



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

7272 Cleanwater Lane, LU-11 • Olympia, Washington 98504 • (206) 753-2353

M E M O R A N D U M  
May 9, 1984

To: Bill Yake  
From: Joe Joy   
Subject: Eagle Harbor Investigations: Project Proposal

Introduction

As you are well aware, the current interest in Eagle Harbor centers around a group of sediment and fish samples collected and analyzed by National Marine Fisheries (NMFS) staff directed by Dr. Malins (Figure 1). The findings of Dr. Malins' staff were simultaneously reported in a March 17 letter to Dr. Gary O'Neal of the U.S. Environmental Protection Agency and the public press. Dr. Malins' letter stated that the sediment from Eagle Harbor contained elevated levels of polynuclear aromatic hydrocarbons (PAHs) and indications of the presence of carbazole, dibenzofuran, and pentachlorophenol (Table 1). The fish had an unusually high occurrence of hepatic lesions, and their bile contained elevated concentrations of benzo(a) pyrene metabolites.

Subsequent to Dr. Malins' letter, public meetings were held in Winslow; the Kitsap County Health Department (KCHD) posted Eagle Harbor against the taking of fish and shellfish; and WDOE, EPA, and NMFS planned and pursued further investigations in the harbor.

I have constructed a proposal for the investigation of environmental problems in Eagle Harbor, as was directed in the April 9 memorandum from Dick Cunningham to John Bernhardt (Attachment A). As was noted in that memorandum, the WDOE and EPA project activities were already underway and "moving very fast" when I was given the project. Objective tasks have been graphically presented to clarify timing questions (Figure 2).

Project Objectives

In the April 9 memorandum, the objectives for the coordinated monitoring effort by WDOE and EPA were set. The objectives stated were:

- "1. To determine the extent of subtidal sediment contamination in Eagle Harbor.

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2. Determine the extent of shellfish contamination.
3. Determine the extent of intertidal sediment contamination.
4. Determine if any commercial operations are presently contributing to the deposition of creosote-type sediment material identified by Dr. Malins."

By prior agreement, EPA would be responsible for Objective 1, while WDOE would undertake the remaining objectives. It was further stated in the April 9 memorandum that any tasks to attain these objectives "should be designed with the proposed WYCOFF scope of work in mind." A copy of the WYCOFF environmental survey proposal is attached (Attachment B).

Tasks to meet these objectives were also roughly laid out in the April 9 memorandum and the EPA study proposal and plan formulated by Dan Tangarone (Attachment C). These tasks are reiterated or refined under specific objectives below.

#### Objective 1: Subtidal Sediment

As mentioned above, this objective was delegated to EPA and has been covered in their proposal which is briefly described below.

##### Task 1: Sample Collection and Analysis

The top six inches of sediment taken by a VanVeen dredge will be composited for a sample at each of 41 subtidal stations located throughout Eagle Harbor (Attachment C - Figure 1).

The samples will be sent to an EPA contract laboratory for the following analyses: base-neutrals, acid extractables, pesticides, PCBs, total PNA, carbazole, dibenzofuran, metals, sulfides, TOC, grain size, and percent solids. Selected samples will be analyzed for TCDD. Low-range detection limits will be used for all analyses.

##### Task 2: Quality Assurance and Quality Control (QA/QC)

Quality assurance and quality control will be performed by EPA-Manchester or their designate after receiving analytical results.

##### Task 3: Data Reporting

EPA will summarize data and discuss any obvious data trends. WDOE will use subtidal sediment data as it relates to findings in Objectives 2 and 4.

## Objective 2: Shellfish

### Task 1: Sample Location, Collection, and Analysis

Nine collection stations have been selected after consulting Don Miles of KCHD, Al Scholz of Washington Department of Fisheries (WDF), Dan Tangarone of EPA, and various Bainbridge Island residents (Figure 1). Station numbers for eight of these coincide with the intertidal stations planned by EPA (Attachment C - Figure 1). The ninth station (#0) will be a control station located near Port Blakely, 1.7 miles south of Eagle Harbor (Figure 1).

Butter clams (Saxidomus giganteus), native littleneck clams (Protothaca staminea), and Japanese littleneck clams (Venerupis japonica) will be the primary species collected. If these are not found in sufficient numbers, horse clams (Tresus capax) will also be used. Enough clams for a minimum of 100 gms of sample will be collected. A geoduck (Panope generosa) may also be collected in the vicinity of EPA sediment station 9 (Attachment C - Figure 1).

Clam samples will be transported on ice to the EPA/WDOE laboratory at Manchester. Clams will be shucked fresh from the shell and composited. Whole meats of primary species will be used, but only adductor muscle, neck, foot, and mantle of horse clams and geoducks will be used. The number of individuals per species, total number of clams, and total sample weight will be noted for each composited sample.

Samples will be analyzed for the following compounds and parameters: base/neutrals, acid extractables, PCBs, dibenzofuran, carbazole, lead, mercury, cadmium, arsenic, chromium, zinc, nickel, percent solids, and percent lipids (Attachment D).

### Task 2: Quality Assurance and Quality Control (QA/QC)

Quality assurance and quality control will be performed by WDOE personnel at Manchester.

### Task 3: Literature review and Agency Inquiries

Initial literature searches and inquiries to other agencies are planned while awaiting shellfish sample results. Some topics to be researched are: typical and non-typical PAH and pollutant concentrations in shellfish; pollutant metabolism and uptake in shellfish; human health hazard of PAH, phenol-related compounds, etc.; and biological factors influencing accumulation of pollutants in shellfish. Researchers in various agencies such as NMFS and WDF will be contacted for current applicable research data.

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Task 4: Data Reporting

WDOE will present data and discuss salient points. This task will be described in more detail below.

Objective 3: Intertidal Sediment

Task 1: Sample Collection and Analysis

Eight intertidal sediment samples will be collected during the shellfish collection at the stations in Eagle Harbor. Samples will be given to EPA to be sent with the subtidal samples to the EPA contract laboratory. Samples will be analyzed for the same compounds and parameters as was described above for subtidal sediments, except that no intertidal samples will be analyzed for TCDD.

