Site: New Bedford
Break: 1.7
Other: 5/938

72. Siscanaw, Richard J. (EPA), 10/03/78
Memo to Edward L. Taylor (EPA);
"PCB Air Samples from the New Bedford Area".

73. Stratten, Charles L. (ESE), 03/17/78
Letter to Thomas Spittler (EPA);
PCB results for air samples taken in the
New Bedford area.

74. Sulanowski, J. et al. (BSU/WHOI), 1981
Data Tables: "PCB Analysis of New Bedford
Harbor Sediments; Inner Harbor".

78. Taylor, John M. (FDA), 10/05/79
Letter to Paul Anderson;
Analysis of lobsters.

79. Taylor, John M. (FDA), 09/25/79
Letter to George A. Michael (Mass. DPH);
FDA lobster analysis.

80. Thompson, Ray E. (EPA), 03/12/76
Letter to Aerovox, Inc. (N. Butterworth);
PCB analyses of wastewater.

82. Tibbetts Engineering Corp., 04/03/80
Lab Report; PCB analysis of sediments;
prepared for Fairhaven Marine
Job No. 3561-000.

83. Versar, Inc., 1981
"PCB Analytical Report".
prepared for Cornell Dubilier Electronics.
Ref. # 717.7.

84. Weaver, Grant (CZM), 1981
PCB Analyses of Sludge.

86. Woodson-Tenent Laboratories, 12/17/74
"Plant Liquid Discharge" Aerovox;
prepared for Aerovox Industries, Inc.

88. Sverdrup & Parcel & Associates, 9/79
"Environmental Assessment; New Bedford - Fairhaven
Bridge Rte. 6 Over New Bedford Harbor";
prepared for Massachusetts Dept. Public Works

SDMS DocID 268636

90. Cambridge Analytical Associates, 08/12/81
PCB Analysis of Water Samples.

91. Okun, James (EPA), 1981
"Aerovox-New Bedford, MA" sediment

92. Versar Inc., 02/03/82
"EPA Compliance Monitoring Program";
prepared for U.S. EPA Region I
EPA No. 68-01-6251 Ref. #717.8.

93. Granz, Daniel S. (EPA), 07/15/82
Memo to James Okun (EPA);
"New Bedford WWTP" heavy metals.

94. Farrington, J.W., A.C. Davis, and J. Sulanowski (WHOI), 1982
"PCBs in Buzzards Bay/New Bedford Harbor Samples"
unpublished data.

95. Szal, Gerald (DWPC), 1982
Revised Copy, "Results of Sediment Sample Analyses for PCBs in New Bedford Harbor, July and October 1981". Chemical Analyses by Cambridge Analytical Associates, with % total solids information.

96. Tibbetts, Fred E., III, (Tibbetts Engineering Corp., 04/28/82
Letter to Metcalf & Eddy, Inc. (J.T. Maughan);
PCBs analyses and EP Toxicity tests.

97. Gershman, Louis, L. (FDA), 05/11/82
Letter to Robert E. Mendoza (EPA);
PCBs in lobsters from New Bedford.

98. Butterworth, Norman (Aerovox, Inc.), 05/07/82
Letter to Metcalf & Eddy, Inc. (J.T. Maughan);
Lycott Environmental Research Company analytical reports attached.

99. DMF, 06/01/77
"Analytic Chemistry Report";
PCB Analysis of Finfish.

100. DMF, 11/04/77
"Analytic Chemistry Report";
PCB Analysis of Bluefish.

101. DerHovanesian, J. (DMF), 11/12/82
Letter to Metcalf & Eddy, Inc.
(R. J. Reimold).

Ref # 71

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: March 21, 1978

SUBJECT: PCB Air Samples from the New Bedford Area

FROM: Richard J. Siscanaw
Chemist

TO: Edward L. Taylor, Chief
Chemistry Section

THRU: Arthur E. Clark
Chemist

Sample Date	Sample	Test	PCB (ng/m^3)*
1/17/78	Landfill Site		
		G	28
		E	24
1/17/78	Downwind Site (Elmwood and Hathaway Sts.)		
		D	12
		F	18
1/19/78	Cornell Dublier Company (Downwind on Cleveland St.)		
		B	32
		C	30
1/27/78	Aerovox Company (Downwind on Bitteau St.)		
		A	703
		H	774

*PCB as Arochlor 1016 +/or 1242

EPA Form 1320-6 (Rev. 3-76)

Ref 72

R. Dangel

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: October 3, 1978

SUBJECT: PCB Air Samples from the New Bedford Area

FROM: Richard J. Siscanaw
Chemist

TO: Edward L. Taylor, Chief
Chemistry Section

Thru: Arthur E. Clark
Chemist

NB landfill

The PCB samples were extracted with hexane and cleaned up ona micro-florisil column. Two back-up florisil traps were used, at the landfill site and downwind of the Aerovox plant to check for PCB breakthrough on the sample column. None was found at the concentration range of 30-400 ng/m^3. A spike of 193 ng of PCB 1016 was added to sample #6, dried and extracted with the unknowns. The recovery was 93%. Two blanks were included in the analysis.

EPA Form 1320-6 (Rev. 3-76)

MTE No

Location	Test #	429 1016/1242 (ng/m3	423 PCB Concentration 1254 (ng/m3	42 Total (ng/m3)
Landfill - upwind	4	J27 4	ND 4A	J27*
Landfill site	8	334 7	33 7A	367
Landfill site back-up to #8	9	ND 8	ND 8A	ND
Landfill site	2	703 2	23 2A	726
Landfill-downwind	3	18 3	ND 3A	18**
Landfill-downwind	7	21 6	ND 6A	21**
Aerovox-upwind	5	41 5	ND 5A	41
Aerovox-downwind	11	301 10	9 10A	310
Aerovox-downwind backup to #11	10	ND 9	ND 9A	ND
Aerovox-downwind	1	259 1	9 1A	268
Cornell-Dublier-upwind	12	18 11	ND 11A	18
Cornell Dublier-downwind	14	743 13	24 13A	767
Cornell Dublier-downwind	13	824 12	38 12A	862

*Value for #4 determined by subtraction of known quantity of PCB added in laboratory from total concentration

J=Approximate value

**These values were not a clear PCB pattern and represent a "background" which may or may not be PCB.

September 5, 6 & 7 1978

CC: T. SPittler
T. Devine
M. Holman
N. Beloin
R. Dangel

Ref #73

environmental science and engineering, inc.
P. O. BOX 13454 ● GAINESVILLE, FLORIDA 32604 ● 904 / 372-3318

March 17, 1978

Dr. Thomas Spittler
Environmental Protection Agency
Region I
60 Westview St.
Lexington, MA 02173

Dear Tom;

The PCB results for the air samples taken in the New Bedford area during January are as follows:

Date	Site	Location	Concentration(ng/m^3)	Aroclor
1/17	landfill	upwind	8.5	1242/1016
		on site	21	1242/1016
		downwind	13	1242/1016
1/24	New Bedford Sludge Incinerator	upwind	4.3	1242/1016
		downwind	13	1242/1016
1/27	Aerovox	upwind	5.6	1242/1016
		downwind	490	1016 only
1/19	Cornell Dublier	upwind	19	1242/1016
		downwind	5.1	1242/1016

I have also enclosed copies of the chromatograms for your reviews.

Sincerely,

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Charles L. Stratton
Charles L. Stratton
Director, Chemistry Division

CLS/gc

Enclosure

Reid May 1981 Ref # 74

Yarek Selmocki

Table I. PCB Analysis of New Bedford Harbor Sediments

Inner Harbor

Sample No.	Depth Interval (cm)	total	ppm Dry Weight 1254		ppm Dry Weight 1242(1016)	ppm Wet Weight 1254	ppm Wet Weight 1242(1016)
NB 84SC5	0-2	175	48.55	28%	126.58	18.50	48.22
"	2-4	260	65.23	25%	194.71	25.25	75.38
"	4-6	275	72.55	26%	202.86	29.41	82.24
"	6-8	193	46.30	24.5	146.90	18.52	58.76
"	14-16	104	28.10	[illegible]	75.52	12.59	33.84
"	20-22	37	9.67	[illegible]	27.56	4.84	13.78
Ast. 28 Sta 84	0-4	130	25.68	[illegible]	104.69	9.07	36.96
"	4-8	179	41.43	[illegible]	137.98	15.24	50.78
"	0-4 (Reex)	1	0.47		0.72	0.17	0.25

Outer Harbor

Ast. 23 Sta.67 #2	0-4	15	3.20	[illegible]	11.58	1.37	4.94

Estimates of the total load of PCBs in sediments will vary with the size and distribution of particles composing them. The proportion of pore space (porosity) within a sediment is dependent on these parameters. The porosity in turn determines the bulk density and hence weight of a particulate volume of sediment.

An estimate of the porosity of inner New Bedford Harbor [illegible] was determined based on the weight loss upon heating samples of the sediment overnight at 110°C.

$$\text{Pore Volume (PV)} = \frac{\text{Wet Weight} - \text{Dry Weight}}{\text{Density of Seawater}}$$

$$= \frac{2.98\ g - 1.18\ g}{1.03\ g/cm^3}$$

$$= \frac{1.8\ g}{1.03\ g/cm^3}$$

$$= 1.75\ cm^3$$

$$\text{Solid Volume (SV)} = \frac{\text{Dry Weight}}{\text{Density of Solids}}$$

$$= \frac{1.18\ g}{2.6\ g/cm^3}$$

$$= 0.45\ cm^3$$

$$\text{Total Volume (TV)} = SV + PV$$

$$= .45\ cm^3 + 1.75\ cm^3$$

$$= 2.20\ cm^3$$

$$\text{Porosity (P)} = \frac{TV - SV}{TV}$$

$$= \frac{2.20\ cm^3 - 0.45\ cm^3}{2.20\ cm^3}$$

$$= \frac{1.75\ cm^3}{2.20\ cm^3}$$

$$= 0.8$$

Bulk Density (BD) of inner New Bedford Harbor muds.

BD = Density of solids - (Density of solids - density of fluids) porosity.

$$= 2.6\ g/cm^3 - (2.6\ g/cm^3 - 1.03\ g/cm^3) \cdot 8$$

$$= 1.34\ g/cm^3$$

Weight of Inner New Bedford Muds Down to 50 cm Depth.

Weight	=	Bulk Density x Volume	Volume	=	Area x Depth
	=	1.34 g/cm^3 (2×10^{12} cm^3)		=	4×10^{10} cm^2 x 50 cm
	=	2.68×10^{12} g		=	2×10^{12} cm^3
	=	2.68×10^{12} g ÷ 454 g/lb.			
	=	5.90×10^{9} lb.			
	=	2.95×10^{6} tons of wet sediment			

Inasmuch as sediment PCB analyses are normally reported as dry weight the amount of dry sediment in inner New Bedford Harbor can be determined by similar calculations ignoring the density of seawater which fills the pore spaces of wet sediment. Such calculations yield a bulk dry density of 0.52 g/cm^3 and a total weight of dry sediment of 1.15×10^6 tons.

Assuming that the average concentration of PCB mixtures 1254 and 1242 (1016) in core NB84 SC5 (Table 1) are representative for the entire inner New Bedford Harbor to a depth of 50 cm then the total load may be estimated by multiplying the dry weight concentrations (ppm) by the total dry weight of the sediment (Table 2).

