CENPS-OP-RG

MEMORANDUM FOR RECORD 6 November 1989

SUBJECT: DECISION ON THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER PSDDA CRITERIA FOR THE U.S.NAVY MANCHESTER FUEL PIER PROJECT (OYB-2-013051) TO BE DISPOSED OF AT THE ELLIOTT BAY OPEN WATER DISPOSAL SITE.

1. The following summary reflects the PSDDA agencies (Corps, Department of Ecology, and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data (i.e., contained in reports dated June 1989, August 1989, September 15, 1989, and October 24, 1989) to make a determination of suitability of the dredged material proposed for dredging from the Manchester Fuel Pier Project site for disposal at a PSDDA disposal site.

2. 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.

3. Chemistry data indicated that exceedences of the 1988 PSDDA screening level (SL) values was limited to fourteen chemicals and generally confined to the surface sediments (i.e., 0-3 feet) east of the existing pier with all exceedences well below the PSDDA maximum level (ML) values. Screening level exceedences were noted as depicted in enclosure 1. The June 1988 SL value for Ni (28 ppm) was exceeded in 10 of the 15 samples and/or composited sample analyses, although the concentrations measured were all well below the proposed new Ni SL of 140 ppm. The June 1988 EPTA bioaccumulation trigger value for Ni of 43 ppm was exceeded in 3 of the analyses, although the new proposed bioaccumulation trigger value for Ni is 504 ppm. Problems with the naturally high concentrations of Ni measured throughout Puget Sound have previously been documented in all PSDDA dredging projects to date (see PSDDA Phase II MPR, page 5-6) and justified not using the 1988 SL values for dredged material suitability decision making. The issue of 1988 bioaccumulation trigger (43 ppm) exceedences of Ni was also addressed in the Phase II MPR, which raised the BT to 504 ppm, and provided the rationale for not requiring bioaccumulation tests. The chemical analyses conducted also noted that quantitation limits for six Chemicals of Concern (COC) were expressed as undetected above the PSDDA SL (enclosure 1). There was no requirement to analyze pesticides and PCB's, due to low levels of these compounds documented during earlier testing (Corps Memo dated 31 October 1988; enclosure 2). SL exceedences of COC and non compliance with PSDDA required detection limits (> SL values) bracketed all fifteen samples analyzed, thereby triggering the requirement to conduct biological testing on all samples. Since biological testing was conducted concurrently on all 15 analyses, these exceedences have no bearing on the determination of suitability for PSDDA disposal.

4. In summary, results for bioassay testing for the fifteen single/ composited samples indicated that all passed the PSDDA interpretation guidelines. PSDDA interpretation guidelines specified in June 1988 EPTA, and Bivalve larvae/Echinoderm embryo bioassay interpretation guidelines clarified

in PSDDA memorandum dated October 1988 (enclosure 3) were used to evaluate the bioassay data. Interpretation guidelines specified in enclosure 3 for the Oyster larvae/Echinoderm embryo bioassay specified necessary clarifications/changes in the mortality and abnormality performance standards for control sediment, reference sediment, and dredged material relative to those specified in June 1988 EPTA. In general the Amphipod, Echinoderm embryo, and Microtox bioassays performed well with respect to appropriate control and reference sediment (Samish Bay) guidelines as specified by PSDDA. Reference sediment (i.e., Samish Bay) and control sediment (i.e., West Beach) performed well within PSDDA performance guidelines specified for each bioassay. Amphipod bioassay and sediment larvae bioassay (Dendraster excentricus) results indicated all 15 samples passed, whereas no toxicity was observed in any of the 15 Microtox analyses performed.

5. Based on the above discussion and summary of chemical and bioassay results for the Manchester Fuel Pier Project area, the PSDDA agencies concluded that all the dredged material tested (15 single/composited analyses) is suitable for disposal at the Elliott Bay PSDDA disposal site.

Concur:

Nov. 12, 1989 — David R. Kendall
Date — David R. Kendall, Ph.D
Seattle District Corps of Engineers

Nov. 20, 1989 — John Malek
Date — John Malek
Environmental Protection Agency
Region X

11-20-89 — Russ McMillan
Date — Russ McMillan
Washington Department of Ecology

Enclosures

Copies Furnished:

PSDDA/Frank Urabeck
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DOE/Rick Vining
DNR/David Jamison

RESULTS OF CHEMICAL ANALYSES EXCEEDING PSDDA GUIDELINES: MANCHESTER FUEL PIER PROJECT (OYB-2-013051)