Task 2: Quality Assurance and Quality Control (QA/QC)

Quality assurance and quality control will be performed as described for subtidal sediment.

Task 3: Literature Search and Agency Inquiries

Concurrent to the literature search and inquiries made for shellfish, information on sediment will also be collected.

Task 4: Data Reporting

EPA will include intertidal data in their subtidal sediment report. WDOE will use intertidal data as they relate to findings in Objectives 2 and 4.

Objective 4: Current Commercial Operations

Task 1: Facilities Tour

A tour of the WYCOFF plant, the Washington State Ferries maintenance facilities, and the Standard Oil Sales storage facility will be made with WDOE Northwest Regional Office personnel, Dave Wright and Craig Baker. The purpose of the tour will be to familiarize ourselves with current plant operations and identify any practices contributing to the problem in Eagle Harbor. Also, inquiries will be made to facilities operators concerning the history of their respective sites and past practices at those sites.

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#### Task 2: Historical Review

A review of pertinent agency files and related documents will be made. These documents will include, but not be limited to Corps of Engineers permits, past facilities inspection reports, oil spill and fishkill reports, and past water quality survey reports.

#### Task 3: Additional Inspections

An additional visit to Eagle Harbor facilities or communication with facilities operators will be made if questions arise after completing Task 2.

#### Task 4: Report Findings

WDOE will include findings from these tasks in a written report. This will be discussed in detail below.

#### Schedule of Tasks and Reporting

The scheduling of objective tasks is graphically presented in Figure 2. The schedule shows estimated task completion dates under ideal and non-ideal situations. The non-ideal situations center around the sample analysis and quality assurance tasks of Objectives 1 and 3. The time required for these tasks is often highly variable, and this affects completion of subsequent tasks.

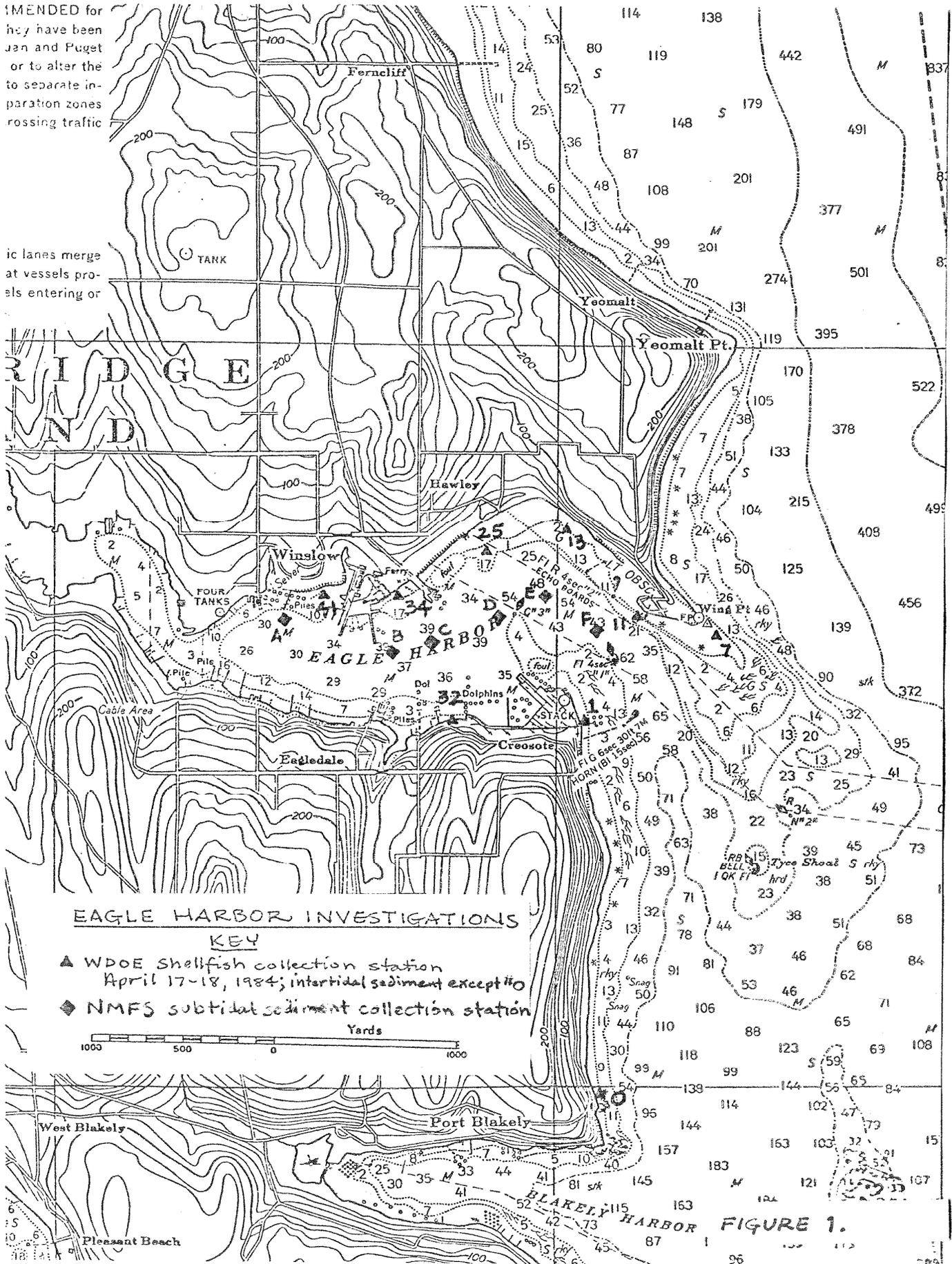
If ideal completion dates for sample analyses and QA/QC are met, all WDOE and EPA reports should be finished by the end of June. If these tasks are delayed, especially for the EPA contract laboratory sediment results, reports or portions of reports discussing those data may not be completed until Fall, 1984. If the latter situation should happen, and the shellfish results are back from Manchester by the end of May, a report will be completed by WDOE of the shellfish data and the findings related to Objective 4 by the end of June. This report will be designed to stand independently and/or be combined with a later report addressing all of the WDOE objectives.