Three other laboratories (Mass. Div. Mar. Fish., Cat Cove Marine Lab; Mass. Dept. Envir. Qual. Engineering, Lawrence Experimental Station; U.S. Environmental Protection Agency, Florida Lab) have previously reported a total of 28 analyses of 1254 mixture in inner New Bedford Harbor sediments. Averages from the individual laboratories and an average of all 28 analyses are included in Table 2 for comparison.

Table 2. Estimated PCB Load in Inner New Bedford Harbor

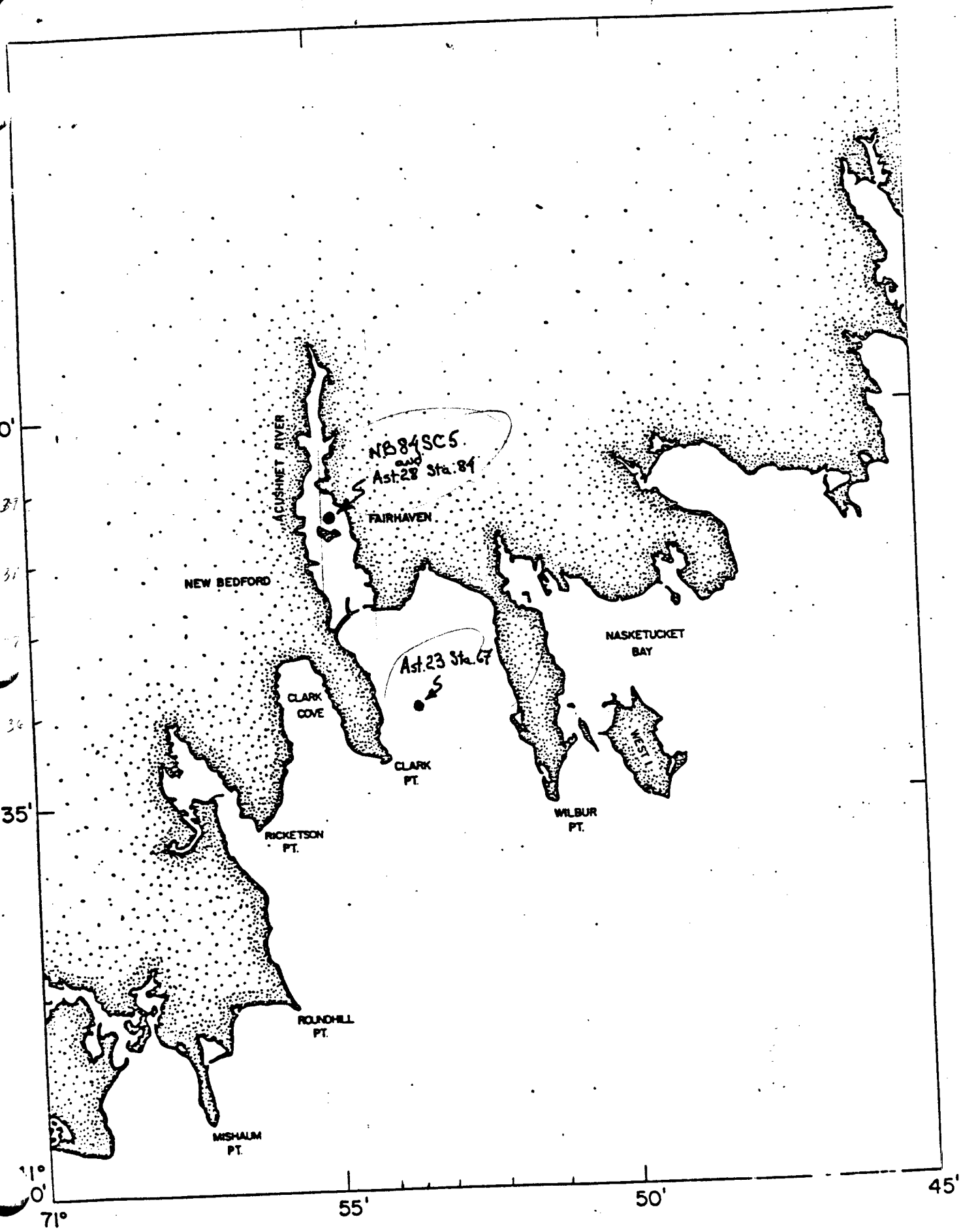
Laboratory	1254 ppm Dry	1254 Load (Tons)	1242(1016) ppm Dry	1242(1016) Load (Tons)
E. P. A. (ave.)	51.25	58.94		
C. C. (ave.)	53.5	61.53		
L. E. S. (ave.)	7.8	8.97		
E. C. L. (ave.)*	20.52	23.60		
W. H. O. I. (0-10cm)**	49.99	11.45	151.78	34.76
" (10-20cm)	28.10	7.59	75.52	20.39
" (20-50cm)	9.67	9.38	27.56	26.73
" Total (0-50cm)		28.42		81.88

*E.C.L. = E.P.A. + C.C. + L.E.S. individual values combined and averaged

**Average of top 8cm of NB84SC5 core and Ast. 28 Sta. 84 grab

Due to different porosity estimates down core the following estimates of total dry weight of sediment were used:

0-10cm = 0.23×10^6 tons
10-20cm = 0.27×10^6 tons
20-50cm = 0.97×10^6 tons


45'
40'
35'
41°
0'
71°
55'
50'
45'
ACUSHNET RIVER
NB84SC5
and
Ast.28 Sta.84
FAIRHAVEN
NEW BEDFORD
NASKETUCKET
BAY
Ast.23 Sta.67
CLARK
COVE
CLARK
PT.
WEST I.
WILBUR
PT.
RICKETSON
PT.
ROUNDHILL
PT.
MISHAUM
PT.

JOHN A. HAMILTON, JR.
DIRECTOR, COMPLIANCE BRANCH, BOS-DO

September 24, 1979

Supervisory Chemist, BOS-DO

Sample Nos: 79-106-178/181 - Lobsters
79-106-183/187 - Lobsters
79-106-188 - Eel

This is to inform you that on 9/18/79, Fred Hanna, Supervisory Inspector, State of Massachusetts Division of Food and Drug, came in to BOS-DO and collected the reserve portions of the above-referenced samples from our storekeeper, Steve Sanders, and initialed and dated the sample accountability card for each sample.

Mr. Hanna collected our reserve in accordance with previously made arrangements between FDA's Compliance Branch and the State of Massachusetts Division of Food and Drug.

William S. Adams

cc: 79-106-178
cc: L. Gershman

BOS:WSA/djk 9/25/79

FDA File

79

George A. Michael, D.
State Department of Public Health
Division of Food and Drugs
305 South Street
Jamaica Plain, MA 02130

Dear Dr. Michael:

Following are the results of our analyses of the five (5) split samples of lobsters which were submitted to our Boston District laboratory on September 19, 1979:

State Sample Number	FDA Sample Number	ppm PCB (Aroclor 1254)
WH-1764	79-159-301	Trace
WH-1765	79-159-302	0.7
WH-1766	79-159-303	1.1
WH-1767	79-159-304	0.3
WH-1768	79-159-305	0.3

The above-referenced samples were collected by the State of Mass. inspectors from various dealers in the New Bedford area, and subsequently prepared by State chemists for analysis by both FDA's Boston District laboratory and the State of Massachusetts Division of Food and Drugs.

Sincerely,

John M. Taylor
District Director
Boston District Office

cc: A. Beebe
cc: L. Gershman
cc: J. Hamilton

BOS:WSA/djk 9/25/79

JOHN A. HAMILTON, JR.
DIRECTOR, COMPLIANCE BRANCH, BOS-DO

September 24, 1979

Supervisory Chemist, BOS-DO

Sample Nos: 79-106-178/181 - Lobsters
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Mr. Hanna collected our reserve in accordance with previously made arrangements between FDA's Compliance Branch and the State of Massachusetts Division of Food and Drug.

William S. Adams

cc: 79-106-178
cc: L. Gershman

BOS:WSA/djk 9/25/79

EPA

Ref #80

March 12, 1976

Mr. Norman Butterworth
Aerovox Industries, Inc.
740 Belleville Avenue
New Bedford, MA 02745

Dear Mr. Butterworth:

Below are the analytical results from samples collected during our survey on January 14 and 15:

Station	Date	425 1016	Aroclor (ug/l) 421 1242	423 1254
North Trough 769-770	14	*	42	8.6
771-B	15	*	24	4.6
Sanitary Waste 772-B	14	*	370	31
773-B	15	*	69	2.8
Influent 774-B	15	2.4	*	*

* - none detected, less than 0.5 ug/l.

If you have any questions, do not hesitate to contact me at 617-223-7370.

Sincerely yours,

Ray E. Thompson
Sanitary Engineer

RET:cb

cc: W. Wirtanen
L. Gitto

Ref #82

...neering Corp., ANALYTICAL LABORATORY DIVISION

...ealth of Massachusetts Certified Laboratory Number: 20153

Page 2
Job No. 3561-000
Date 4-3-80

...LS AND SEDIMENTS ANALYSIS (mg. Per kg.) DRY BASIS

Client FAIRHAVEN MARINE
Project SEDIMENT ANALYSIS

Source A - SAMPLE AREA S-1
Source B - " " S-2
Source C - " " S-3
} COLL. BY CLIENTS' CRANE AND CLAMSHELL
Source D
Column E
Column F

756-A 751-A "FM" 758-A

	A	B	C	D	E	F
Sample No.	S0035D	S0035E	S0035F			
Date of Collection	2-4-80	2-4-80	2-4-80			
Type of Sample	GRAB	GRAB	GRAB			
Time of Collection	A.M.	A.M.	A.M.			
Collector	F.G.	F.G.	F.G.			
Date Received	2-4-80	2-40-80	2-4-80			
Temperature °C						
% SOLIDS	48.92	39.81	60.86			
P.C.B. - DRY WT. AS A-1016 (ppm)	1.1	2.1	0.31 *			
P.C.B. - DRY WT. AS A-1254 (ppm)	2.1	3.3	0.84 *			
A 1016 + A1254	3.2	5.4	1.15 *			