CHEMICAL	1988 SL	1988 ML	HIGHEST	D > SL	U > SL	STATIONS D/U > SL
ANTIMONY	2.6	26	2.9J	1	0	E4-03
CADMIUM	0.96	9.6	1.15J	3	0	E1-03, E2-03, E-36
NICKEL	28	120	76J	10	0	NONE > 1989 SL (140 PPM)
TOTAL LPAH	610	6100	1039	2	0	E2-03, E4-03
PHENANTHRENE	320	3200	650	2	0	E2-03, E4-03
ANTHRACENE	130	1300	250	2	0	E2-03, E4-03
TOTAL HPAH	1800	51000	6420	3	0	E2-03, E3-03, E4-03
FLUORANTHENE	630	6300	1000	2	0	E2-03, E4-03
PYRENE	430	7300	1200	3	0	E2-03, E3-03, E4-03
BENZO(a)ANTHRACENE	450	4500	550	1	0	E2-03
CHRYSENE	670	6700	950	1	0	E2-03
BENZOFLUORANTHENES	800	8000	1200	1	0	E2-03
IDENO(1,2,3,c,d)PYRENE	69	5200	340	5	0	E1-03, E2-03, E3-03, E4-03, E-36
DIBENZO(a,h)ANTHRACENE	120	1200	240	3	0	E2-03, E3-03, E4-03
1,2,4-TRICHLOROBENZENE	6.4	64	16U	0	15	ALL STATIONS
PHENOL	120	1200	220	2	0	C1-03, AB-03
2-MEHYLPHENOL	10	72	16U	0	15	ALL STATIONS
2,4-DIMETHYLPHENOL	10	50	31U	0	15	ALL STATIONS
PENTACHLOROPHENOL	69	690	80U	0	4	E1-03, E2-03, A-36, F1-03
HEXACHLOROBUTADIENE	29	290	31U	0	5	E1-03, E2-03, A-36, B-36, F1-03
BENZYL ALCOHOL	10	73	31U	0	15	ALL STATIONS

encl. 1

MEMORANDUM

CENPS-OR

DATE: 31 October 1988

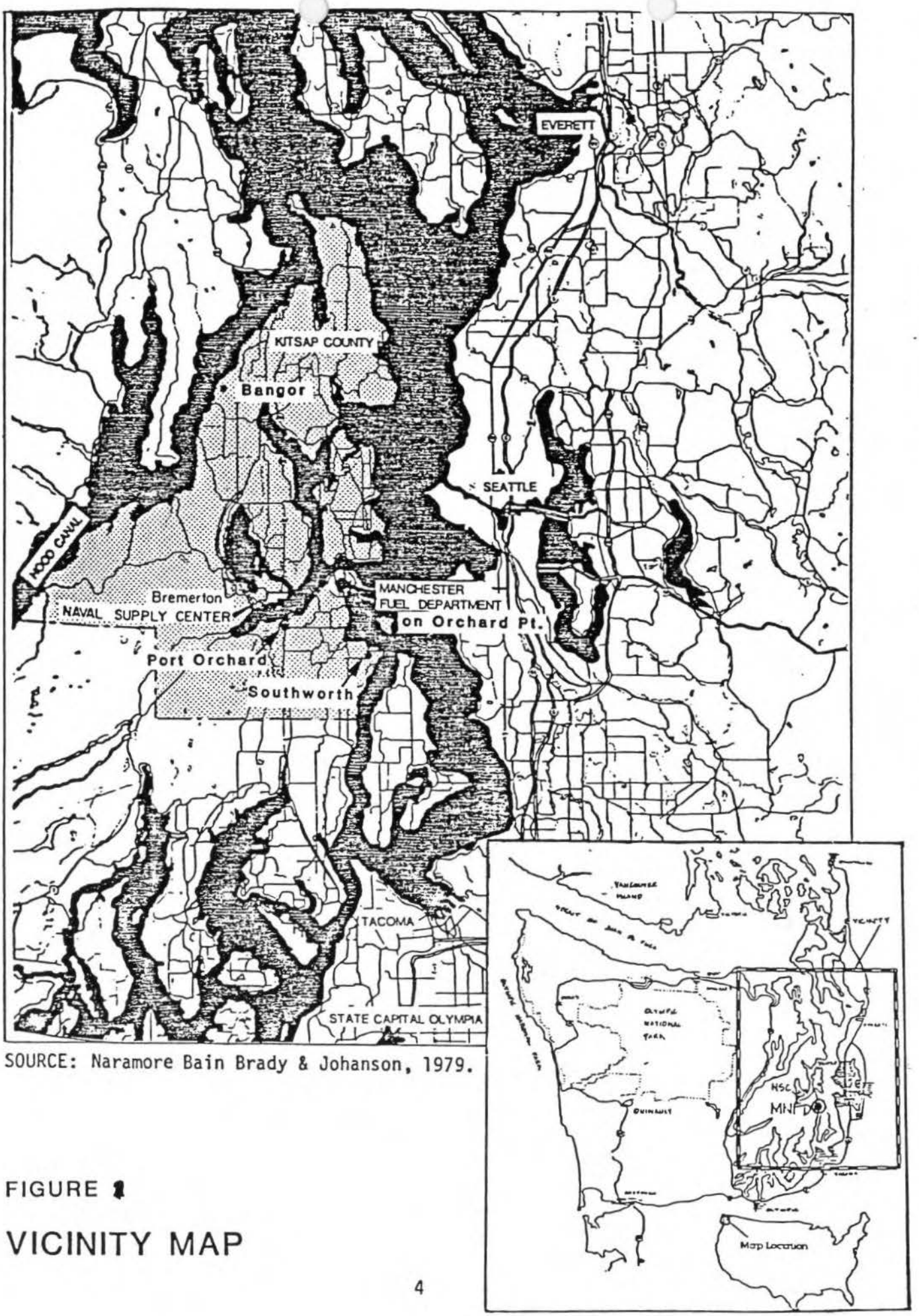
Subject: Manchester Fuel Pier Dredged Material Sampling Plan per PSDDA Requirements

