CENPS-OP-TS

MEMORANDUM FOR RECORD November 14, 1996

SUBJECT: SUITABILITY DETERMINATION FOR DREDGED MATERIAL FROM THE DUWAMISH UPPER TURNING BASIN AND WATERWAY FOR DISPOSAL AT THE PSDDA ELLIOTT BAY OPEN-WATER NONDISPERSIVE SITE (Public Notice CENPS-OP-NP-92).

1. The Corps of Engineers proposes to dredge 112,000 cubic yards of sediment from the Duwamish upper turning basin and waterway. The following summary reflects the PSDDA agencies' (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) suitability determination for disposal of this material at the PSDDA Elliott Bay open-water nondispersive site.

2. The PSDDA agencies ranked the turning basin and waterway upstream of station 257+35 "low-moderate", based on the results from previous PSDDA surveys of this area. The waterway downstream from station 257+35 was ranked "high". The low-moderate area required only "safety-net" testing under the PSDDA frequency guidelines [1, see pages II-42, II-44], since full characterization of this area was conducted both in 1989 and 1992 [2,3].

3. A sampling and analysis plan was developed for full characterization [4] and approved verbally by the PSDDA agencies August 30, 1996.

4. Three samples were collected from the low-moderate area and composited for one safety-net analysis (C1). A single uncomposited sample was collected from each of three dredged material management units (DMMUs) in the high-ranked area (S1-S3). See Attachment 1.

5. The chemistry data indicated that a single detected exceedance of the Dredging Year 1997 PSDDA screening levels (SLs) occurred for S1; indeno(1,2,3-cd)pyrene was detected at 97 ug/kg (SL = 69 ug/kg) [5]. There were no SL exceedances for any other DMMU.

6. Tiered testing was planned for C1. Therefore, no biological testing was required for this DMMU in the absence of SL exceedances. Because SL exceedances were anticipated in the high-ranked area, concurrent bioassays were conducted for S1-S3.

7. The amphipod (*Ampelisca abdita*) 10-day acute toxicity test, echinoderm (*Dendraster excentricus*) sediment larval combined mortality and abnormality test, and the *Neanthes arenaceodentata* 20-day biomass test were conducted for S1-S3. PSDDA interpretation guidelines [6], as modified by changes made at annual review meetings, were used to evaluate the bioassay data. The control sediment for the *Neanthes* bioassay was collected from West Beach (Whidbey Island). The control sediment for the amphipod bioassay was collected concurrently with the test organisms in the vicinity of Narraganset, RI. The reference sediment was collected from Carr Inlet.

8. There were no statistical hits in the sediment larval or biomass tests, although one replicate for S1 had no survivors in the latter test. However, the presence of small crabs in this beaker at the end of the test was the presumptive cause (see Attachment 2). In the amphipod test, DMMUs S2 and S3

were significantly different from reference and S3 exceeded the reference sediment mortality by greater than 30 percent. Therefore, S2 scored a hit under the two-hit rule, while S3 scored a hit under the single-hit rule. There were no corroborating hits in the larval or biomass tests. As a result, S2 passed biological testing while the hit under the single-hit rule failed DMMU S3.

9. In summary, the PSDDA-approved sampling and testing plan was followed, and quality assurance, quality control guidelines specified by PSDDA were 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 testing, the following consensus determination was made by the PSDDA agencies:

The 108,000 cubic yards represented by DMMUs C1, S1 and S2 are suitable for disposal at the Elliott Bay open-water nondispersive site. The 4,000 cubic yards represented by DMMU S3 are not suitable for PSDDA disposal.

10. The chemical quality of the low-moderate-ranked material (C1) was also evaluated for potential beneficial use projects. Chemical concentrations were compared to the State of Washington SQS and there were no detected exceedances[1]. However, there was a detection limit exceedance of the SQS for hexachlorobenzene [Attachment 3]. In addition, dry-weight detection limits were also compared to the draft July 1996 detection limit guidelines provided by the Department of Ecology [Attachment 4]. Several chemicals exceeded the detection limit guidelines including hexachlorobutadiene and individual PCB Aroclors. When compared to the 1988 dry-weight LAETs, only hexachlorobutadiene exceeded its respective value.