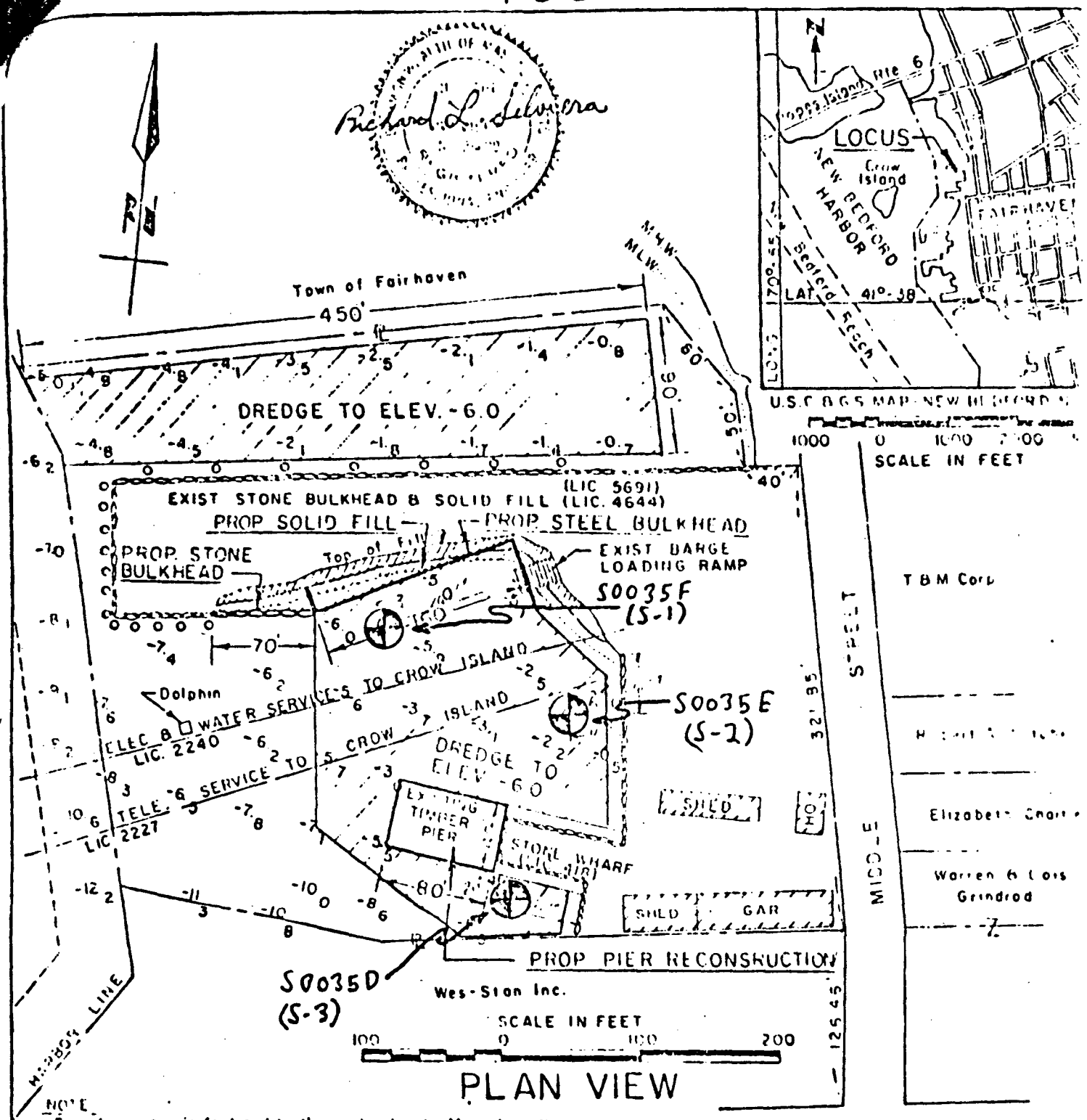
Station "FM"

* AVG. OF ANALYTICAL TEST VALUES OBTAINED FROM 2 DIFFERENT PORTIONS OF SAMPLE S0035F

Dr. Tilletts
Laboratory Supervisor

JOB# 561-000
7-3-80

NEW BEDFORD, MASS. 02746



NOTE:
Soundings are in feet and tenths and refer to Mean Low Water

Approx. 7,000 C.Y. of material is to be dredged and placed above Mean High Water Line.

WASHINGTON STREET

PROPOSED BULKHEAD, SOLID FILL, PIER RECONSTRUCTION & DREDGING
IN NEW BEDFORD HARBOR
AT FAIRHAVEN
COUNTY OF BRISTOL STATE OF MASS
APPLICATION BY FAIRHAVEN MARINE INC

PURPOSE: PRIVATE MARINE CONSTRUCTION YARD
ABOVE MEAN LOW WATER

Attachment A-1 KEF 03

Versar inc.

Exhibit 3

PCB ANALYTICAL REPORT

PREPARED FOR: Mr. Jon Byroade REF. # 717.7

Re-Analysis Results

M+E NO Facility Inspected Cornell Dubilier Electronics

SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
CD - 01 449	4665	59,000	1242	Soil
CD - 02 450	4666	3	1242	Oil
CD - 03 451	4667	100	1242	Oil
CD - 04 452	4668	11,000	1242	Soil
CD - 05 453	4669	21,000	1242	Soil
CD - 06 454	4670	44,000	1242	Soil
CD - 07 455	4671	260	1242	Oil
CD - 08 456	4672	Did not reanalyze <1	—	Oil

DATE: May 6, 1982

Mark T. Carkhuff

MARK T. CARKHUFF, CHIEF
APPLIED GC SECTION
APPLIED CHEMISTRY DIVISION

6821 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE (703) 750-7000

REF 83 Exhibit 4

ATTACHMENT A

Versar Inc.

PCB ANALYTICAL REPORT

PREPARED FOR: Mr. Jon Byroade

REF. # 717.7

Facility Inspected AEROVOX INDUSTRIES, INC.

SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
AUX-01 440	4656	<1	—	Oil
AUX-02 441	4657	200	1254 423	Soil
AUX-03 442	4658	22,000	1254	Soil
AUX-04 443	4659	40	1242 424	Soil
AUX-05 444	4660	170	1242	Oil
AUX-06 445	4661	24,000	1254	Soil
AUX-07 446	4662	11,000	1242	Soil
AUX-08 447	4663	23,000	1242	Soil
AUX-09 448	4664	<1	—	Oil

DATE: 8/19/81

Mark T. Carkhuff

MARK T. CARKHUFF, CHEMIST
APPLIED CHEMISTRY DIVISION

6850 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE: (703) 750-2000

REF 63 Exhibit 5

ATTACHMENT A

Versar inc.

PCB ANALYTICAL REPORT

PREPARED FOR: Mr. Jon Byroade

REF. # 717.7

Facility Inspected NEW BEDFORD WASTEWATER TREATMENT PLANT

MH No.	SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
435	NB-01	4522	43 ppb	1242 (Q21)	Water
436	NB-02	4524	33 ppb	1242	Water
439	NB-03	4526	<1	—	Sediment
438	NB-04	4527	30	1242	Sediment
437	NB-05	4652	70	1242	Soil

DATE: 8/19/81

Mark T. Carkhuff

MARK T. CARKHUFF, CHEMIST
APPLIED CHEMISTRY DIVISION

6621 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE: (703) 750-3000

ATTACHMENT A

Exhibit 6 REF 83

Versar inc.

PCB ANALYTICAL REPORT

PREPARED FOR: Mr. Jon Byroade

REF. # 717.7

Facility Inspected FAIRHAVEN WATER POLLUTION CONTROL FACILITY

SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
FWP-1 457	4528	25 ppb	1242	Water
FWP-2 458	4529	26 ppb	1242	Water
FWP-3 459	4530	12	1242	Sediment
FWP-4 460	4531	7	1242	Soil

TE: 8/19/81

Mark T. Carkhuff

MARK T. CARKHUFF, CHEMIST
APPLIED CHEMISTRY DIVISION

6621 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE: (703) 750-3000

769-1815

6/19/81

Ref 83

Results of Sampling from New Bedford

TOSCA Survey

New Bedford Sewage Treatment Plant

1. Influent - 43 ppb (1242) 25-10 PPB
2. Effluent - 33 ppb (1242)
3. Sludge before incineration - 70 ppm (1242) (0.4-8.5)
4. Solids from grit chamber - 30 ppm (1242)
5. Incinerator ash - none detected 100 PPB

Aerovox

1. DOP (Dioctyl Pthalate - PCB replacement) impregnation tank - none detected
2. Soil from discharge pipe 001 - 200 ppm (1254)
3. Soil from discharge pipe 002 - 22,000 ppm (1254)
4. Soil from below - 40 ppm (1242)
5. TCE still bottoms - 170 ppm (1242)
6. Stained soil from rear of building - 24,000 ppm (1254)
7. Soil from 001 - 11,000 ppm (1242)
8. Soil from 001 - 23,000 ppm (1242)
9. Waste DOP - none detected

Cornell-Dubilier

1. Leachate (?) and soil - 4,400 ppm (1242)
2. DOP impregnation storage tank - 200 ppm (1242)
3. Waste DOP - 80 ppm (1242)
4. Sanitary sewer sediment - 660 ppm (1242)
5. Stained soil from yard - 46,000 ppm (1242)
6. Stained soil pile - 100,000 ppm (1242)
7. TCE still bottoms - 80 ppm (1242)
8. Hydraulic press - none detected

1242 = 421
1254 = 422

Fairhaven Water Pollution Control Facility

1. Influent - 25 ppb (1242)
2. Effluent - 26 ppb (1242)
3. Sludge - 12 ppm (1242)
4. Grit solids - 7 ppm (1242)

(Friday - 9:30 EPA) Cornell

Tentative

Aerovox

Date

ROUTING AND TRANSMITTAL SLIP

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1.		
2.		
3.		
4.		
5.		

METCALF & EDDY, INC.
SUBJ.
FILE
NOV 12 1982
REF'D TO ACK. BY
ANS. BY NOTED

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

Lisa,
I could find this info with no problem - so I'll pass it along. The other items will take some digging. Note some corrections.
Gary Sotolongo

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

☆ GPO : 1981 O - 341-529 (120)

Edited by Gerry Sotolongo EPA Superfund

TSCA DATA REQUIRING FURTHER DOCUMENTATION

SAMP. NO	LATITUDE AND LONGITUDE	SAMPLE TYPE	SOURCE	EXACT SOURCE	DATES COLLECT ANALYSIS	PARAM CODE	CONCENTRATION AND UNITS	LAB AND STUDY	METH. AND REF.	CEC	AEC	COMMENTS
460	461120 034370	WST	GRT		6/15/81 8/19/81	421	7.000 PPM	VERSAR TSCA/EPA	03 ~~00~~ 0083	i	I	FAIRHAVEN WWTP
440	411450 034010	MIS			6/18/81 8/19/81	431 ~~426~~	ND PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	PCB REPLACEMENT DUICTYL PHTHAL
444	461450 034010	MIS			6/18/81 8/19/81	421	170.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	TCE STILL BOTTOMS
448	461450 034010	MIS			6/18/81 8/19/81	~~426~~ 431	ND	VERSAR TSCA/EPA	~~00~~ 0083	i	I	WASTE DOP
450	460840 034080	MIS			6/19/81 8/19/81	421	200.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	DOP IMPREGNATION STORAGE TANK
451	460840 034080	MIS			6/19/81 8/19/81	421	80.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	WASTE DOP
455	460840 034080	MIS			6/19/81 8/19/81	421	80.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	TCE STILL BOTTOMS
456	460840 034080	MIS			6/19/81 8/19/81	421	ND PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	HYDRAULIC PRESS
441	411450 034010	SED	LND		6/18/81 8/19/81	423	200.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	DISCHARGE PIPE NO. 001
442	411450 034010	SED	LND		6/18/81 8/19/81	423	22,000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	DISCHARGE PIPE NO. 002
443	411450 034010	SED	LND		6/18/81 8/19/81	421	40.000 PPM	VERSAR TSCA/EPA	00 0083	i	I	DISCHARGE PIPE NO. 002
445	461450 034010	SED	LND		6/18/81 8/19/81	423	24,000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	STAINED SOIL FROM REAR OF BLDG
446	461450 034010	SED	LND		6/18/81 8/19/81	421	11,000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	FROM 001
447	461450 034010	SED	LND		6/18/81 8/19/81	421	23,000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	FROM 001
452	460840 034080	WST ~~SED~~	WWR		6/19/81 8/19/81	421	660.000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	SEDIMENT FROM SANITARY SEWER
453	460840 034080	SED			6/19/81 8/19/81	421	46,000 PPM	VERSAR TSCA/EPA	~~00~~ 0083	i	I	STAINED SOIL FROM YARD