The final WDOE report will have the following sections: Introduction; Methods; Results; Discussion; Conclusions; and Recommendations. Briefly, the Introduction and Methods sections will be standard--who, what, where, why, how. The Results section will present shellfish, intertidal sediment, and subtidal sediment data in independent tables.

The length of the Discussion section will be limited, with the thought of getting the report out in a timely manner. The most important areas to be covered will be an evaluation of the extent of shellfish and sediment contamination. The discussion will center on analytical results from the shellfish

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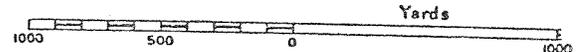
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**EAGLE HARBOR INVESTIGATIONS**

**KEY**

- ▲ WDOE Shellfish collection station  
April 17-18, 1984; intertidal sediment except #10
- ◆ NMFS subtidal sediment collection station



**FIGURE 1.**

# EAGLE HARBOR PROJECT

## OBJECTIVE

1. SUBTIDAL SEDIMENT
  - └─ EPA sampling
  - └─ Planned analyses and QA, QC of samples
  - └─ Possible analysis and QA, QC of samples
  - └─ Planned report writing (EPA)
  - └─ Possible report writing (EPA)
  
2. SHELLFISH
  - └─ WDOE sampling
  - └─ Planned analyses and QA, QC at Manchester
  - └─ Literature search
  - └─ Report writing for shellfish only (WDOE)
  - └─ Possible 2nd report or chapter to include sediment (WDOE)
  
3. INTERTIDAL SEDIMENT
  - └─ WDOE sampling
  - └─ Planned analyses and QA, QC of samples
  - └─ Literature search
  - └─ Possible analyses and QA, QC of samples
  - └─ Planned WDOE and EPA report writing
  - └─ Possible EPA reporting or 2nd report or chapter by WDOE
  
4. COMMERCIAL OPERATIONS
  - Wycoff and Washington State Ferries facilities tour
  - Review of files and documents
  - Pertinent materials included in report with shellfish



FIGURE 2

Table I.  
Concentrations of aromatic compounds in sediment samples, ng/g (ppb) dry weight.

Sample #	EGH-A		EGH-B		EGH-C		EGH-D		EGH-E		EGH-F		SFIIE	
	2-36	2-37	2-38	2-39	2-40	2-41	2-42	2-43	2-44	2-45	2-46	2-47	2-48	2-49
1-Propyl Benzene	< 2.0	< 15	< 11	< 20	< 5.3	< 4.2	< 2.5	< 2.5	< 2.5	< 4.2	< 2.8	< 2.8	< 2.8	< 2.8
n-Propyl Benzene	< 2.0	< 15	< 11	< 20	< 5.5	< 4.4	< 2.6	< 2.6	< 2.6	< 4.4	< 2.8	< 2.8	< 2.8	< 2.8
Indan	2.7	< 14	< 10	250	5.4	< 4.2	< 2.4	< 2.4	< 2.4	< 4.2	< 2.6	< 2.6	< 2.6	< 2.6
1,2,3,4-Tetraethylbenzene	< 2.5	< 14	< 9.7	26	< 4.8	< 4.3	< 2.3	< 2.3	< 2.3	< 4.3	< 2.5	< 2.5	< 2.5	< 2.5
Naphthalene	98	220	310	9000	270	44	44	44	44	8.9	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(b)fluorene	5.6	< 16	19	470	14	< 2.7	< 2.7	< 2.7	< 2.7	< 5.1	< 3.0	< 3.0	< 3.0	< 3.0
2-Methyl Naphthalene	28	55	86	5400	73	8.2	8.2	8.2	8.2	< 3.5	< 2.0	< 2.0	< 2.0	< 2.0
1-Methyl Naphthalene	16	30	43	5500	37	4.4	4.4	4.4	4.4	< 3.5	< 1.9	< 1.9	< 1.9	< 1.9
Biphenyl	16	29	38	590	33	2.4	2.4	2.4	2.4	< 1.7	< 2.0	< 2.0	< 2.0	< 2.0
2,6-Dimethyl Naphthalene	9.5	29	39	2300	36	< 1.9	< 1.9	< 1.9	< 1.9	< 1.8	< 2.1	< 2.1	< 2.1	< 2.1
Acenaphthene	34	53	34	22000	98	5.3	5.3	5.3	5.3	< 1.9	< 2.1	< 2.1	< 2.1	< 2.1
2,3,5-Triethyl Naphthalene	< 2.0	< 11	< 7.4	1800	< 3.8	2.7	2.7	2.7	2.7	< 1.5	< 2.1	< 2.1	< 2.1	< 2.1
Fluorene	45	119	170	26000	140	19	19	19	19	34	< 2.2	< 2.2	< 2.2	< 2.2
Dibenzothiophene	29	92	120	9500	39	12	12	12	12	< 2.1	< 2.2	< 2.2	< 2.2	< 2.2
Phenanthrene	130	600	700	76000	470	73	73	73	73	150	< 1.7	< 1.7	< 1.7	< 1.7
Anthracene	65	350	570	25000	220	100	100	100	100	150	< 1.7	< 1.7	< 1.7	< 1.7
1-Methyl Phenanthrene	9.5	71	51	3400	36	7.7	7.7	7.7	7.7	< 1.5	< 1.6	< 1.6	< 1.6	< 1.6
2,5-Dimethyl Phenanthrene	3	27	30	1000	< 3.1	< 1.5	< 1.5	< 1.5	< 1.5	7.3	< 1.7	< 1.7	< 1.7	< 1.7
Fluoranthene	180	1200	1400	59000	770	94	94	94	94	220	< 1.6	< 1.6	< 1.6	< 1.6
Pyrene	240	1600	1800	32000	800	140	140	140	140	33	< 1.6	< 1.6	< 1.6	< 1.6
Benzo(a)anthracene	99	820	1100	9300	370	200	200	200	200	71	< 2.6	< 2.6	< 2.6	< 2.6
Chrysene	160	1400	2200	11000	690	450	450	450	450	140	< 3.1	< 3.1	< 3.1	< 3.1
Benzo(g)fluoranthene	190	900	1200	2400	250	150	150	150	150	100	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(e)pyrene	85	760	1200	3300	300	210	210	210	210	42	3.6	3.6	3.6	3.6
Benzo(a)pyrene	58	740	940	2300	240	210	210	210	210	41	< 2.6	< 2.6	< 2.6	< 2.6
Ferylene	18	190	270	530	64	45	45	45	45	17	< 2.1	< 2.1	< 2.1	< 2.1
Indeno(1,2,3-cd)pyrene	42	400	520	480	110	100	100	100	100	30	< 3.0	< 3.0	< 3.0	< 3.0
Dibenz(a,h)anthracene	11	120	190	300	37	30	30	30	30	8.3	< 3.0	< 3.0	< 3.0	< 3.0
Benzo(k)fluoranthene	37	330	470	640	160	94	94	94	94	23	5.2	5.2	5.2	5.2
Sample Weight (g)	20.00	20.00	20.00	20.05	20.02	20.01	20.01	20.01	20.01	20.03	20.01	20.01	20.01	20.01
% Dry Weight	78.07	51.72	51.83	63.34	74.92	79.65	78.29	67.24	67.24	78.29	67.24	67.24	67.24	67.24
Recovery of 03 Naphthalene	93%	77%	61%	100% c	65%	96%	72%	96%	96%	72%	96%	96%	96%	96%
Recovery of 010 Acenaphthene	93%	72%	56%	100% c	75%	84%	79%	84%	84%	79%	84%	84%	84%	84%
Recovery of 012 Ferylene	71%	64%	52%	100% e	75%	78%	77%	78%	78%	77%	77%	77%	77%	77%

