATION SAMPLE LOCATIONS (PC-1 THRU PC-51)



U.S. ARMY ENGINEER DISTRICT, WASHINGTON
 CORPS OF ENGINEERS
 WASHINGTON
 CONDITION SURVEY - 14.15 OCTOBER 1982
 SHONISH RIVER
 DOWNSTREAM SETTLING BASIN
 SAMPLING & ANALYSIS PLAN
 (FOR FY93 DREDGING)

DATE: 10/15/82
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 SCALE: AS SHOWN
 SHEET: 1 OF 1

* 2' ALLOWABLE OVERDEPTH TO MINOR - 17' & 22' MLW