TSCA DATA REQUIRING FURTHER DOCUMENTATION

SAMP. NO	LATITUDE AND LONGITUDE	SAMPLE TYPE	SOURCE	EXACT SOURCE	DATES COLLECT ANALYSIS	PARAM CODE	CONCENTRATION AND UNITS	LAB AND STUDY	METH. AND REF.	CEC	AEC	COMMENTS
454	460840 034080	SED			6/19/81 8/19/81	421	99,000 ~~100,000~~ PPM	VERSAR TSCA/EPA	00 0083	i	I	STAINED SOIL PILE
435	460600 034150	WST	RWW		6/15/81 8/19/81	421	.043000 PPM	Versar TSCA/EPA	00 0083	i	I	
436	460600 034150	WST	TWW		6/15/81 8/19/81	421	.033000 PPM	Versar TSCA/EPA	00 0083	i	I	
437	460600 034150	WST	SLG		6/15/81 8/19/81	421	70.000 PPM	Versar TSCA/EPA	00 0083	i	I	BEFORE INCINERATION
438	460600 034150	WST	GRT		6/15/81 8/19/81	421	30.000 PPM	Versar TSCA/EPA	00 0083	i	I	SOLIDS FROM GRIT CHAMBER
439	460600 034150	WST	ASH		6/15/81 8/19/81	421	ND PPM	Versar TSCA/EPA	00 0083	i	I	INCINERATOR ASH
449	460840 034080	WST			6/19/81 8/19/81	421	4400.000 PPM	Versar TSCA/EPA	00 0083	i	I	LEACHATE AND SOIL
457	461120 034370	WST	RWW		6/15/81 8/19/81	421	.025000 PPM	Versar TSCA/EPA	00 0083	i	I	FAIRHAVEN WWTP
458	461120 034370	WST	TWW		6/15/81 8/19/81	421	.026000 PPM	Versar TSCA/EPA	00 0083	i	I	FAIRHAVEN WWTP
459	461120 034370	WST	SLG		6/15/81 8/19/81	421	12.000 PPM	Versar TSCA/EPA	00 0083	i	I	FAIRHAVEN WWTP

EXHIBIT F-1

Ref # 6

WOODSON-TENENT Laboratories

ANALYTICAL AND CONSULTING CHEMISTS

345 Adams Ave. P. O. Box 2135
Memphis, Tennessee 38101

Telephone
Area Code 901/525-6333

Official Chemists For:
National Cottonseed Products Association • National Soybean Processors Association

Laboratory Locations:
Clarksdale, Miss. • Des Moines, Iowa • Little Rock, Ark.
Memphis, Tenn. • Wilson, Ark. • Gainesville, Ga.

Referee Chemists:
American Oil Chemists' Society

Aerovox Industries, Inc.
New Bedford, Mass, 12/17/74

Sample of: Plant Liquid Discharge

Marked: #6 North Moat Continuous

ally Sampled By:

C.C.:

PCB 11.1 PPB

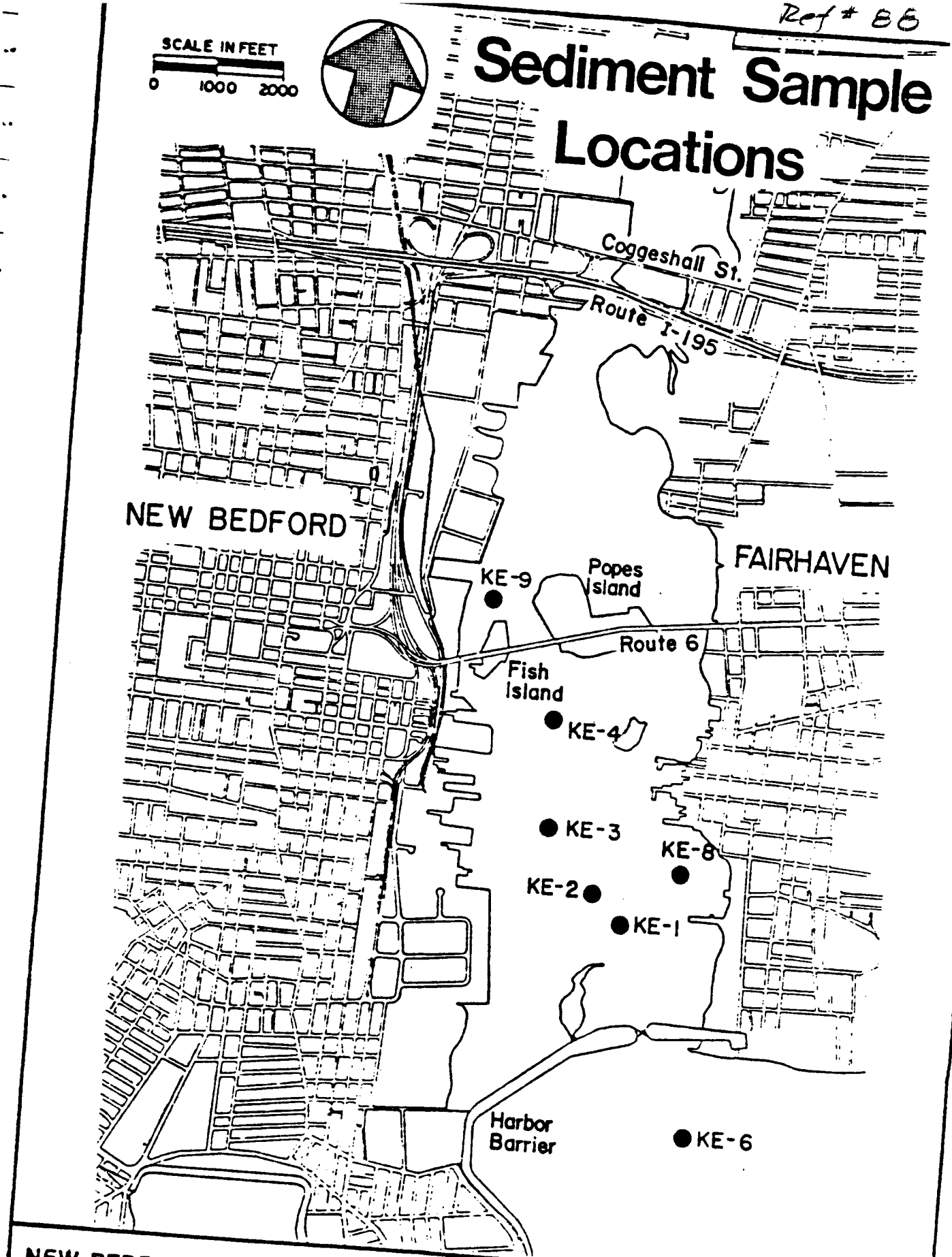
Laboratory No. 8106

Respectfully Submitted,

Woodson Tenent Laboratories

Methods of Association of Official Agricultural Chemists and Official Methods of American Oil Chemists Society Employed in This Analysis.

Ref # 88



NEW BEDFORD-FAIRHAVEN BRIDGE

FIGURE 11

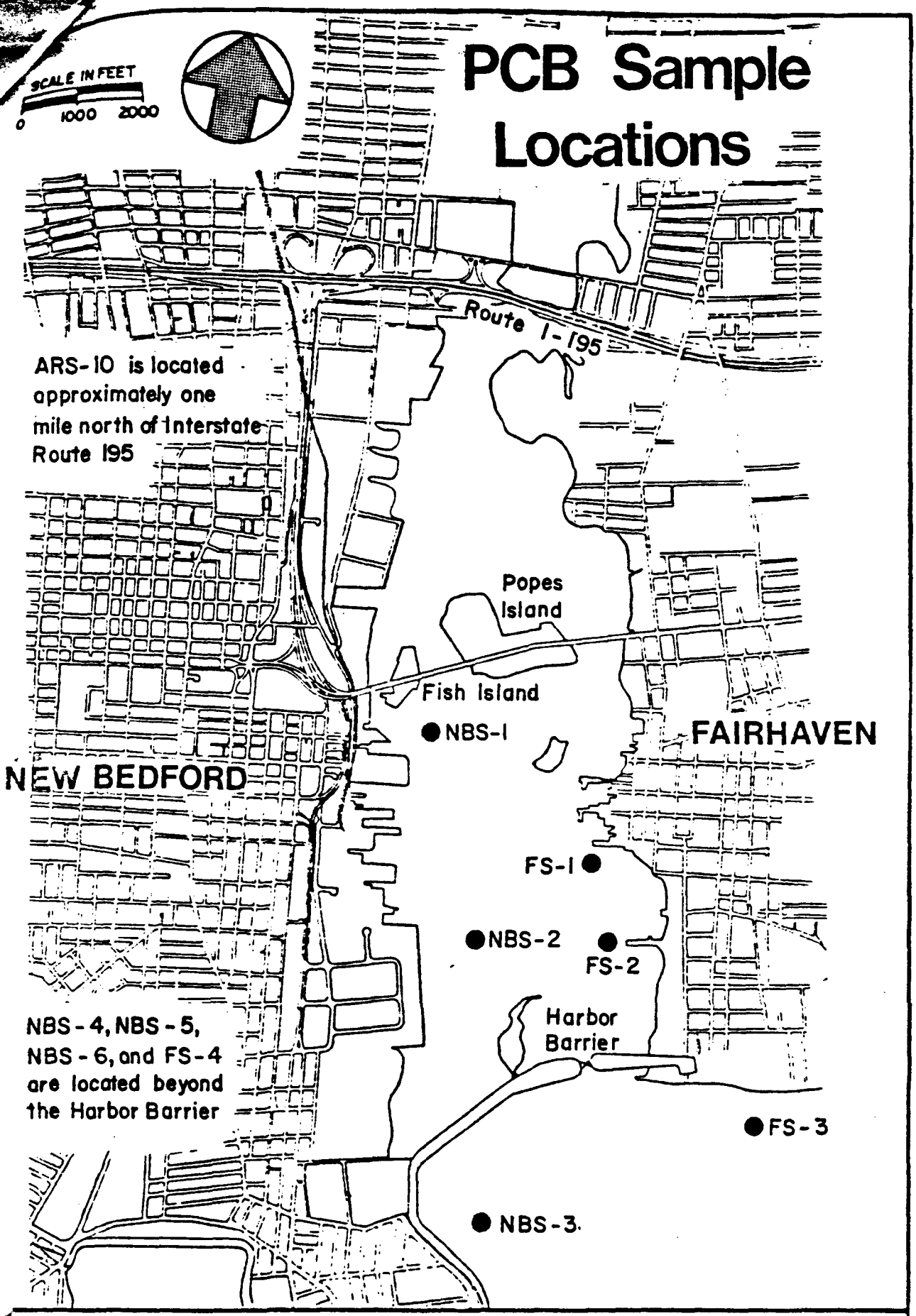
Environmental Assessment Mass DPW
Rt 6 over New Bedford Harbor
Sept 1979
Sverdrup Parcel & Assoc.