The PSDDA agencies agreed that the potential risk for deleterious adverse effects posed by these detection limit exceedances was negligible. Therefore, the PSDDA agencies used best professional judgment in determining that sediments from C1 were chemically suited for use in beneficial uses projects. The following table provides sediment conventional data for the evaluation of beneficial use options:

	C1
total solids (%)	75.8
total volatile solids (%)	3.6
total organic carbon (%)	1.8
ammonia (mg/kg)	12
total sulfides (mg/kg)	14
sand (%)	89.8
silt (%)	8.5
clay (%)	1.6

[1] Chromium is a PSDDA chemical-of-concern only for dredging projects located near specific pollution sources. There are no known sources of chromium in the immediate vicinity of this project. Therefore, the sediment was not analyzed for this element and no comparison to SQS was possible.

11. Under PSDDA recency guidelines the data collected for the characterization of sediment in the low-moderate area are valid for 5-7 years after the sampling date. The data from the high-ranked area are valid for 2 years. If a "changed condition" (e.g. 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.

12. Additional sedimentation is predicted to occur before dredging takes place. Based on the results from sediment testing conducted in 1989, 1990, 1992 and 1996, the PSDDA agencies do not consider this material to present a significant risk. Therefore, under the PSDDA frequency guidelines, additional sediment accumulating within the footprint of C1, S1 and S2 between the time of this determination and the time of dredging in 1997 may be dredged without further characterization.

13. This memorandum documents the suitability of proposed dredged sediments for disposal at the Elliott Bay open-water site and chemical suitability for beneficial use. However, this suitability determination does not constitute final agency approval of the project.

References:

[1] PSDDA, 1988, *Evaluation Procedures Technical Appendix, Phase I.*

[2] USACE, 1990, Memorandum for Record: *Finding of No Significant Impact; Seattle Harbor Navigation Project Operations and Maintenance, February-March 1990,* Seattle District.

[3] USACE, 1992, Memorandum for Record: *Decision on the Suitability of Dredged Material Tested under PSDDA Criteria for the Corps of Engineers Duwamish O&M 1991/92 Dredging Project for Disposal at the PSDDA Elliott Bay Open-water Disposal Site,* prepared by Seattle District for the PSDDA agencies.

[4] USACE, 1996, *Sampling and Analysis Plan for Sediment Characterization at Duwamish Waterway and Turning Basin; FY96 Operations and Maintenance Dredging,* prepared by Seattle District.

[5] USACE, 1996, CITE SEA REPORT.

[6] PSDDA, 1989, *Management Plan Report, Phase II.*

USACE Duwamish DY97
Suitability Determination

Concur:

11/25/96
Date

David Fox
Seattle District Corps of Engineers

Nov. 14, 1996
Date

Justine Barton
Environmental Protection Agency, Region X

14NOV96
Date

Ted Benson
Department of Natural Resources

11/14/96
Date

Tom Gries
Washington Department of Ecology

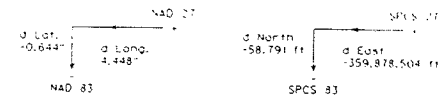
4 Attachments
Copies Furnished:

DMMO file/CENPS-OP-TS
Alex Sumeri/CENPS-OP-NP
Therese Littleton/CENPS-EN-PL-ER
Sandy Browning/SEA