a The concentrations of compounds above biphenyl were calculated using 03 naphthalene as internal standard, the concentrations of compounds below pyrene using 012 ferylene, and the remainder using 010 acenaphthene.

b The less than symbol (<) indicates that the chemical was not detected and that the value is the detection limit.

c Recovered results too small to estimate recovery percentage.

e Recovered results too small to estimate recovery percentage.



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M E M O R A N D U M

April 9, 1984

To: John Bernhardt  
From: Dick Cunningham  
Subject: Eagle Harbor

A meeting was held at the Northwest Regional Office on April 2 with Bill Schmidt and Dan Tangarone of EPA, Bob McCormick, Stew Messman, and Dave Wright of the Northwest Regional Office, and Bill Yake and myself to discuss our strategy toward the Eagle Harbor problem. Since our strategy options were limited by previous commitments of a videotape survey on or about April 10 and an environmental sampling survey the week of April the 16th, the meeting focused on activities relative to these anticipated surveys.

Two documents were given to us by EPA at the meeting. An Ecology and Environment, Inc. document identified past and present industrial/municipal activities at Eagle Harbor. A second document is a scope of work for an environmental investigation of the WYCKOFF property and adjacent areas. The scope of work will be carried out in three to six months by WYCKOFF required by the Criminal Investigations Division (CID) of EPA. For your information, the CID is pursuing actions unrelated to Malins' findings and our followup videotape on environmental investigations. We were told by Bill Schmidt that our study should be designed with the proposed WYCKOFF scope of work in mind (which could be expanded, possibly because of Malins' or our findings), and we should use care not to duplicate the future WYCKOFF investigation.

During our discussion, it was brought out that an additional report might be available from the files of Jim Willmann of EPA. Dan Tangarone will attempt to get copies of this for himself and for us.

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The objectives of the EPA and WDOE studies will be:

1. To determine the extent of subtidal sediment contamination in Eagle Harbor.
2. Determine the extent of shellfish contamination.
3. Determine the extent of intertidal sediment contamination.
4. Determine if any commercial operations are presently contributing to the deposition of creosote-type sediment material identified by Dr. Malins.

The first objective would be accomplished primarily by EPA. A scope of work would be developed by Dan Tangarone. Station selections and the interpretive report will be conducted by EPA. Comment will be provided by WDOE as requested. Specific design elements will include the following:

1. Using an EPA boat/equipment, a VanVeen grab sampler will be used initially to define areal sediment contamination. Samples will be collected and visually inspected for signs of contamination. Of the samples collected, 35 to 40 will be retained for chemical analysis.
2. Chemical analysis will include primarily base/neutral and acid extractable priority pollutant groups. Additional compounds would include carbazole and dibenzofuran, PCB, pesticides, and dioxin on selected samples. Other parameters would include TOC, sulfides, grain-size, and percent solids.
3. Using a large U of W boat, a followup survey may be conducted to collect six to eight core samples.
4. Sample analysis would be conducted by an EPA contract lab.

The second objective to determine shellfish contamination will be conducted by WDOE. The scope of work, sample collection, and data reporting will be the responsibility of Art Johnson and Joe Joy. Information as to the type of organisms (probably mussel and clam) and sample stations would be selected after communication with Kitsap County Health Department. Specific design elements would include:

1. Approximately 10 sample composites which would include both background samples and other samples within Eagle Harbor.
2. Samples will be analyzed at the EPA Manchester lab.

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Objective three to determine intertidal sediment contamination will be the responsibility of Art Johnson/Joe Joy. Specific design elements would include:

1. Samples near the commercial facilities of WYCKOFF Company and the ferry maintenance terminal.
2. Additional samples may be collected (possibly in public use areas) after discussions with EPA.
3. Samples will be turned over to EPA for analysis by their contract lab.