1. Introduction. The Navy is proposing to construct a new fuel pier adjacent to the existing fuel pier at the Manchester Naval Station in Puget Sound. The Naval Fuel Pier has existed at Manchester since 1942. Dredging originally increased depths near the shoreline end of the pier to about -35 ft MLLW. In 1983, additional dredging was conducted to increase the depth to about -40 ft MLLW. Associated iwth the new pier, the Navy proposes additional dredging to an approximate depth of -45 feet. The dredge area includes most of the area previously dredged for use of the existing pier, as well as new area to the east that has not been previously dredged. Total estimated dredge quantity is 181,930 cubic yards.

2. Site Description. The Manchester Fuel Station is a 234-acre facility with a two-part mission: (1) to receive, store, and supply various types of fuels to Naval fleet units and shore activities in the Pacific Northwest and (2) to operate an Oily Waste Treatment Facility and Fuel Reclamation Plant. The station ranks as the largest underground storage facility in the continental United States. Three types of fuel and two types of lube oil, are supplied to ships and submarines stationed at the Puget Sound Naval Shipyard Command in Bremerton and the Trident Submarine Base in Bangor.

The station is located in southern Kitsap County in an unincorporated area adjacent to the urbanized area of the City of Manchester to the south (refer to figure 1). The station is situated on Orchard Point, a peninsula surrounded by the adjacent marine waters of the Puget Sound, Clam Bay and Little Clam Bay. Beaver Creek is a freshwater stream located in the northeastern portion of the station. Water quality testing is conducted by the nearby U.S. EPA's Water Quality Testing Laboratory. The beaches vary from rocky to gravelly sand or mud. Results of geotechnical studies performed by Dames and Moore in 1986 indicate that the project area is underlain by varying thicknesses of recent alluvial material consisting of silt, sand, and gravel. Beneath the alluvium, explorations encountered very dense deposits of glacially consolidated silt, sand, and gravel. Bedrock is expected to underlie the glacial soils. Dredging to a proposed depth of -45 feet will require dredging of the glacial soil deposits which is expected to be very difficult. Few dredging problems are expected in the overlying loose marine sediments. Results of preliminary surface sampling of sediments by Entranco, 1987, indicated that the physical composition of the material was primarily sand (65 to 85 percent), gravel/shell fragments (5 to 17 percent), silt (7 to 14 percent), and clay (3 to 5 percent). A larger grain size such as sand generally denotes a smaller potential for chemical contamination.

enclosure 2



SOURCE: Naramore Bain Brady & Johanson, 1979.

FIGURE 1

VICINITY MAP

Functions of the existing fuel pier are off-loading and refueling of large naval vessels. Ship maintenance activities are not permitted in the vicinity of the pier. The three primary piped fuels are Diesel Fuel Marine (DR4FM), Navy Special Fuel Oil (NSFO), and a type of aviation turbine fuel referred to as JP5. During the 1940s amd the following 20 years, NFSO, a heavy distillate fuel, was used. The mid 1960's brought a Navy-wide conversion to a cleaner fuel type. A third and cleaner fuel, a DFM, was introduced during the late 1970s and is still being used by the Navy Fuel Department. The handling of petroleum fuels and oils presents the risk of spill on land and water. Spills have occurred at the Manchester station and have been reported as mandated by the Clean Water Act. The station has developed and implemented a Spill Prevention Control and Countermeasure Plan to clean up and minimize effects on the environment.

3. Existing Testing Data. In 1986, surface samples were collected from the proposed dredge area (Entranco, 1987). Samples along transects A, B, C, and D of the attached Figure 1 were each composited and analyzed separately. The preliminary sampling strategy was intended to target and characterize representative and worst case sediment quality at the proposed dredging site with a relatively small data collection effort. Numerous shallow sediment cores were collected over the proposed dredging area and analyzed for oil and grease, and lead-indicative of the site's historic use. These analyses served to identify specific hotspot areas or general trends with respect to the presence of metal and toxic organic pollutants and to determine appropriate composites of cores for analysis of a suite of parameters.