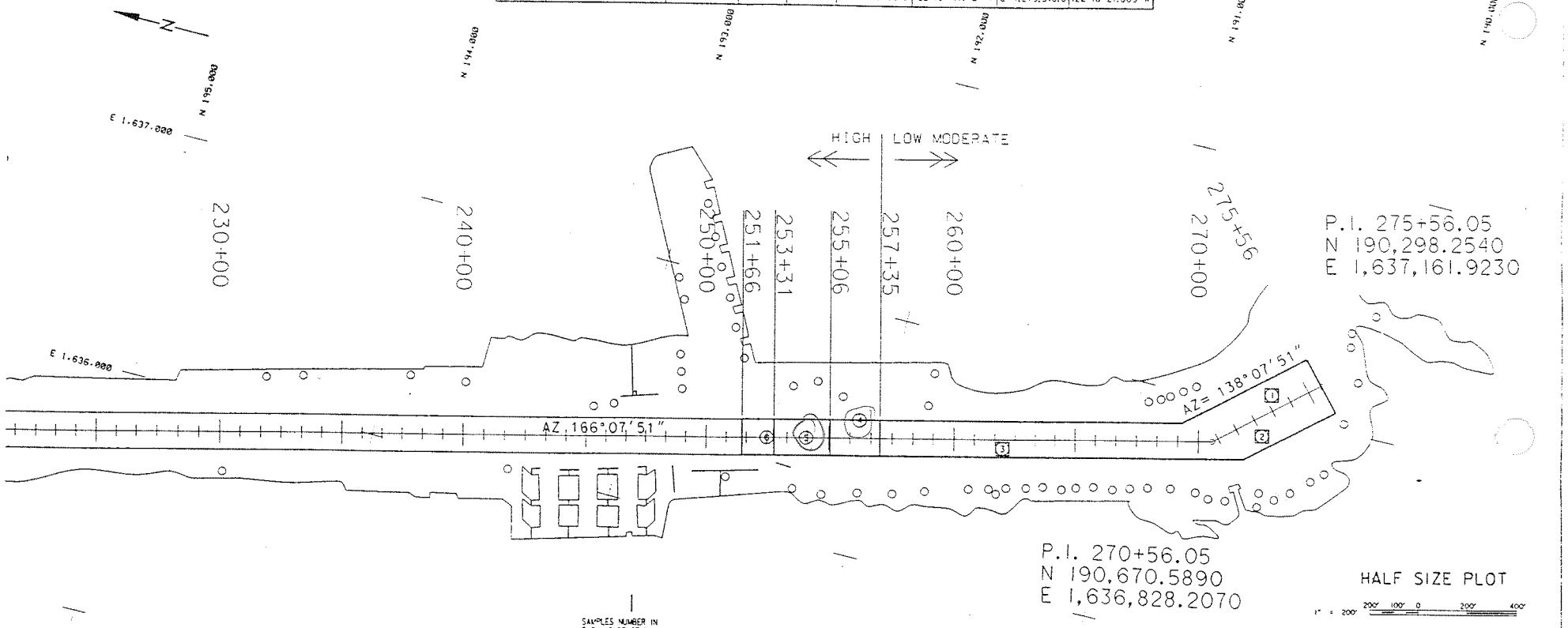
Justine Barton/EPA
Tom Gries/Ecology
Ted Benson/DNR
Rod Malcom/Muckleshoot Tribe

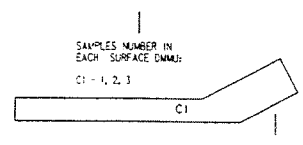
Attachment 1

The coordinates shown are referenced to NAD 27 and are in feet based on the SPCS 27 WA. Differences between NAD 27 and NAD 83 and between SPCS 27 and SPCS 83 at the center of the sheet are shown on the diagram below. Datum conversion was performed using the computer program "CORPSCON." Metric conversions were based on US Survey Foot = 1200/3937 Meter.



COMPOSITE NUMBER	Sample Number	Station	Range	Est. Depth To Surface (in feet)	Est. Length of Sample (in feet)	NAD 27 State Plane	NAD 27 Geographic	NAD 83 State Plane	NAD 83 Geographic
C1	1	273+60.0	60.0 LEFT	4	4	N 190,484.3 E 1,637,075.8	47 30 45.761 N 122 18 06.970 W	N 190,425.5 E 1,277,197.2	47 30 45.117 N 122 18 11.417 W
	2	272+45.0	73.0 RIGHT	13	4	N 190,481.2 E 1,636,900.0	47 30 45.697 N 122 18 09.529 W	N 190,422.4 E 1,277,021.4	47 30 45.053 N 122 18 13.977 W
	3	261+97.0	38.0 RIGHT	13	4	N 191,495.5 E 1,636,585.4	47 30 55.646 N 122 18 14.393 W	N 191,436.7 E 1,276,706.9	47 30 55.003 N 122 18 18.841 W
S1	4	256+20.0	75.0 LEFT	12	4	N 192,082.7 E 1,636,556.8	47 31 01.436 N 122 18 14.973 W	N 192,024.0 E 1,276,673.3	47 31 00.792 N 122 18 19.421 W
S2	5	254+10.0	0 CL	13	4	N 192,268.6 E 1,636,433.6	47 31 03.247 N 122 18 16.819 W	N 192,209.9 E 1,276,555.1	47 31 02.604 N 122 18 21.267 W
S3	6	252+50.0	0 CL	13	4	N 192,424.0 E 1,636,395.3	47 31 04.773 N 122 18 17.421 W	N 192,365.2 E 1,276,516.8	47 31 04.129 N 122 18 21.869 W





NOTES:

HORIZONTAL CONTROL BASED ON NAD 27 LAMBERT GRID PROJECTION FOR WASHINGTON STATE PLANE COORDINATE SYSTEM NORTH ZONE.