Objective number four also will be the responsibility of Art Johnson and Joe Joy, with assistance from Dave Wright of the Northwest Regional Office. On-site inspections will be conducted at WYCKOFF and the ferry maintenance terminal with a review and possibly on-site inspections of Diesel (Standard) Oil Sales, and the Winslow Ferry Terminal. The purpose of these on-site inspections will be primarily to determine if creosote-related compounds are now coming from these industrial sites. Specific design elements would include:

1. Review existing practices at suspect facilities.
2. On-site inspections and sampling, as necessary.
3. Review of appropriate agency files.

The WDOE schedule will be approximately as follows:

1. Participation in DNR video survey on or about April 10.
2. Inspections, as appropriate, with Dave Wright at the above-mentioned sites.
3. Participation in a subtidal sediment survey conducted by EPA during the week of April 16.
4. Conduct shellfish survey at an early opportunity.
5. Conduct an intertidal sampling survey as soon as possible after EPA subtidal survey. (Intertidal samples must be joined with EPA samples and shellfish samples.)

As with other intensive surveys, this WDOE investigation will involve a project proposal for review by management staff. It is understood that some phases of the survey will already be underway before the proposal is completed.

SOIL AND GROUND WATER SURVEY PROPOSAL  
WYCKOFF CO., BAINBRIDGE ISLAND

I. INTRODUCTION

The Wyckoff Co., wood preserving facility at Eagle Harbor, Bainbridge Island has treated timbers with the following oil based preservatives: pentachlorophenol dissolved in an aromatic oil, creosote, and a creosote fuel oil mixture. Over a period of years, oily wastes and creosote have escaped from containment and has contaminated the site. The purpose of this proposal is to survey the site for contamination and estimate the quantity, type, and location of wastes in the soil, ground water, and the volume of creosote sludge in the storage tanks. Observation wells will be installed, samples of soil and ground water will be obtained and analyzed. Tidal flushing actions and ground water gradients will be determined.

II. REVIEW OF EXISTING INFORMATION

Review technical site studies and company records of site operation to guide the development of survey plans. Specifically, information sought will be the location and depth of waste materials in the soil, sludge disposal history, ground water hydrology, and abandoned burial sites.

III. PLAN DEVELOPMENT

On the basis of the historical review and preliminary site inspections, develop detailed survey plans for the site. Such plans may deviate from the guidelines of this proposal if adequate justification is found and formally approved. Detailed study plans are to be presented to EPA for comment and approval before beginning the survey.

IV. OFF-SHORE SEDIMENTS

Bottom samples will be taken at approximately 50 foot intervals from the off-shore area surrounding the plant site. Core samples shall be taken to determine the depth of the deposits and define the contaminated area. Emphasis should be placed on sediments in the vicinity of the creosote dock where barge unloading took place. The former wet grading area for floating timber grading and storage should be investigated for creosote deposits in addition to all boomed areas.

V. TIDAL BEACHES

Assess all beaches exposed at low tide for evidence of creosote and oily waste seepage. Determine the location and thickness of such waste deposits by core samples or test pits to assess waste seepage.

*Was this survey ever completed  
J. Parkman*

## VI. TANK FARM AND PROCESS AREA

Formulate a plan to survey waste in the tank farm and process areas for contamination in the soil and ground water, and to estimate the volume of creosote sludge in the creosote storage tank and in other tanks. The survey plan will include the following elements:

1. Test borings.
2. Installation of wells.
3. Sampling soil and ground water.

Determine ground water conditions:

1. Determine soil types and depth of contaminated soil.
2. Install a control well to measure background chemistry and ground water elevation.

### A. Test Hole Protocols

Test holes will be drilled by hollow stem auger to the bottom of the contaminated soil. Approximate locations are shown in Figure 1. Test holes should be augered at all locations where waste sludge might have been buried. The cuttings should be examined for oily residue. A composite soil sample will be prepared for each 3 feet of depth and properly preserved for analyses. The survey plan should justify any changes in the locations of test holes. Geotechnical logs will be prepared for each augered site with observations of residues noted.

### B. Well Protocols

At least one background well will be installed upstream (South) of the tank farm and storage area, at the foot of the hill.

The survey plan will specify the completion of monitoring and observation wells in some test holes for water samples and measurement of ground water elevations. The plan may specify completion of some wells for sampling heavy waste liquids and also for sampling floating oil if multi phases are encountered.

Ground water elevations will be measured and tidal effects will be determined. If waste oil layers are found they will be collected for chemical analysis.

### C. Storage Tanks

Sludges in creosote storage tanks as well as any other accumulated sludges in tanks will be measured to estimate sludge volume. If possible the volume of sludge will be verified using chemical

or physical tests for identification and instrumentation or pumping tests to determine the sludge levels.

VII. TIMBER GRADING AND STORAGE AREA

Develop a plan to assess soil and ground water contamination at the timber stack storage area. The plan will include the following:

1. Install at least one background well to establish background ground water quality.
2. Install at least 2 monitoring wells in stack area obtaining soil and ground water samples.
3. Bore or excavate test holes to estimate the depth and concentrations of contamination. If grading of fill has occurred, the test holes should be sufficiently deep to evaluate former surfaces of graded soil.
4. If historical evaluation shows the possibility that waste has been buried in this area test holes will be bored through all suspected burial sites.

VIII. ANALYSES REQUIRED

Samples will be analyzed for full priority pollutant scans covering the acid extractables and base-neutral extractable compounds. The scans should be performed by Gas Chromatography/Mass Spectrometry

IX. QUALITY ASSURANCE

Quality Assurance protocols will be described in depth to insure that the following considerations are made:

1. Technical quality assurance, including detailed descriptions of sampling techniques, equipment to be used, field decontamination, procedures for controlling cross contamination and approaches to insure steady state sampling.
2. Analytical quality assurance, including methods to insure laboratory accuracy and precision, field controls including blanks, transfer blanks, and transport controls.
3. Proper handling of sampling spoils to include provisions to insure proper disposal of hazardous cuttings in accordance with RCRA requirements. Of specific concern are well cuttings and purged well bore water.

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#### QUALITY ASSURANCE

Quality Assurance protocols will be described in depth to insure that the following considerations are made:

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3. Proper handling of sampling spoils to include provisions to insure proper disposal of hazardous cuttings in accordance with RCRA requirements. Of specific concern are well cuttings and purged well bore water.