Shallow sediment cores (20 to 40 cm) were collected from each of the 18 sampling stations, analyzed for total oil/grease and lead. Based on those results, a total of four composites of several cores underwent more intensive analysis. The four cores were composited according to equivalent distance from the existing fuel pier, because individual core lead and oil/grease samples conclusively demonstrated improved sediment quality with increased distance from the pier. The cores were analyzed in accordance with the Four Mile Rock interim dredge material disposal criteria. From the preliminary sediment sampling, the following conclusions were drawn: (1) analysis conclusively demonstrated that sediment qwuality improved with increasing distance from the fuel pier; (2) sediments in the undisturbed or proposed new berthing area did not reflect a single exceedance of the screening level criteria for any of the contaminants of concern analyzed (e.g. Composites C and D). This suggests that dredged material outside the area of the existing fueling berths may be approved for unconfined open water disposal, subject to verification by formal testing of all contaminants of concern and dredging depths; and (3) sediments in the existing fuel area did not exceed ML2; however, there were numerous exceedances of the SL, indicating that bioassays would be required to determine the suitability of that material for disposal in open water (Composites A and B).

4. Meeting with the PSDDA Agencies. On 2 September 1988, the Navy and their consultant, Parametrix, met with the PSDDA agencies (EPA, WDE, COE) to discuss a proposed sampling plan for the Manchester project. In summary, the plan was to collect 16 core samples at 12 proposed locations shown in Figure 3. At each location, one composite sample would be taken from the