LEGEND:

SURFACE ONLY SAMPLE LOCATION (19)

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

DUWAMISH WATERWAY

SEDIMENT CHARACTERIZATION PLAN
SEPTEMBER 1996

SEATTLE HARBOR, WASHINGTON

ALEX SUMERI, P.E.
PROJECT MANAGER, NAVIGATION SECTION

ROBERT M. PARRY
NAVIGATION SECTION

BRIAN R. APPLEBURY, P.E.
OPERATIONS DIVISION

SURVEYED BY: LMR
CHECKED BY: DSM
DATE: 30 AUG 96
SCALE: 1" = 200'
SHEET 1 OF 1

E-12-2 1-

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Consultants in Engineering and Environmental Science

SENT VIA FACSIMILE (360) 866-4816

Ms. Sandy Browning
Striplin Environmental Associates
6541 Sexton Drive NW, Suite E-1
Olympia, Washington 98502

November 4, 1996
55 2758 05

RE: PRESENCE OF PREDATORY CRABS IN *NEANTHES* REPLICATE

Dear Ms. Browning:

The purpose of this letter is to provide a clarification for the 100% mortality observed in replicate N110 of the *Neanthes* bioassay conducted 19 September 1996. Upon sieving Sample DUW-S1 at test termination, two small crabs (roughly identified as *Pinnixa sp.*) were found in replicate N110. Only one test organism (dead) was found in this replicate. Given 100% survival in all other replicates of DUW-S1, it seems likely that these crabs were preying on the *Neanthes*, and that these mortalities were not due to sediment toxicity.

I have also enclosed a copy of the data sheet indicating the presence of the crabs. If you have any other questions, please feel free to call me or Ms. Dayle Ormerod at (206) 822-8880. Thank you.

Sincerely,

PARAMETRIX, INC.

Douglas Henderson
Project Manager

cc: D. Ormerod DEO
C. Wisdom
file

Attachment 2

20 DAY NEANTHES BIOASSAY BREAKDOWN

Job Name Striplin

Job Number 55275805

Date 10/9/96

Day 20 of Test

Container	Found Alive	Found Dead	Comments	Initials
N101	5	0	guts 3/4 full	PS
N102	5	0	guts 3/4 full	PS
N103	5	0	guts 1/4 full	JK
N104	5	0	guts 1/2 full	JK
N105	5	0	guts 3/4 full	JK
N106	5	0	guts 1/2 full	JK
N107	5	0	guts 3/4 full	JK
N108	5	0	guts 3/4 full	JK
N109	5	0	guts 1/2 full	JK
N110	0	1	Small crabs present	PS
N111	5	0	guts 1/2 full	JK
N112	5	0	guts 3/4 full	JK
N113	5	0	guts 3/4 full	JK
N114	5	0	guts 3/4 full	PS
N115	5	0	guts 1/2 full	JK
N116	5	0	guts 3/4 full	JK
N117	5	0	guts 1/2 full	JK
N118	5	0	guts 1/4 full	PS
N119	5	0	guts 1/2 full	PS
N120	5	0	guts 1/2 full	JK
N121	5	0	guts 1/2 full	PS
N122	5	0	guts 3/4 full	PS
N123	5	0	guts 3/4 full	JK
N124	5	0	guts 1/2 full	PS
N125	5	0	guts 1/2 full	PS

Attachment 2 (cont.)

ATTACHMENT 3
DETECTION LIMIT COMPARISONS

Guidelines for Comparison

	SQS (mg/kg oc)		C1
Hexachlorobenzene	0.38		0.56

	Draft 1996 SMS DL (ug/kg dw)	**PSDDA SL (ug/kg dw)**	
Hexachlorobutadiene	11	29	14
Aroclor 1016	6	*	8.8
Aroclor 1221	6	*	18
Aroclor 1232	6	*	8.8
Aroclor 1242	6	*	8.8
Aroclor 1254	6	*	8.8

	1988 LAET (ug/kg dw)	**PSDDA SL (ug/kg dw)**	
Hexachlorobutadiene	11	29	14

* SL for Total PCBs = 130 ug/kg dw
SQS = Sediment Quality Standard
SMS = Sediment Management Standards
DL = Detection Limit
LAET = Lowest Apparent Effects Threshold

oc = organic-carbon-normalized
dw = dry-weight-normalized

Recommended Sample Preparation Methods, Cleanup Methods, Analytical Methods, and Detection Limits For Sediment Management Standards, Chapter 173-204 WAC