O WELL LOCATION  
 X OFF SHORE CORE  
 ■ SOIL SAMPLE

DOCK

DOCK

EAGLE

HARBOR

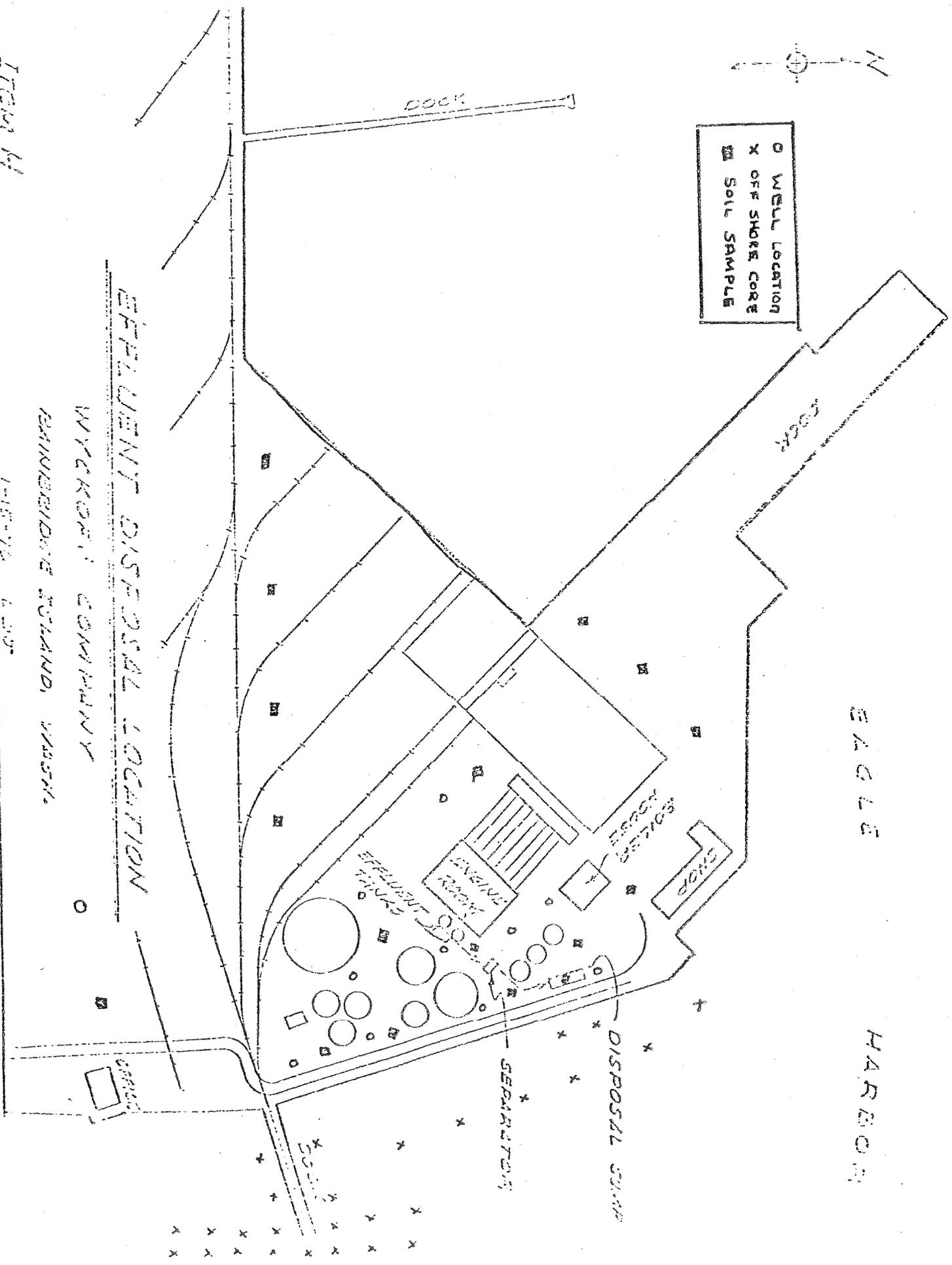
EFFLUENT DISPOSAL LOCATION

WYCKOFF COMPANY

RAINIER ISLAND, WASH.

TRIM #1

1-15-76 6:30P



DISPOSAL TANK

SEPARATOR

WYCKOFF COMPANY

EFFLUENT TANK

SEWAGE TANK

RAINIER ISLAND

Joy

STUDY PROPOSAL AND QUALITY ASSURANCE PLAN

EAGLE HARBOR SEDIMENT SURVEY

EPA Region 10, Field Operations Section

Approvals:

Project Officer: Dan Tangarone Dan Tangarone Date 4-11-84

QA Officer: Barry Towns W. B. Towns Date 4/11/84

Supervisor: Bill Schmidt William B. Schmidt Date 4/12/84

Project Code: TEC-097A

Account No: TFA10PA00

RECEIVED

APR 16 1984

Department of Ecology  
Southwest District Office

1. PROJECT ORGANIZATION / RESPONSIBILITY

Project Officer	Dan Tangarone
QA Officer	Barry Towns
Field Operation	Dan Tangarone, EPA, ESD Mike Matta, EPA, ESD Joyce Crossen, EPA, ESD Joe Joy, DOE Art Johnson, DOE
Laboratory	Contract
Clam Collection	Joe Joy, Art Johnson, DOE
Tissue Analysis	EPA
Data Verification	Dr Joe Blazeovich
Data Summarization	Field Operations Section

2. PROJECT DESCRIPTION

A. OBJECTIVE / SCOPE

Sediment and fish samples obtained by NOAA during recent studies in Eagle Harbor have indicated high contamination levels of Polynuclear Aromatic Hydrocarbons (PNA) in a location not far from a long established cresote operation. Several English sole were dissected and more than 85% were found to have tumors. The current survey will attempt to widely sample all areas of Eagle Harbor with additional emphasis on locations around the Wyckoff plant and the Washington State Ferry dock and repair facility.