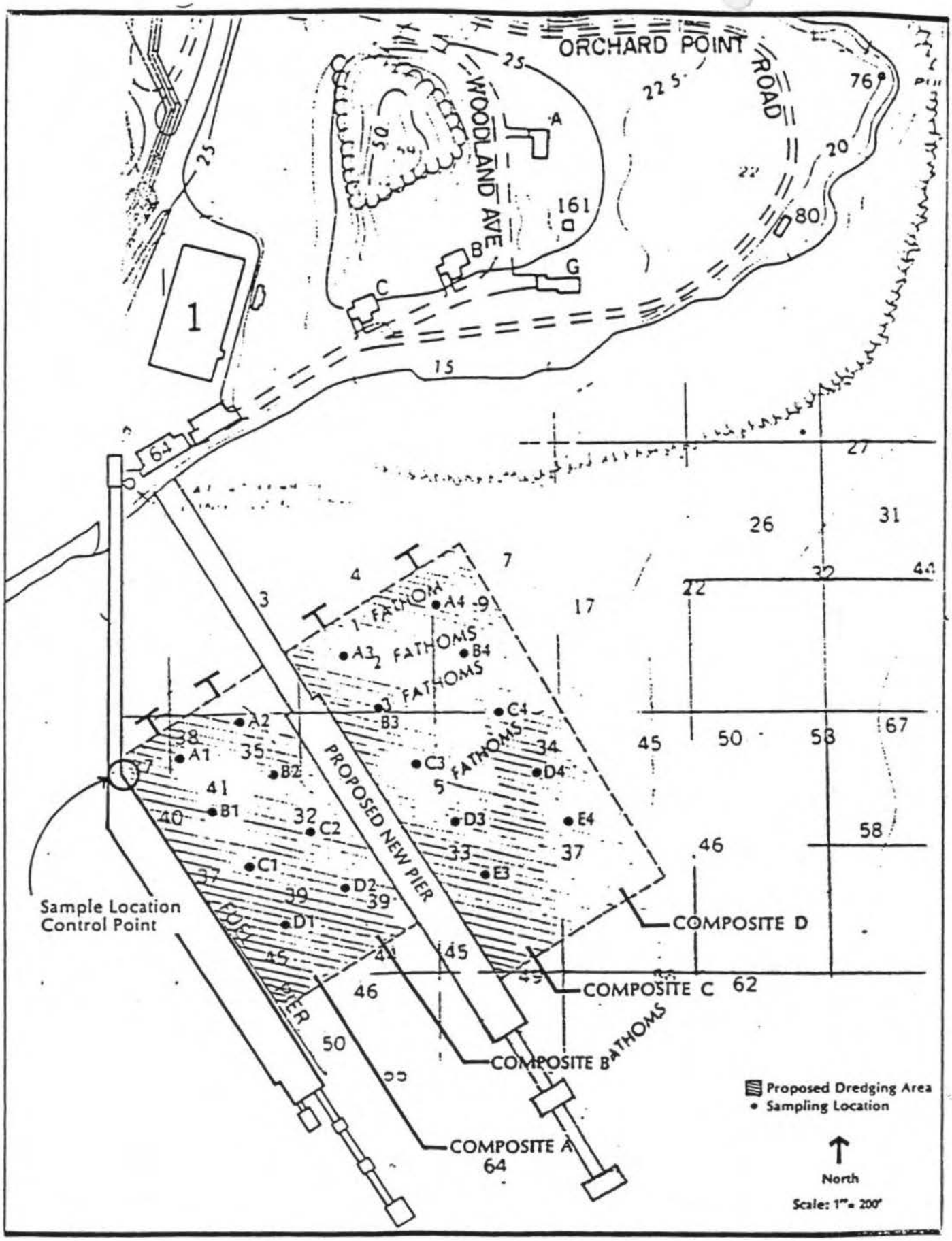


Figure 3
PRELIMINARY SEDIMENT SAMPLING LOCATIONS

Figure 2

Rib. Entranco, 87.

sediment between the surface and 3 feet deep. Near the shore, composite samples were planned from sediments between 3 and 6 feet. The characterization of the dredge area into areas of high ranking and low-moderate ranking were based on the preliminary testing results and the demonstration that as you move away from the fuel pier, contamination of the sediments decreases.

The nature of the sediment in the proposed area is such that native alluvial material covers consolidated glacial material. The plan discusses that fact that it is not expected that contaminants will be present in the consolidated material because it has not been disturbed by man's activities and thus has little potential for contamination by the contaminants (organics) previously observed at the site. The 0-3 ft cut for the vertical sampling depth was based on the expected depth of the alluvial material. The plan also assumed that any contamination is limited to the surface since the site does not appear to have rapid deposition. Verification of the assumption that only the upper layer of the native sediments are likely to be contaminated would be accomplished by testing of those samples collected at 3-6 feet. Chemical testing was proposed for only organics as they were the parameters that exceeded ML2 in the preliminary sampling done by Entranco. The plan also proposed amphipod bioassays for the biological testing, based on the fact that the preliminary sampling indicated exceedance of the SL's by several parameters and therefore biological testing would be required. Bivalve larvae bioassays were not proposed because the Puget Sound protocol criteria of 70% larval survival in controls cannot be met at the time of year testing is being proposed (winter).

The applicant's proposed plan was discussed. Consensus among the PSDDA agencies was reached on the following:

(1) All agreed that it was reasonable to assume based on the existing sediment chemistry data that the area indicated as A on figure 3 would be considered as having a low-moderate ranking.

(2) that due to the nature of the sediments, 0-3ft. could be considered equivalent to the 0-4 ft. surface layer depth used in PSSDA;

(3) that areas B and C would be ranked as having a high potential for contamination.

Additional data was requested of the applicant to include the dredge plan and the full text of the preliminary testing data and geotechnical report. Following receipt and review of that information, the agencies would draft their views of an appropriate sampling plan for discussion with the Navy.

5. <u>Review of Information.</u> The information requested of the applicant was provided to the PSDDA agencies during the week of September 5. The dredge plan and quantities were based on a 35% design, and it is possible that the final plan could change which may affect the sampling plan. Corps of Engineers staff reviewed the data for its adequacy in meeting the requirements of PSDDA. The following is the result of that review:

Parameter	Analyzed Previously	Reason to Believe not Necessary now	Necessary	Reason
Pesticides	Yes	Yes	No	REF:Entranco87 -well below SLs -largely sand -No history of use.
PCB	Yes	Yes	No (Note: EPA ?)	REF:Entr.,87 -well below SLs -largely sand -No history of use
Metals	Some	No	Yes	REF: Entr,87 -not all sampled -not as many # of samples as required by PSDDA -mercury suspect (close to SL)
Conventionals	Most (except for ammonia)	No	Yes	REF: Entr,87 -important for amphipod bioassay evaluation -same for reference -had not done NH4
Organics	Some; not all	No	Yes	REF:Entr, 87 -not all done -problem with detection limits (Note EPTA: pages II-106-108)

The sampling plan proposed by the applicant includes analysis for conventionals (excluding ammonia) and organic analyses for LPAHs and HPAHs, since these are the two groups in which all detected contaminants occurred for the preliminary analysis. Amphipod bioassay was proposed for the biological testing. Method proposed was the use of a hammer driven core. Under PSDDA, the following acute biological testing would be required should the chemistry levels fall above SL, but below ML: Amphipod, Echinoderm (instead of oyster larvae bioassay), and Microtox. The juvenile bivalve test is currently on hold as a requirement until development of a protocol.

6. Sampling Plan. Per PSDDA guidelines, the following number of samples and analyses would be required for each of the areas shown on figure 3.

a. Area A. Ranked Low-Moderate.