Sediment Chemistry

	SAMPLING SITE	KE-1	KE-1	KE-2	KE-2	KE-3	KE-3	KE-4	KE-4	KE-6	KE-6	KE-8	KE-8	KE-9	KE-9
	DEPTH (ft)	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17	0.0-.17	1.0-1.17
602	SED REDOX POT. (MV)	-252.0		-377.0		-463.0		-415.0		-305.0		-323.0		-488.0	
601	COD (ppm)	162,000		149,100		17,100		259,700		151,100		111,000		186,500	
603	OIL AND GREASE (ppm)	6010		5800		12,950		16,960		540		3040		16,090	
509	Hg (ppm)	.96	.59	1.09	.59	1.56	1.01	2.25	1.49	.38	.63	.44	.40	1.18	1.63
507	Pb (ppm)	135.1	79.0	97.2	97.0	199.8	134.3	261.7	237.7	18.6	75.0	75.9	40.7	249.3	492.4
514	Zn (ppm)	278.6	188.0	238.3	88.5	461.9	318.9	631.3	577.3	36.5	185.7	207.1	87.3	616.8	790.2
502	As (ppm)	11.9	5.9	13.3	2.3	10.8	1.6	38.1	25.6	.7	8.2	.8	11.0	31.5	44.6
504	Cd (ppm)	3.4	2.3	5.3	1.1	12.5	5.0	16.9	9.1	1.2	1.4	4.8	1.2	18.4	6.9
505	Cr (ppm)	145.2	48.9	229.4	25.7	536.8	268.5	692.8	565.9	19.2	46.4	207.1	38.4	721.8	744.3
506	Cu (ppm)	447.5	180.5	467.7	113.0	1036.2	671.3	1401.1	1335.6	47.1	21.14	483.3	148.9	1535.4	2026.9
510	Ni (ppm)	23.6	18.1	29.1	9.7	43.7	29.4	53.9	44.1	8.0	17.9	22.1	9.3	55.1	68.7
508	V (ppm)	50.7	56.4	53.0	20.0	93.6	50.3	123.2	90.6	18.6	92.9	38.0	23.3	85.3	91.6

NEW BEDFORD-FAIRHAVEN BRIDGE

TABLE 3



IEW BEDFORD-FAIRHAVEN BRIDGE FIGURE 12

PCB Concentrations

Sample Code	Concentrations (dry wt., ppm)
NBS-1	47.4
NBS-2	61.3
NBS-3	77.9
NBS-4	143.0
NBS-5	0.5
NBS-6	1.9
ARS-10	620.0
FS-1	74.8
FS-2	21.5
FS-3	4.1
FS-4	0.3

NEW BEDFORD-FAIRHAVEN BRIDGE TABLE 4

90

Cambridge Analytical Associates

SUMMARY OF RESULTS

	DEQE#	CAA#	Concentration in ppb[1] 1016	1221	1232	1242	1248	1254	1260
7/17/81	1	810720-8	ND[2]	ND	ND	ND	4.0	ND	ND
	2	810720-9	ND	ND	ND	ND	2.7	ND	ND
	3	810720-10	ND	ND	ND	ND	2.4	ND	ND
	4	810720-11	ND	ND	ND	1.2	ND	ND	ND
	5	810720-12	ND	ND	ND	1.2	ND	ND	ND
	6	810720-13	ND	ND	ND	ND	ND	ND	ND
	7	810720-14	ND	ND	ND	ND	ND	ND	ND
	8	810720-15	ND	ND	ND	ND	ND	ND	ND
	9	810720-16	ND	ND	ND	ND	ND	ND	ND
	10	810720-17	ND	ND	ND	ND	ND	ND	ND
	11	810720-18	ND	ND	ND	ND	ND	ND	ND
	12	810720-19	ND	ND	ND	ND	ND	ND	ND
	13	810720-20	ND	ND	ND	ND	ND	ND	ND
	14	810720-21	ND	ND	ND	ND	ND	ND	ND
	15	810720-22	ND	ND	ND	ND	ND	ND	ND
/21	Main St. Bridge South #4	810722-4	ND	ND	ND	ND	ND	ND	ND
	Hanlin Rd. Pond outlet #5	810722-5	ND	ND	ND	ND	ND	ND	ND
	Coggle shell Bridge North #6	810722-6	ND	ND	ND	trace[3]	ND	ND	ND

1. Concentration of polychlorinated biphenyls in the sample in parts-per-billion (ng/ml).
2. ND - none detected. Lower limit of detection 0.5 ppb.
3. Trace - less than 2 times the lower limit of detection.

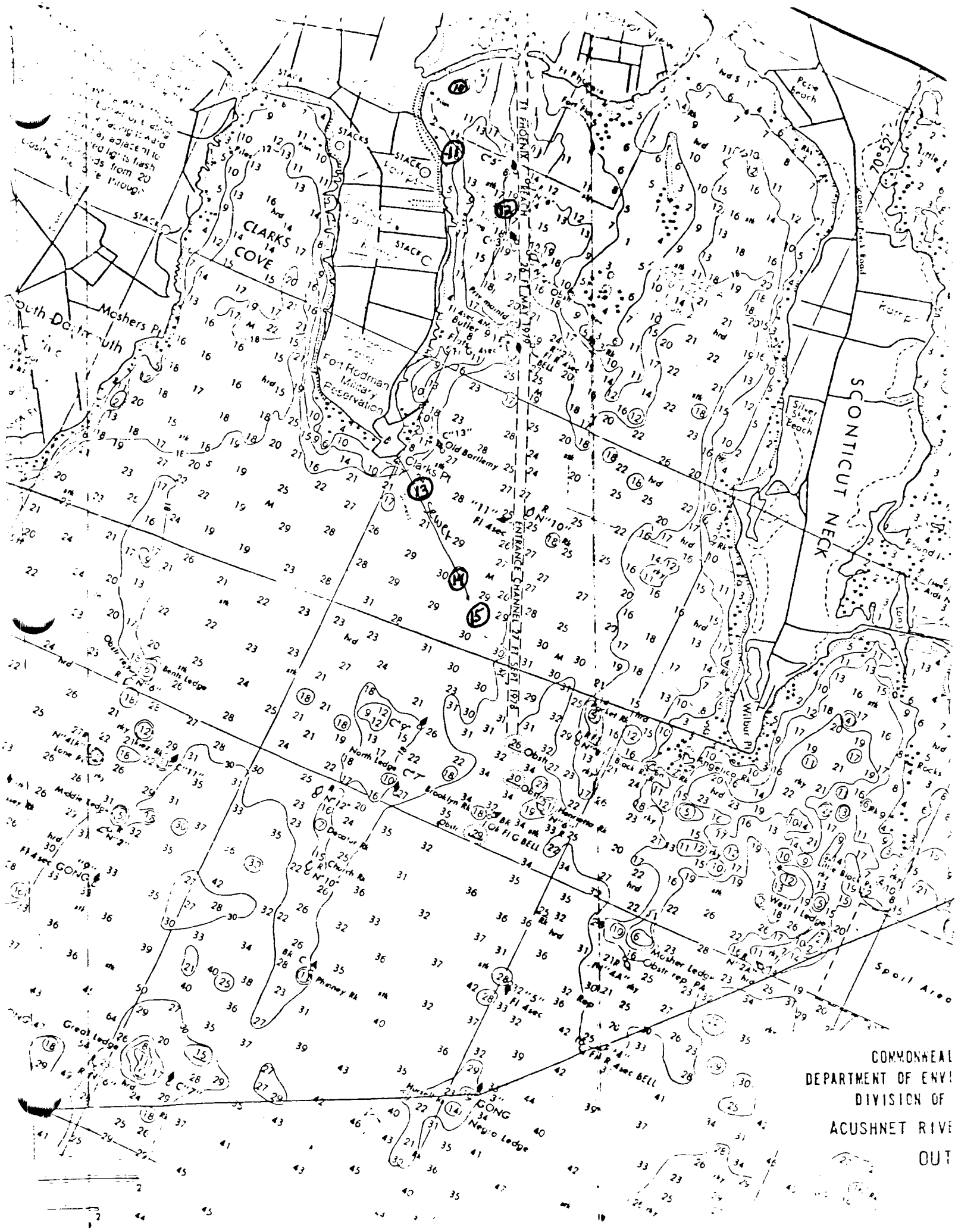

CLARKS COVE
Mashers Pt
Fort Rodman Military Reservation
Clarks Pt
Old Bartlemy
SCONTICUT NECK
Silver Shell Beach
Wilbur Pt
Benth Ledge
North Ledge
Middle Ledge
Great Ledge
Negro Ledge
Mosher Ledge
West Ledge
Spoil Area
COMMONWEAL
DEPARTMENT OF ENV
DIVISION OF
ACUSHNET RIVE
OUT

PLATE 1

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENT QUALITY ENGINEERING
DIVISION OF WATER POLLUTION CONTROL

ACUSHNET RIVER ESTUARY PCB STUDY

HAGGOD AREA

Okun, J (EPA)
Anal. of sed's at Aerovox Corp

1 of 11

AEROVOX - New Bedford, MA

orig sample ↓ | location # ↓ | lab # ↓

Location Number and Description	Station Number	Sample Depth	Sample Number	PCB Concentration (ppm)	Aroclor
1: 25' offshore from riprap and in line with cooling-water discharge "A"	AER001	Surface	74179	20,200	Mix - total
	AER01B	12" to 16"	74180	20,600	Mix total
2: 65" offshore from riprap and in line with cooling-water discharge "A"	AER002	Surface	74181	4,900	1242/1016
	AER02B	24"	74182	370	1242/1016
3: 110' offshore from riprap and in line with cooling-water discharge "A"	AER003	Surface	74183	3,200	1242/1016
	AER03B	16"	74184	3,200	Mix
4: 65' offshore from riprap and 40' downstream of Location #2	AER004	Surface	74185	5,000	Mix
	AER04B	12"	74186	5,800	Mix
5: 65' offshore from riprap and 40' downstream of Location #4	AER005	Surface	74187	2,400	Mix
	AER05B	12"	74188	6,500	Mix
6: 65' offshore from riprap and 40' downstream of Location #5	AER006	Surface	74189	3,400	Mix
	AER06B	12"	74190	6,000	Mix
7: 65' offshore from riprap and midway between the two discharges "A" and "B"	AER007	Surface	74191	13,000	Mix
	AER07B	12"	74192	220	Mix
8: 45' offshore from riprap and directly in line with discharge "B"	AER008	Surface	74193	10,000	Mix
	AER08B	12"	74194	190,000	Mix
9: 65' offshore from riprap and 40' upstream of Location #8	AER009	Surface	74195	6,500	Mix
	AER09B	12"	74196	16,000	Mix
10: 20' offshore from riprap and 45' upstream of Location #9	AER010	Surface	74197	15	1242/1016