Fifty (50) sediment sampling locations have been proposed in Eagle Harbor as shown on Figure 1. Samples will be collected on April 17, 18 & 19, 1984 by Van Veen dredge from the EPA boat. Several stations (1, 7, 11, 13, 25, 34, 32, 41, 42) will be located in inter-tidal, shallow water and thus serve as an indicator of sediment conditions in shellfish inhabited areas.

Joe Joy and Art Johnson, DOE, will collect approximately 10 composite clam samples and sediments from locations in the vicinity of proposed stations 1, 7, 13, 25, 34, 41, and 32 in the intertidal areas on Tuesday. Two way radios will be used for communication between the shore and boat. Adjustment of the shore transponders for the mini-ranger may be possible by the shore crew. From discussions with the EPA laboratory, approximately one to two dozen clams should be collected. Clams should be placed into glass jars and kept on ice. Cleaning and preparation of the clams will be done at the lab.

B. PROJECT SCHEDULE / MILESTONES

TV Camera Reconnaissance	4/10/84
Van Veen Dredge Sampling	4/17-19/84
Clam and Intertidal Sediments	4/17/84
Sample Shipment	4/23/84
EPA Analyses Complete By	5/10/84
Contract Analyses Complete By	5/25/84
Data Quality Assurance Review By	5/30/84
Data Summarization By	6/15/84

C DATA USAGE

Data will be used to determine the extent of sediment and clam contamination in Eagle Harbor with emphasis on the Wyckoff plant location, the Ferry Terminal Repair Yard, and certain intertidal areas.

D SAMPLE COLLECTION

Sediments other than at intertidal locations will be obtained by use of a Van Veen Stainless Steel dredge. [Intertidal locations will be sampled using a shovel which will be rinsed with ambient Eagle Harbor water prior to use. The top 6 inches will be composited and placed into 16 oz glass jars with teflon lined lids using a clean stainless steel spatula. The same spatula will not be used for more than one sample. Two jars will be required at each location for analysis of:

<u>Organics</u>	Base-Neutrals, Acid Extractables, Pesticides,
	PCB, Total PNA, Carbazole & Di-Benzo-Furan
<u>Inorganics</u>	Metals, Sulfides, TOC, Grain Size, % Solids

In addition, at approximately ten stations, an additional sample jar will be obtained for analysis of TCDD (Dioxin).

Organic and Inorganic Traffic Reports (OTR & ITR) will be completed for all Base-Neutral/Acid samples. A Packing list will be used for transport of the 10 TCDD samples. The Case Number (2645) and SAS No 1047J will be shown on the Traffic reports. The peel-off labels will be applied to each sample. All required documentation will be completed at each site before collection of additional samples. Samples will be segregated according to destination laboratory. Organics will be shipped via Federal Express to \_\_\_\_\_  
Inorganics will be shipped to \_\_\_\_\_. TCDD samples will be shipped to \_\_\_\_\_. Shipment will occur on 4/23.

Samples will be shipped as medium level environmental samples requiring them to be packed in plastic bags inside paint cans with vermiculite. Packing and labeling will be as required by DOT regulations.

A Field Sample Data Sheet will be used to document sample location, EPA lab number, Project Code, Date, Time, OTR Number, ITR Number, Case Number 2645, SAS Number 1047J, and other pertinent information. Sample location will be documented by Mini-Ranger. Actual station locations will be plotted on aerial photos.

E. SAMPLING EQUIPMENT

Stainless Steel Van Veen Dredge  
Stainless Steel Spatulas  
Large porcelain/stainless steel trays  
16 oz glass jars  
Bucket & Rope  
pH paper  
Leitz Range Finder  
Mini Ranger

3. DATA QUALITY OBJECTIVES

A. PRECISION / ACCURACY / DETECTION LIMITS

Detection limits and precision and accuracy considerations will be those specified in the standard contract and analytical protocols established by the Sample Management Office.

B. DATA REPRESENTATIVENESS

Data will be representative of the specific sample locations identified in Figure 1. Grab sediment samples will be composited over the top 6 inches of depth.

C. DATA COMPARABILITY

Data will be reported according to established contract laboratory protocols. Samples will be analyzed according to approved analytical procedures. Dry weight basis is required.

D. DATA COMPLETENESS

All samples are to be analyzed with appropriate QC supportive documentation.

4. SAMPLING PROCEDURES (Including QC Checks)

Sampling procedures are described in Section 2 D.

One empty jar will be submitted to the Contract labs which perform the Organics and Inorganics analyses. A sediment jar filled with diatomaceous earth will be submitted to the lab performing the TCDD analyses to serve as a blank. These will be considered the control blank samples.

The Van Veen dredge, and gloves, will be rinsed between stations with ambient Eagle Harbor water. A clean spatula will be used at each location to transfer sediments into the sample jars.

As a control on rinse water, a sample of Eagle Harbor water will be collected for analysis by EPA for Base-Neutral and Acid Extractables.

5. SAMPLE CUSTODY PROCEDURES

Samples will be in the custody of EPA personnel. Region 10 Chain of Custody Procedures and forms will be used. A Chain of Custody form will accompany all samples. Custody seals will be placed on all shipping containers.

For intertidal samples collected by DOE personnel, EPA Chain of Custody sheets will be used as well as the Field Sample Data Sheets and Organic Traffic Reports. Samples will be transferred to the EPA soon after collection to allow timely shipment of the samples to the contract lab.

6. CALIBRATION PROCEDURES AND PREVENTIVE MAINTAINENCE

Calibration and calibration frequencies are specified in the analytical test procedures described in the contract laboratory protocol.

7. ANALYTICAL METHODS (Including QC Checks)

All samples collected during this project will be analyzed in accordance with EPA approved methods and associated quality control procedures. For the Contract Laboratory, analytical procedures are described in the contract.