Dredge Volume: 105,110 cubic yards.
surface:18,860 cubic yards
subsurface: 86,250 cubic yards

For full characterization:
Maximum volume of surface sediment represented by each sample = 8000 cy
Amount of surface sediment characterized by a single analysis = 32,000 cy
Maximum # of samples per surface analysis = 4

$\frac{18,860}{8000 \text{ cy}}$ = 3 samples

$\frac{18,860}{32000}$ = 1 analysis

Maximum volume of subsurface sediment represented by each sample = 8000 cy
Maximum volume of subsurface sediment sharacterized by a single analysis = 48,000 cy
Maximum number of samples per subsurface analysis = 6

$\frac{86,250}{8000}$ = 11

$\frac{86,250}{48,000}$ = 2

Summary for Area A:
0-3 feet: 3 samples composite for 1 analysis
Below 3 feet: 11 samples, composite 6 and 5 for 2 analyses
Total analyses for Area A = 3

b. Area B. Ranked High.

Dredge Volume: 22,820 cubic yards
surface:6,370 cy
subsurface: 16,450

For full characterization:
Maximum volume of surface sediment represented by each sample = 4,000 cy
Maximum volume of sediment represented by each analysis = 4,000 cy
Maximum number of samples per surface analysis = 1

$\frac{6,370}{4,000}$ = 2 samples

$\frac{6,370}{4,000}$ = 2 analyses

Maximum volume of subsurface sediment represented by each sample = 4,000 cy
Maximum volume of sediment represented by each analysis = 12,000 cy
Maximum number of samples per subsurface analysis = 3 samples

$\frac{16,450}{4,000 \text{ cy}}$ = 4 samples

$\frac{16,450}{12,000}$ = 2 analyses

Summary for Area B:
0-3 feet: 2 samples; 2 analyses
Below 3 feet: 4 samples composite 2 and 2 for 2 analyses
Total analyses for Area B = 4

c. Area C. Ranked High.

Dredge Volume: 54,000 cubic yards
surface: 20,900 cy
subsurface: 33,000

For full characterization:

Surface:

$\frac{20,900}{4,000}$ = 5 samples

$\frac{20,900}{}$ = 5 analyses

4,000

Subsurface:

$\frac{33,300}{4,000}$ = 8 samples

$\frac{33,300}{12,000}$ = 3 analyses

Summary for Area C:
Surface: 5 samples; 5 analyses
Subsurface: 8 samples composited 2, 2, and 3 into 3 analyses
Total analyses = 8

Total analyses for Areas A, B, and C = 15 (8 surface; 7 subsurface).

7 Modified Sampling Plan. Based on the following, it is proposed that the sampling plan described in paragraph 7 be modified to reflect what is known about the site:

*previous testing indicating contamination decreases as you move away from the existing fuel pier
*knowledge of the sediment characteristics (sandy nature of material; onsite observations and anticipated homogeneity of the material; soft surface layer of alluvial material underlain by a consolidated layer of glacial till)
*No reason to believe there is groundwater contamination at depth
*Low sedimentation rate in the proposed dredge area
*Likelihood of contamination at depth is not as great as at the surface
*Knowledge of site use

a. Area A. It is proposed that 2 surface samples be taken in Area A. These samples would be composited into 1 surface analysis. For the subsurface sampling, it is proposed that the material from the two samples be compositied and archived in the event that the results of the surface testing and onsite observations indicate that subsurface testing is warranted.

b. Areas B and C. The difference between paragraph 7 and the modified proposal is in the distribution of the analyses between Areas A and Areas B and C and between surface and subsurface. The modification in distribution is based on the previous testing results and geotechnical knowledge allowing us to better outline the suspected contaminated area. Refer to figure 3. In areas B and C, the following sampling program is proposed:

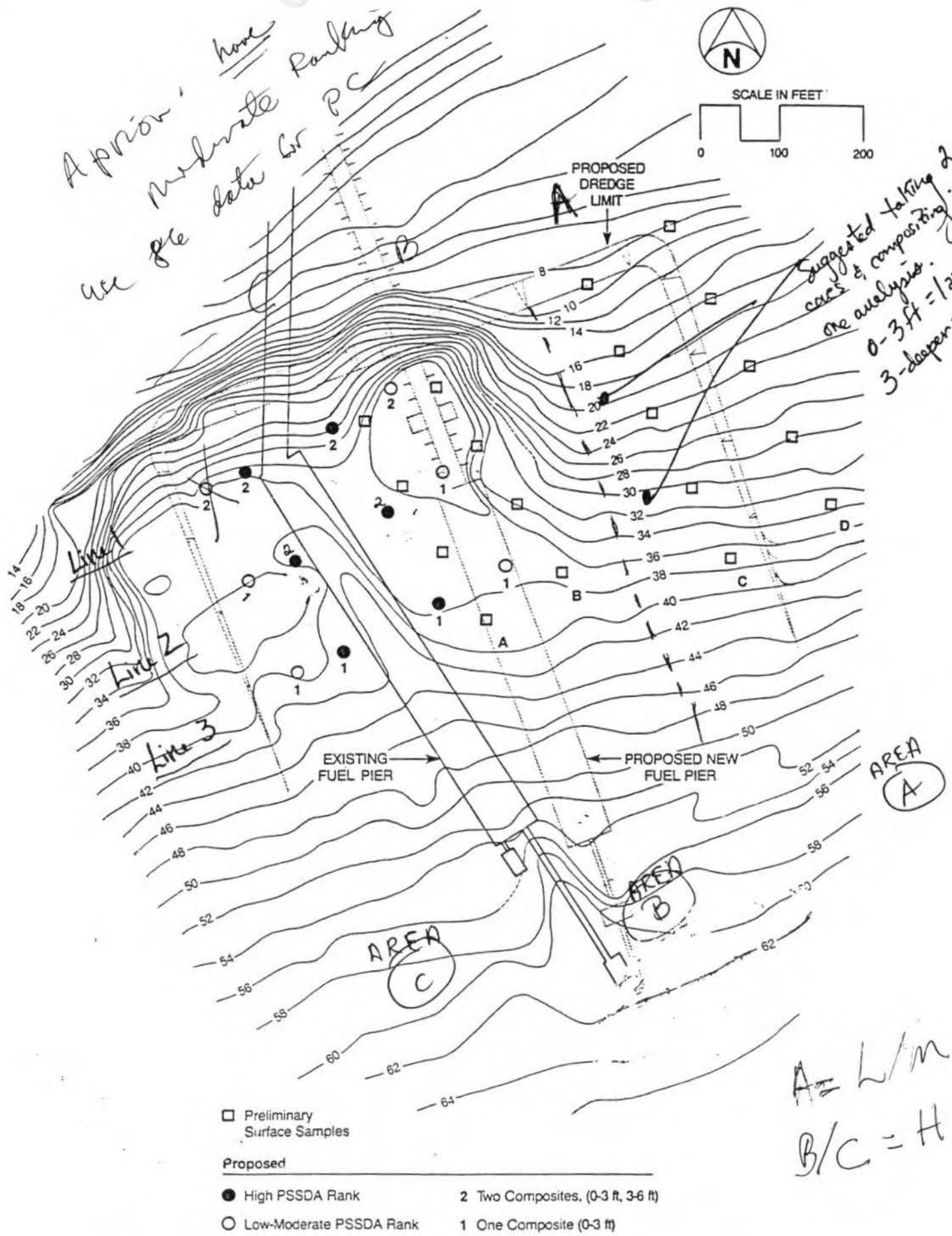


Figure 3. Preliminary and proposed sediment samples in proposed dredge area for reconstruction of fuel pier, Manchester.

(modified Plan)

October 31, 1988

MEMORANDUM

TO: Keith Phillips
John Malek
Dave Jamison
Dave Kendall
Fred Weinmann

SUBJECT: PSDDA Oyster Larave Acute Toxicity Test

FROM: Frank Urabeck

1. See attached revised pages of EPTA containing clarifications for the subject test based on recent discussions with you, Scott Becker (PTI), Peter Chapman (EVS) and others. We were experiencing problems with dredgers understanding how to handle our PSDDA "mortality" in checking the control, reference and dredged material sediments against the PSDDA guidelines. Under the clarification we will be computing both mortality and abnormality inaccordance with ASTM and PSEP protocols and then applying the PSDDA disposal guidelines:

- o Control sediments - unacceptable if mortality > 30% or if abnormality > 10%

- o Reference sediments - unacceptable if mortality > 20% (absolute) over control mortality or if abnormality > 20% (absolute) over control abnormality

- o Dredged material - unacceptable if mortality statistically significant relative to reference sediment (using "t" test and if mortality > 20% (absolute) over ~~reference~~ control sediment mortality) and at least one other bioassay is statistically significant relative to reference or if mortality is > 30% (absolute) over reference mortality if this is the only bioassay that is statistically significant.

  - unacceptable if abnormality statistically significant relative to reference sediment and at least one other bioassay is statistically significant relative to reference or if

enclosure 3

abnormality is > 30% (absolute) over reference abnormality if this is the only bioassay that is statistically significant.

2. Per Beaker (10/28/88) doing more than one aliquot for reference and dredged material mortality check is unnecessarily expensive and is not reasonable to require. In most cases the abnormality determination will control anyway.