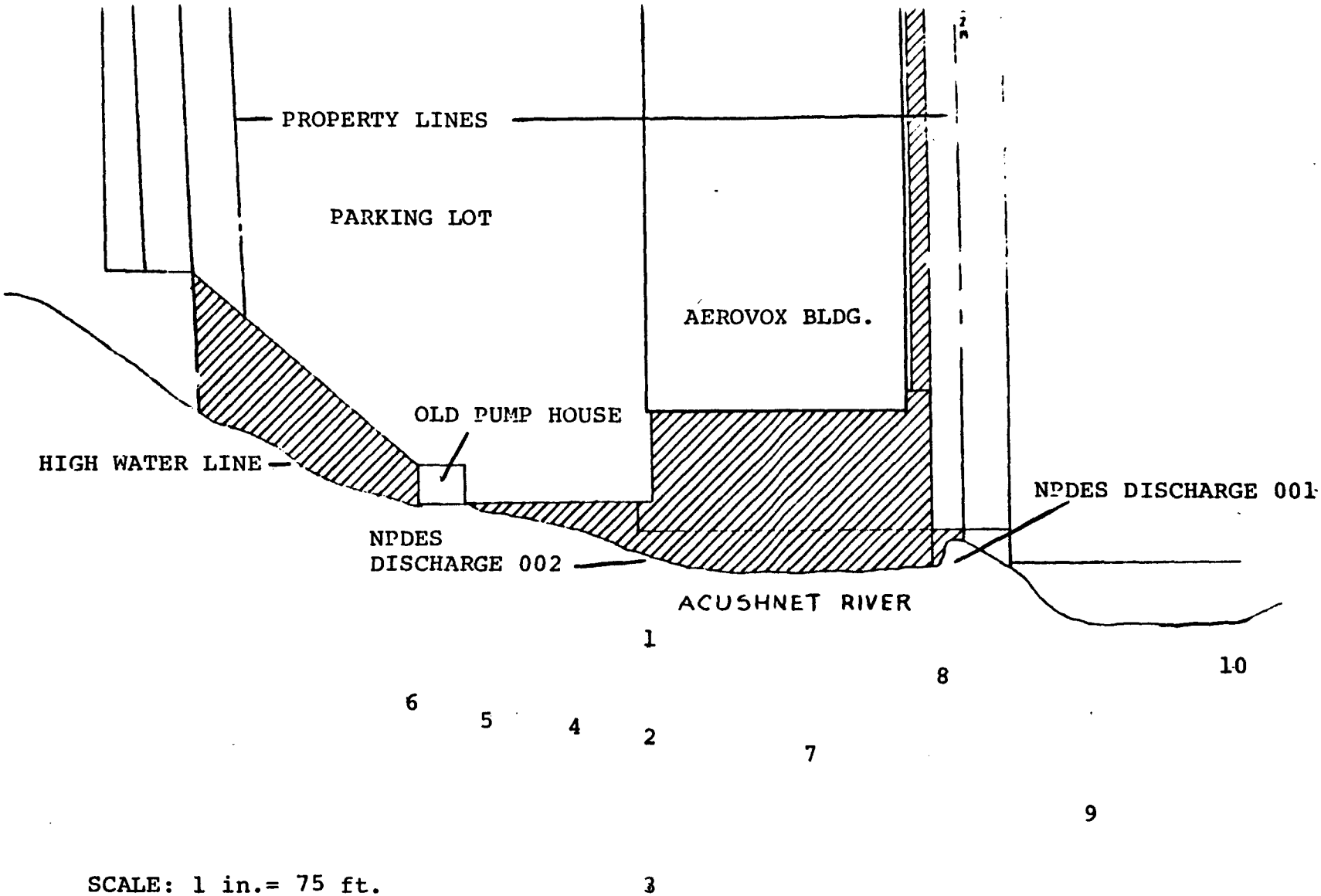
Analyzed @ EPA contract lab - VERSAR

Sediment samples - reported in Dry Wt.

M[illegible]h. are EPA stds.

Wh[illegible] 1242/1016 is reported were no [illegible] present.

AEROVOX, NEW BEDFORD MASS.
SAMPLING LOCATIONS FROM NOVEMBER 12, 1981



SCALE: 1 in.= 75 ft.

Ref #92

EPA COMPLIANCE MONITORING PROGRAM

Submitted to:

US EPA Region I
John F. Kennedy Building
Boston, Massachusetts 02203

EPA No. 68-01-6251
Versar No. 717.8

Submitted by:

Versar Inc.
6621 Electronic Drive
Springfield, Virginia 22151

February 3, 1982

Versar inc.

INTRODUCTION

Versar received 27 samples from US EPA, Region I, on November 17, 1981, for PCB analysis. All samples were collected by Region I personnel and sent to Versar via Delta Airlines. All analytical work was performed in accordance with the written work plan for Task IV2-81-02-06.

The methodology for the analysis is outlined below. The Standard Versar Quality Control Program (SVQCP) was followed, and the results discussed in the Quality Control Summary Section. A description of the SVQCP is enclosed for your convenience. Appendix I contains copies of field and laboratory Chain-of Custody forms.

RESULTS

The results for the analysis of 27 soil and sludge samples are tabulated in Table 1. Three samples were found to be free of PCBs at the 1 ppm detection limit. Out of the remaining samples, 6 were quantitated between 1 ppm and 50 ppm, 2 between 50 ppm and 500 ppm, and the last 16 substantially higher than 500 ppm.

METHODOLOGY

Soil:[1]

Ten grams of soil were extracted with three 50 ml portions 1:1 acetone/hexane. The extracts were passed through a Na_2SO_4 column and collected in a 250 ml Kuderna-Danish. After the extract was concentrated to below 50 ml, it was transferred to a 100 ml volumetric flask and diluted to the mark with hexane.

At this point 5 ml of extract were pipetted on top of a 20 gram packed florisil column. The aliquot was eluted with 200 ml petroleum ether and concentrated to 5 ml. One ml was vialed for injection (2 µl) into a gas chromatograph equipped with an electron capture detector.

[1]Method for Organochlorine and Organophosphorous Pesticide in Soil, EPA/Pesticide Monitoring Laboratory (PML), Building 1105, NSTL/NASA, Bay St. Louis, Mississippi.

Versar inc.

PCB ANALYTICAL REPORT

PREPARED FOR: US EPA Region I

REF. # 717.8

TABLE 1

SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
1002 74172	7364	<1	—	Sludge
74173	7365	<1	—	Soil
1004 74174	7366	2	1254	Sludge
1005 74175	7367	4	1254	Sludge
74176	7368	2	1254	Soil
1007 74177	7369	3	1254	Sludge
1008 74178	7370	<1	—	Sludge
981 74179	7371	20,000	1242 & 1254	Sludge
982 74180	7372	21,000	1242 & 1254	Sludge
983 74181	7373	4900	1242	Sludge
984 74182	7374	370	1242	Sludge
985 74183	7375	3200	1242 & 1254	Sludge
986 74184	7376	3200	1242 & 1254	Sludge
987 74185	7377	5000	1242 & 1254	Sludge
988 74186	7378	5800	1242 & 1254	Sludge
989 74187	7379	2400	1242 & 1254	Sludge
990 74188	7380	6500	1242 & 1254	Sludge
991 74189	7381	3400	1242 & 1254	Sludge
992 74190	7382	6000	1242 & 1254	Sludge

DATE: February 3, 1982

Mark T. Carkhuff

MARK T. CARKHUFF, CHEMIST
APPLIED CHEMISTRY DIVISION

6621 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE: (703) 750-3000

Versar inc.

PCB ANALYTICAL REPORT

PREPARED FOR: US EPA Region I

REF. # 717.8

TABLE 1
Page 2

SAMPLE NO.	LAB NO.	CONCENTRATION PARTS/MILLION	AROCLOR	COMMENTS
74191	7383	13,000	1242 & 1254	Sludge
74192	7384	220	1242 & 1254	Sludge
74193	7385	10,000	1242 & 1254	Sludge
74194	7386	190,000	1242 & 1254	Sludge
74195	7387	6500	1242 & 1254	Sludge
74196	7388	16,000	1242 & 1254	Sludge
74197	7389	15	Mix	Sludge
74198	7390	20	1242 & 1254	Sludge

DATE: February 3, 1982

Mark T. Carkhuff
MARK T. CARKHUFF, CHEMIST
APPLIED CHEMISTRY DIVISION

6621 ELECTRONIC DRIVE, SPRINGFIELD, VIRGINIA 22151 TELEPHONE: (703) 750-3000

Versar inc.

QUALITY CONTROL SUMMARY

The full Standard Versar Quality Control Program was run with the sample batch. Precision data is not available because of the absence of PCBs in the sample used. Recovery data was obtained and indicates that the method used is sufficient for PCB analysis. The Quality Control data is presented in Table 2 and summarized on the Quality Control summary sheet.

Versar inc.

TABLE 2

Quality Control Data

Matrix	Audit	Amount Found (µg/g)	Amount Spiked (µg/g)
Soil	Reagent Blank	<1	*N.A.
	Method Standard	51	50
	7365X (sample)	<1	N.A.
	7365Y (duplicate)	<1	N.A.
	7365Z (spiked sample)	55.5	50

*Not Applicable

QUALITY CONTROL SUMMARY

DATE: November 23, 1981 MATRIX: Soil

SPIKE: 1 ml Aroclor 1254 500 ppm

Precision		Duplicate Sample	*N.A.	
Recovery Accuracy		Spiked Sample	111%	
		Method Standard	110%	

*N.A. - Not Available

DATE: MATRIX:

SPIKE:

Precision		Duplicate Sample		
Recovery Accuracy		Spiked Sample		
		Method Standard		

Versar inc.

STANDARD VERSAR
QUALITY CONTROL PROGRAM

The Standard Versar Quality Control Program is included with each batch of samples. A batch is a suitable number of samples to be analyzed at one time. The program consists of four QC audits which are treated with the same conditions as the samples. The QC audits represent from 20-400% of the total number analyzed, depending on the number of samples per batch. The audits are:

(1) Duplicate
(2) Spiked Matrix
(3) Method Standard
(4) Method Blank

A sample is chosen randomly from the batch and split three ways, labelled x, y and z. The x and y aliquots are analyzed as duplicates (QC Audit 1). The z aliquot and a blank sample (QC audits 2 and 3) are spiked with the parameter of interest at the concentration of interest. The fourth QC audit is simply a blank treated as a sample.

Versar calculates its laboratory precision and recovery as follows:

<u>Precision</u> - calculated from the duplicate sample and presented as the relative percent difference

$$\frac{a - b}{(a + b)/2} \times 100$$

<u>Recovery</u> - calculated from the spiked sample and the method standard and presented as the percent recovered

$$\frac{c}{d} \times 100$$

Where: a - first value from sample "x"
b - second value from sample "y"
c - amount calculated
d - amount spiked

Method blanks are calculated from the values obtained from instrument background and method interferences detected during analysis. A value reported does <u>not</u> mean the parameter of interest was detected but it does reflect the lower limits of detection.

Ref # 93

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: July 15, 1982

SUBJECT: New Bedford WWTP

19 JUL 1982

FROM: Daniel S. Granz
Enviornmental Engineer

TO: Jim Okun
Enforcement

On April 14, 1982, samples of ash, scum, & sludge were collected from the New Bedford WWTP. Below are the analyses done on the E.P. Toxicity procedure extracts.