8. DOCUMENTATION - DATA REDUCTION AND REPORTING

A. DOCUMENTATION

Field Notes, Photos, Traffic Reports, Sample Packing Lists, Sample Tags, and Field Sample Data Sheets will be used to document survey sampling activities.

B. DATA REPORTING AND VALIDATION

The designated laboratories will have total responsibility for data generation and reporting. Data generated by contract labs will receive additional quality control review by the EPA Region 10 Laboratory. This will include examination of raw data, confirmation of peak shapes and resolution, precision and accuracy and verification of adequacy of QC documentation. Data generated by the EPA laboratory will be put into the Laboratory Data Management System.

9. DATA ASSESSMENT

The Field Operations Section will be responsible for data summarization and distribution to interested programs.

10. PERFORMANCE / SYSTEM AUDITS

EPA and contract laboratories participate in EPA's semi annual performance evaluation studies. The specific documentation for analyses performed for this study is a matter of record.

- 11. CORRECTIVE ACTION

Corrective action procedures that might be implemented from audit results or detection of unacceptable data will be developed when and where appropriate.

12. REPORTS

Reports development and distribution will be the responsibility of the Field Operations Section.

From Attachment C

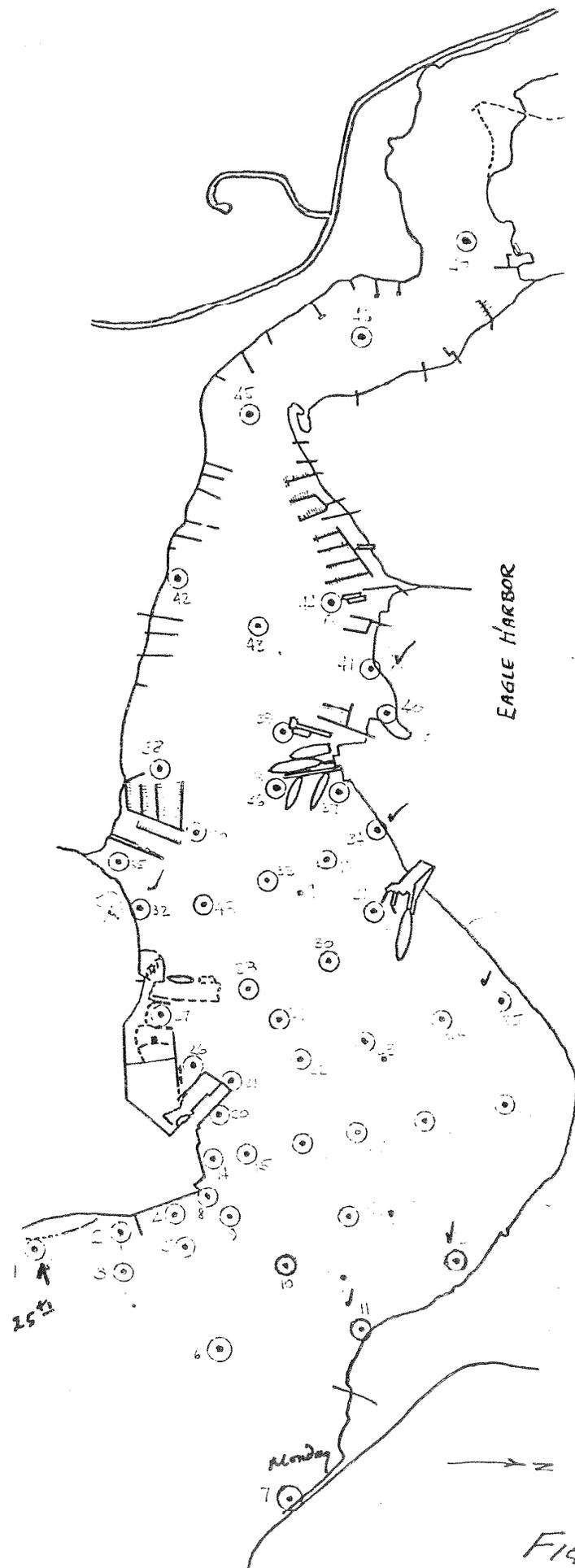


FIGURE 1

*Hunter me  
4-2-84*

# REQUEST FOR ANALYSIS

ATTACHMENT D

Date 4/13/84



SOURCE Multiple REQUESTED BY J. Joy

LOCATION Eagle Harbor/Winslow COLLECTED BY J. Joy / A. Johnson

DATE WERE (WILL BE) COLLECTED April 16, 1984 APPROVED BY \_\_\_\_\_

SAMPLES WILL ARRIVE: DATE 4/16 APPROXIMATE TIME PM CARRIER AOV

PRIORITY: REASONABLY SOON  AS SOON AS POSSIBLE \_\_\_\_\_ EMERGENCY \_\_\_\_\_

ROUTE DATA SUMMARY TO: J. Joy and A. Johnson

PROGRAM CODE     -     -      Amb. Mon.  Compliance  Inspection  Class, # \_\_\_\_\_

Investigation  Survey  Spill  Complaint  Other (describe) \_\_\_\_\_

OTHER INFORMATION: Samples are to be taken in conjunction w/ EPA sediment sampling. EPA samples have been contracted-out for analysis.

Type of Analyses Required	Number of Samples	Approx. Range	Preservative Type-Vol.	For Lab Use Only			
				Laboratory Number	Analyst	Date	Notes
<del>Base-neutrals</del>	10	} <i>all shellfish</i>					
Acid Extractables	10						
PCBs	10						
Dibenzofuran	10						
Carbazole *	10		* will try and obtain std. from NMFS				
<del>PAHs</del>	10						
Pb	10						
Hg	10						
Cd	10						
As	10						
Cr	10						
Zn	10						
Ni	10						
<del>   </del>	<del>10</del>						
% lipids	10						
% solids	10						
TOTAL							

Fill out as completely as possible. Some Analyses (bacteriological, biological, BOD, etc.) and large numbers of samples must be scheduled ahead of time. Specific questions should be directed to the Analyst supervising the particular analysis desired.