Draft - July 1996

	Recommended Sample Preparation Methods	Recommended Sample Cleanup Methods	Recommended Analytical Methods	Recommended Detection Limits (mg/kg dry weight)	RDLs are all assumed to be the DWLAET/3 unless otherwise noted
Metals					
Arsenic	PSEP	--	6010/7061	19	
Cadmium	PSEP	--	6010/7131	1.70	
Chromium	PSEP	--	6010/7191	87	benaet/3, only 2 aet
Copper	PSEP	--	6010	130	
Lead	PSEP	--	6010/7421	150	
Mercury	#NAME?	--	7471	0.14	
Silver	PSEP	--	6010	2	
Zinc	PSEP	--	6010	137	
Nonionizable Organic Compounds					
LPAH Compounds					
Naphthalene	3540/3550	3640/3660	8270/1625C	700	
Acenaphthylene	3540/3550	3640/3660	8270/1625C	433	
Acenaphthene	3540/3550	3640/3660	8270/1625C	167	
Fluorene	3540/3550	3640/3660	8270/1625C	180	
Phenanthrene	3540/3550	3640/3660	8270/1625C	500	
Anthracene	3540/3550	3640/3660	8270/1625C	320	
2 Methylnaphthalene	3540/3550	3640/3660	8270/1625C	223	
HPAH Compounds					
Fluoranthene	3540/3550	3640/3660	8270/1625C	567	
Pyrene	3540/3550	3640/3660	8270/1625C	867	
Benz[a]anthracene	3540/3550	3640/3660	8270/1625C	433	
Chrysene	3540/3550	3640/3660	8270/1625C	467	
Total benzofluoranthene	3540/3550	3640/3660	8270/1625C	1067	
Benzo[a]pyrene	3540/3550	3640/3660	8270/1625C	533	
Indeno[1,2,3 cd]pyrene	3540/3550	3640/3660	8270/1625C	200	
Dibenz[a,h]anthracene	3540/3550	3640/3660	8270/1625C	77	
Benzo[ghi]perylene	3540/3550	3640/3660	8270/1625C	223	

Attachment 4

Recommended Sample Preparation Methods, Cleanup Methods, Analytical Methods, and Detection Limits For Sediment Management Standards, Chapter 173-204 WAC

Draft - July 1996

Chlorinated Benzenes				Recommended Detection Limits (ug/kg dry weight)	
1.2 Dichlorobenzene	3540/3550	3640/3660	8270/1625C	35*	DWLAET, LAET/3 <8270
1.4 Dichlorobenzene	3540/3550	3640/3660	8270/1625C	37	
1.2.4 Trichlorobenzene	3540/3550	3640/3660	8270/1625C	31*	DWLAET, LAET/3 <8270
Hexachlorobenzene	3540/3550	3640/3660	8270/1625C	22*	DWLAET, LAET/3 <8270
Phthalate Esters					
Dimethyl phthalate	3540/3550	3640/3660	8270/1625C	24	
Diethyl phthalate	3540/3550	3640/3660	8270/1625C	67	
Di-n-butyl phthalate	3540/3550	3640/3660	8270/1625C	467	
Butyl benzyl phthalate	3540/3550	3640/3660	8270/1625C	21	This LAET/3 is close to 8270 # of 16
Bis[2 ethylhexyl]phthala	3540/3550	3640/3660	8270/1625C	433	
Di n octyl phthalate	3540/3550	3640/3660	8270/1625C	2067	
Misc. Extractable Comp's.					
Dibenzofuran	3540/3550	3640/3660	8270/1625C	180	
Hexachlorobutadiene	3540/3550	3640/3660	8270/1625C	11*	DWLAET, LAET/3 <8270 #=27
N-nitrosodiphenylamine	3540/3550	3640/3660	8270/1625C	28*	This # = DWLAET, LAET/3 <8270 #=27
PCBs					
Individual PCB Aroclors®	3540/3550	3620/3640/3660	8080	6	Agreed w/Metro&SMU
Ionizable Org. Comp's.					
Phenol	3540/3550	3640/3660	8270/1625C	140	
2 Methylphenol	3540/3550	3640/3660	8270/1625C	63*	DWLAET, LAET/3 <8270 #=27
4 Methylphenol	3540/3550	3640/3660	8270/1625C	223	
2.4 Dimethylphenol	3540/3550	3640/3660	8270/1625C	29*	DWLAET, LAET/3 <8270 #=27
Pentachlorophenol	3540/3550	3640/3660	8270/1625C	120	
Benzyl alcohol	3540/3550	3640/3660	8270/1625C	57*	DWLAET, LAET/3 <8270 #=27
Benzoic acid	3540/3550	3640/3660	8270/1625C	217	

Attachment 4 (cont.)