	Ash (ug/l)	Scum (ug/l)	Sludge (ug/l)	Criteria Max (ug/l)
Cadmium	5K	5	5K	1000
Zinc	150	470	290	--
Lead	50K	50K	50K	5000
Chromium	10	20	50	5000
Barium	200	500	500	100,000
Silver	0.1 J	0.1 J	0.6 J	5000
Arsenic	26 J	2 J	2 K J	5000
Selenium	5 J	5 K	5K	1000
Chromium $^{+6}$	6 J	6 J	15 J	5000

K - Less than
J - Approximate because spike recoveries and/or recoveries through filters were low.

The ash, scum, and sludge samples were found not to contain any of the above contaminants in concentrations equal to or greater than the E.P. Toxicity limits. Therefore these solid wastes do not exhibit the characteristic of E.P. Toxicity.

REF No. 94

Woods Hole Oceanographic Institution
Woods Hole, MA 02543
Phone: (617) 548-1400
Telex: 951679

March 11, 1983

METCALF & EDDY
FILE _____ SUBL. _____
MAR 16 1983
REF'D TO _____ ACK. BY _____
ANS. BY _____ NOTED _____

Dr. Robert J. Reimold
Metcalf and Eddy, Inc.
50 Staniford Street
Boston, MA 02114

Dear Bob:

At long last we have completed filling in the missing information for the New Bedford Data Management System. Please accept our apologies for its tardiness as due to funding curtailments, we have had to stop working on New Bedford related projects. We are applying for future grants and try to keep abreast of developments concerning the PCB problem. However, we are not presently engaged in any research concerning the problem. If you are in need of further information please call and I promise to respond back faster than this last request; you may contact either myself or Mr. Bruce Tripp.

Sincerely,

Alan C. Davis

Alan C. Davis
Research Associate
Chemistry Department

ACD:pac
Enclosure

Biological Samples

Collection

Finfish and bottom dwelling shellfish were captured by bottom trawling or capturing in cages, while tidal shellfish were caught using procedures similar to those described in Farrington et al. (1981) p. 3 (enclosed). All samples were handled with equal care, being wrapped in clean aluminum foil and frozen immediately at -20°C to await analysis.

Analytical Results

Detailed methodology (Farrington et al., 1981) was developed as part of an EPA sponsored research and monitoring program (The Mussel Watch). We employed the Year 3 extraction procedure (p. 10) and column clean-up (p. 11) as described in the report. All analyses were performed in duplicate with < 20% standard deviation between replicate samples. Values reported are based on quantitation using packed column chromatography with recovery of internally spiked samples > 80%. Values reported are not corrected for recoveries.

Sediment, Particulate and Water Samples

Collection Results

Suspended particulate and water samples are collected using an all glass Bodman bottle (Gagosian et al., 1979). The water is immediately filtered through an all stainless steel system with the particulates being collected on 0.3 micron glass fiber filter and the water collected into a glass carboy. Filters are frozen at -20°C while water samples are immediately extracted by a single addition of methylene chloride and vigorously stirring. Sediment trap samples are collected in an all metal sequencing sediment trap (Jannasch et al., 1980) and filtered through 0.3 micron glass fiber filters and frozen at -20°C. Sediments were sampled either by a 0.1 m^2 Van Veen grab sampler or a Soutar type box corer. Samples were obtained by carefully subsampling the sediment avoiding any material which had contacted the sides of the sampling device.

Analytical Results

Water samples were completely extracted with further partitioning into methylene chloride within 24 hrs. Sediments and filters were Soxhlet extracted using acetone:hexane (suggested EPA procedure) for 48 hrs. Clean-up was similar to the biological samples with the addition of activated copper to remove elemental sulfur. Quantitation was carried out on both packed column and capillary column EC-GC with recoveries of internally spiked standards > 80%. Selected samples were run on GC/MS to confirm isomer identifications. Occasional samples were run in duplicate with the variation between replicates < 20%.

Metcalf & Eddy, Inc.
Engineers & Planners

50 Stanford Street
Boston, Massachusetts 02114
TWX 710 321 6365
Cable METEDD-Boston
Telex 681 7067 (METED UW)
Telephone (617) 367-4000

November 11, 1982

Bruce W. Tripp, Ph.D.
Research Associate
Department of Chemistry
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

Dear Dr. Tripp:

Thank you for your past assistance in sending us information on PCB analysis for the New Bedford PCB Data Management System, which we have been developing under our USEPA contract.

As you are probably aware, this data base is currently being used by the EPA and the State Task Force to develop solutions related to PCB contamination in the Acushnet Estuary.

EPA has recently directed us to apply the Data Evaluation Criteria which were discussed in our Phase 1 Report and at the Data Management System Demonstration on September 1, 1982. At present, certain information is needed to assist in completing this evaluation.

Enclosed is a copy of the summary of the Woods Hole PCB data which you sent us. We would like to know the dates of analysis of these samples. In addition, we are interested in obtaining the following information regarding the generation of these data:

1. Methods and procedures used to collect samples.

2. Method references, including extraction methods and cleanup procedures for each type of sample (sediments, aquatic biota, etc.)

3. Copies of quality control data for each study or series of samples.

4. The manufacturer and model number of the gas chromatograph used.

Any recent PCB data collected in the Acushnet Estuary area would also be greatly appreciated.

Thank you in advance for your attention to this request. If you have any questions, please feel free to contact our Analytical Chemist, Mr. Art Michelini, at 367-4400.

Sincerely,

Robert J. Reimold

Robert J. Reimold, Ph.D.
Project Manager

cc w/enclosure: Mr. Robert Mendoza, USEPA

RJR:LDE

PCB'S IN BUZZARDS BAY/NEW BEDFORD HARBOR SAMPLES.
~~ALL CONCENTRATIONS ARE REPORTED AS UG/G DRY SAMPLE~~
STATION LOCATIONS ARE APPROXIMATELY THE SAME AS
SUMMERHAYES (WHOI-76-115), CHART APPENDED. SAMPLES ARE
ORGANIZED BY STATION LOCATION AND ARRANGED CHRONOLOGICALLY WITHIN STATIONS.

CITE:

Farrington, J.W., A.C. Davis, and J. Sulanowski (1982) Unpublished Data
Reference # 94

MIE No	SAMPLE	DATE	Date Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
	SEDIMENT					421 ug/gdw	4
1029-A	ACUSHNET R. GRAB, 1 0-4	801114	8-16-81	ABOVE AEROVOX	201	37	36
—	" " 2	"	8-16-81	"	202 (A)	NA	NA
1030-A	" " 3	"	8-16-81	AT AEROVOX	203 (D)	730	520
—	" " 4	"	8-16-81	AT REVERE	205 (E)	NA	NA
1031-A	USGS CORE, 0-2	NB84SC5	2-10-80	INNER HARBOR	84	96	66
1032-A	" " 2-4	"	2-10-80	" "	"	140	88
1033-A	" " 4-6	"	2-10-80	" "	"	138	96
1034-A	" " 6-8	"	2-10-80	" "	"	106	61
1035-A	" " 14-16	"	8-18-80	" "	"	67	36
1036-A	" " 20-22	"	8-18-80	" "	"	26	12
1037-A	" " 28-30	"	8-18-80	" "		<.1	<.1
—	AST. 28 GRAB, 0-4	800725	8-20-80	" "	84	-	-
—	AST. 28 " , 4-8	"	8-20-80	" "	"	-	-
1038-A	USGS CORE, 0-2	NB81ASC4	7-20-81	" "	81	11	12
1039-A	" " ,20-22	"	7-20-81	" "	"	20	28
1040-A	AST. 23 GRAB, 0-4	800618	9-16-80	" "	117 (J)	34	12
—	BLUMER GRAB, 0-4	7306	X	BUTLER FLAT	67	NA	8.4
—	AST. 23 GRAB, 0-4	800618	8-18-80	" "	"	-	-
1041-A	AST. 16 GRAB, 0-4	790626	7-11-79	OUTER HARBOR	55 (RR)	.20	.30
1042-A	AST. 12 GRAB, 0-2	780613	6-15-78	OFF QUICKS HOLE	226 (BC)	<.1	<.1
1043-A	AST. 15 " "	790508	7-11-79	" "	" (BC)	<.1	<.1
1044-A	AST. 32 " "	800922	~~[illegible]~~ 6-10-81	" "	" (BC)	<.1	.1

1980 Sept. 22

No.	SAMPLE	DATE	Date Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
						µg/gdw	
	TISSUE POLYCHAETA						
1045-A	AST. 26 NEPTHYS INCISA	800723	8-11-80	BUTLER FLAT	67	25	15
	AST. 14 POLYCHAETE SPP.	780925	10-16-78	OFF QUICKS HOLE	226 (BC)	<.1	.96
1046-A	AST. 15 CERIANTHUS AMERICANUS	790608	7-17-79	" " "	" "	<.1	.45
	" " " (TUBE)	"	7-17-79	" " "	" "	<.1	<.1
1047-A	AST. 20 CERIANTHUS AMERICANUS	791011	10-16-79	" " "	" "	<.1	.71
1048-A	AST. 20 NEPTHYS INCISA	"	10-16-79	" " "	" "	<.1	.85
	[~~AST. 26 NEPTHYS INCISA~~]						
	MOLLUSCA						
# 1049 1049-A	AEQUIPECTEN IRRADIANS (SCALLOP)	780320	11-19-78	CLEVELAND LEDGE	227	<.1	.18
1050-A	CRASSOSTREA VIRGINICA (OYSTER)	810504	6-11-81	SLOCUM RIVER	221	<.1	.5
1051-A	"	"	6-11-81	LLOYD CENTER	222	<.1	1.0
935A (A) 1052-A	MERCENARIA MERCENARIA (QUAHOG)	780311	7-20-78	CLARK POINT	48	1.6	1.5
(942A B) 1053-A	"	"	7-20-78	OUTER HARBOR	20	.22	.20
1054-A	MODIOLUS MODIOLUS (RIBBED MUSSEL)	800327	6-25-80	FORT PHOENIX	105 (LL)	35	7
1055-A	MYTILUS EDULIS (BLUE MUSSEL)	780210	6-10-79	" "	" "	16	15
1056-A	"	800327	6-20-80	" "	" "	39	10
1057-A	"	810504	6-3-81	" "	" "	11	13
1058-A	"	810512	6-17-81	WESTPORT RIVER, MOUTH	220	<.1	.17
1059-A	"	800327	6-15-80	EAST END BEACH	219	<.1	1.0
1060-A	"	810504	6-3-81	" "	"	.44	.92