3. Please call me by COB Wednesday (Nov 2, 88) if you have objections to the above clarification. Receiving none, I will put this out for regulatory and planning usage. We have projects in the pipeline right now so that it is urgent that we have agreement now. Thanks.

cc: Wakeman
Krueger
Scott Becker
file:a:oysl

DA 15

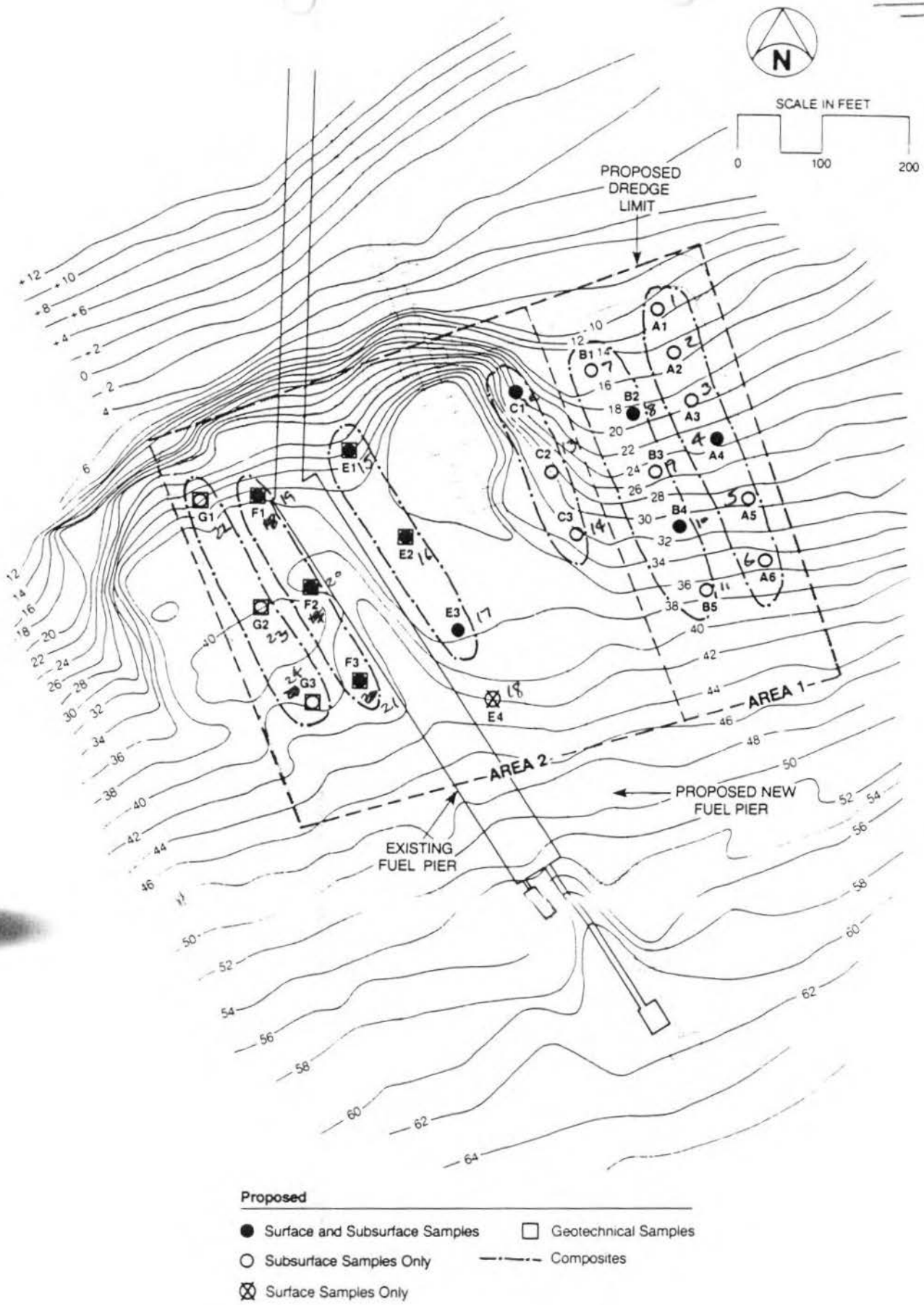


Figure 1. Site map of Manchester Fuel Pier indicating dredge area and locations of core sampling stations.

DAIS

US Navy Manchester
Alias list

Lab Samples:

				volume
	S1	=	C1-03	3409
	S2	=	~~C-36~~ E1-03	3409
	S3	=	~~E1-03~~ E2-03	3409
	S4	=	~~E2-03~~ E3-03	3409
	S5	=	~~E3-03~~ E4-03	3409
	S6	=	F1-03	3409
	S7	=	F2-03	3409
	S8	=	F3-03	3409
L/M	C1	=	A-36	43,125
	C2	=	B-36	43,125
L/M	C3	=	AB-03	18,860
High	C4	=	C-36	12,363
	C5	=	E-36 ~~subsurface~~	12,363
	C6	=	F-36	12,363
	C7	=	G-36	12,363

ampling Stations:

A1=1	B1=7	C1=12	E1=15	F1=19	G1=22
A2=2	B2=8	C2=13	E2=16	F2=20	G2=23
A3=3	B3=9	C3=14	E3=17	F3=21	G3=24
A4=4	B4=10		E4=18		
A5=5	B5=11				
A6=6					

36 (subsurface)
03 (surface)