NHE NO.	SAMPLE	DATE		STA. LOCATION	STA. (DMF)	1242	1254
1061-A	CRASSOSTREA VIRGINICA	800327	6-9-80	SLOCUM RIVER	221	<.1	1.2
1062-A	"	"	6-9-80	LLOYD CENTER	222	<.1	1.2
1063-A	MYTILUS EDULIS	760925	6-30-79	CAPE COD CANAL	223	<.1	.22
1064-A	"	770819	4-18-79	CAPE COD CANAL	"	<.1	.18
1065-A	"	800114	5-1-80	" " "	"	<.1	.24
1066-A	"	800214	5-1-80	" " "	"	<.1	.26
1067-A	"	800310	5-20-80	" " "	"	<.1	.17
1068-A	"	800424	6-2-80	" " "	"	<.1	.20
1069-A	"	800522	6-10-80	" " "	"	<.1	.22
1070-A	"	791205	1-23-80	CUTTYHUNK HARBOR	224	.20	.70
1071-A	"	"	"	" WEST POND	225	.20	.70
1072-A	"	800628	10-27-80	" " "	"	<.1	.20
1073-A	"	800826	11-3-80	" " "	"	<.1	.30
1074-A	"	810519	6-11-81	" " "	"	<.1	.10
1075-A	"	781011	12-16-79	GAY HEAD	229	<.1	.10
1076-A	"	781026	12-16-79	"	"	<.1	.10
1077-A	"	790828	1-3-80	"	"	<.1	.10
1078-A	"	790926	1-3-80	"	"	<.1	.14
1079-A	"	800717	10-27-80	NANTUCKET HARBOR JETTY	"	<.1	.10
1080-A	"	800924	10-27-80	" " "	"	<.1	<.1
TRANSPLANTS, MYTILUS							
1129-A	EXPER. 1 AST. 26, MYTILUS	800721	9-24-80	NARRAGANSETT BAY	"	<.1	.62
1130-A	DEPLOY	800723	9-24-80	ESL STORAGE	"	<.1	.60
1131-A	1st RETRIEVAL, DAY 34	800827	10-1-80	CAGE 1 (TOP), 31-1	233	<.1	.75
1132-A		"	10-1-80	" " (BOTTOM)	"	<.1	.96
1133-A		"	10-7-80	CAGE 2, 31-2	234	<.1	.91
1134-A		"	10-15-80	CAGE 3, 31-3	237	<.1	1.3
1136-A	2nd " DAY 61	800924	10-15-80	CAGE 2	234	<.1	1.1
1137-A	EXPER. 2 BACKGROUND, 1980	800717	7-10-81	NANTUCKET, ESTER IS.	-	<.1	.10
1138-A	DAM COLLECTION DAY 0	810519	7-13-81	" " "	-	<1	<.1
1139-A	1st RETRIEVAL, DAY 17	810605	7-13-81	OUTER HARBOR	93 (DOD)	1.0**	1.3

SAMPLE	DATE	Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
1140-A 2nd ", DAY 28	810616	7-28-81	" "	93 "	1.4**	1.6
1141-A 3rd ", DAY 57	810715	7-28-81	" "	93 "	1.8**	2.8
1142-A 4th RETRIEVAL, DAY 105	810903	11-18-81	OUTER HARBOR	93 (DOO)	<.1**	4.8
1143-A 1st RETRIEVAL, DAY 17	810605	10-27-81	PENIKESE IS.	228	.11**	.20
1144-A 2nd ", Day 28	810616	11-18-81	" "	"	<.1**	.43
1145-A 3rd ", DAY 57	810715	11-5-81	" "	"	<.1**	.74
1146-A 4th ", Day 105	810903	11-12-81	" "	"	<.1**	.82
1147-A 1st RETRIEVAL, DAY 17	810605	10-15-81	CLEVELAND LEDGE	227	.10**	.19
1148-A 2nd ", DAY 28	810616	11-5-81	" "	"	<.1**	.37
1149-A 3rd ", DAY 57	810715	10-15-81	" "	"	.12**	.36
1150-A 4th ", DAY 105	810903	11-12-81	" "	"	<.1**	1.0

CRUSTACEA (LOBSTER)

						µg/gww
1081-A HOMARUS AMERICANUS (FLESH)	790709	9-10-79	BUTLER FLAT	37 (T)	<.1	2.2*
1082-A " VISCERA	"	9-10-79	" "	"	<.1	84*
1083-A " FLESH	"	9-10-79	" "	"	<.1	1.0*
1084-A " VISCERA	"	9-10-79	" "	"	<.1	43*
1085-A AST. 33-1 HOMARUS AMER. FLESH	800923	11-20-80	BUZZARDS BAY	17	<.1	.30*
1086-A " " VISCERA	"	11-20-80	" "	"	<.1	6.9*
1087-A AST. 33-2 FLESH	"	11-20-80	" "	231	<.1	.30*
1088-A " " VISCERA	"	11-20-80	" "	"	<.1	11.2*
1089-A AST. 22-5 HOMARUS AMER. FLESH	800617	2-4-81	" "	233	<.1	.13*

MHF NO	SAMPLE	DATE	Analyzed	STA. LOCATION	STA. (DMF)	1242 (µg/gm)	1254
1090-A	AST. 22-5 HOMARUS AMER. VISCERA	800617	2-4-81	BUZZARDS BAY	233	< .1	6.8*
1091-A	AST. 26-1 HOMARUS AMER. FLESH	800723	11-12-80	" "	"	< .1	.13*
1092-A	AST. 26-1 HOMARUS AMER. VISCERA	"	11-12-80	" "	"	< .1	3.7*
1093-A	AST. 29-1 HOMARUS AMER. FLESH	800730	2-25-81	" "	"	< .1	.34*
1094-A	AST. 29-1 HOMARUS AMER. VISCERA	"	2-25-81	" "	"	< .1	8.7*
1095-A	AST. 26-2 HOMARUS AMER. FLESH	800723	2-10-81	" "	234	< .1	.23*
1096-A	AST. 26-2 HOMARUS AMER. VISCERA	"	2-23-81	" "	"	< .1	5.9*
1097-A	AST. 24-1 HOMARUS AMER. FLESH	800626	8-11-80	" "	236	< .1	.10*
1098-A	AST. 24-1 HOMARUS AMER. VISCERA	"	"	" "	"	< .1	2.1*
1099-A	AST. 24-2 HOMARUS AMER. FLESH	"	"	" "	235	< .1	< .1*
1100-A	AST. 24-2 HOMARUS AMER. VISCERA	"	"	" "	"	< .1	4.7*
1101-A	MARKET SAMPLE HOMARUS AMER. FLESH	800826 ~~800626~~	11-20-80	CUTTYHUNK	-	< .1	.47*
1102-A	MARKET SAMPLE HOMARUS AMER. VISCERA	"	11-20-80	"	-	< .1	12.9*
1103-A	MARKET SAMPLE HOMARUS AMER. FLESH	800717	2-25-81	NANTUCKET HARBOR	-	< .1	< .1*

	SAMPLE	DATE	Date Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
1104-A	MARKET SAMPLE HOMARUS AMER. VISCERA	800717	2-23-81	NANTUCKET HARBOR	-	<.1	1.6*
1105-A	MARKET SAMPLE HOMARUS AMER. FLESH	801126	2-10-81	CAPE COD BAY	-	<.1	<.1*
1106-A	MARKET SAMPLE HOMARUS AMER. VISCERA	"	2-10-81	" " "	-	<.1	5.6*
	LOBSTER DEPURATION.						
1107-B	D-0 FLESH	800923	12-4-80	ESL	-	<.1	.30/.30* Cage 1/Cage
1108-B	" VISCERA	"	12-4-80	"	-	<.1	6.9/11.2* "
1109-B	D-36 FLESH	801029	12-4-80	"	-	<.1	.26/.93* "
1110-B	" VISCERA	"	12-4-80	"	-	<.1	15.6/4.0* "
1111-B	D-69 FLESH	801201	12-11-80	"	-	<.1	1.1/.30* "
1112-B	" VISCERA	"	12-11-80	"	-	<.1	34.0/15.3* "
1113-B	D-91 FLESH	801223	12-11-80	"	-	<.1	.20/.28* "
1114-B	" VISCERA	"	12-11-80	"	-	<.1	14.4/10.7* "
	TELEOST FLESH						µg/gdw RETURN TO gdw
1151-A	PSEUDOPLEURONECTES AMERICANUS (WINTER FLOUNDER)	790709	11-19-79	BUTLER FLAT	67 (T)	<.1	18
1152-A	SCOPHTHALMUS AQUOSUS (WINDOW-PANE) (LARGE)	"	12-18-79	" "	"	<.1	36.0
1153-A	(SMALL)	"	12-18-79	" "	"	<.1	17.0
1154-A	MUSTELUS CANIS (DOGFISH)	"	12-10-79	" "	"	<.1	1.2
1155-A	STENOTOMUS VERSICOLOR (SCUP)	"	12-3-79	" "	"	<.1	10.0
same as 1153	LEPHOPSETTA MALCULATA, 20-28 CM	"	11-13-79	" "	"	<.1	36.0
	" 12-15 CM	"	11-13-79	" "	"	<.1	18.0
1158-A	PROTONTUS TRIACANTHUS (BUTTERFISH)	"	12-10-79	" "	"	<.1	8.5

M+E NO	SAMPLE	DATE	Date Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
						421 µg/gdw	
1159-A	TAUTOGOLABRUS ADSPERSUS (CUNNER)	790709	12-10-79	BUTLER FLAT	67 (T)	.1	10.3
1160-A	PSEUDOPLEURONECTES AMERICANUS (WINTER FLOUNDER)	790421	10-29-79	WESTPORT R., EAST	220 e	.1	.48
1161-A	"	790429	10-29-79	" WEST	220 w	.1	.12
	OTHER						
1162-A	LOLIGO PEALEI (SQUID)	790709	12-3-79	BUTLER FLAT	67 (T)	.1	5.7
1163-A	NEOPANOGOE TEXONS (CRAB)	790709	11-19-79	BUTLER FLAT	37 (T)	<.1	7.0
	WATER-PARTICULATES					ng/L. (µg/gdw)	NOTE CHANGE
1164 A	AST.49 SURF.WATER	810724	8-01-81	OUTER HARBOR	93	3.9	2.8
1165 A	", DEEP WATER "		8-01-81	" "	"	61	32
1164C	", SURF. PART. "		9-21-81	" "	"	1.6	2.8
1165B-C	", DEEP PART. "		9-21-81	" "	"	1.6	2.6
1168-A	", SURF. WATER "		8-01-81	INNER HARBOR	117	5.2	4.9
1169-A	", DEEP WATER "		8-01-81	" "	"	55	21
1168B-C	", SURF. PART. "		9-21-81	" "	"	68	71
1169B-C	", DEEP PART. "		9-21-81	" "	"	80	53
1172-A	AST. 59, SURF.WATER	811029	11-16-81	" "	"	139	69
1173-A	", DEEP WATER "		11-16-81	" "	"	118	52
1172B-E	", SURF. PART. "		11-20-81	" "	"	66 (8.3)	97 (12)
1173B-D	", DEEP PART. "		11-20-81	" "	"	28 (3.8)	36 (5.0)
1178-A	", MID WATER "		11-16-81	" "	84	170	95
1178 B-E	", MID PARTIC. "		11-20-81	" "	"	174 (16)	217 (20)
1181-A 2-23-82	AST. 59, PORE WATER 0-1 CM	811029	~~12-03-81~~	INNER HARBOR	84	780	790
1182-A 2-23-82	" " " " 1-3 CM		~~12-03-81~~	" "	"	690	690
1183-A 2-23-82	" " " " 3-6 CM		~~12-03-81~~	" "	"	160	160

SURFACE

PARTICULATES

M+E No.	SAMPLE	DATE	Date Analyzed	STA. LOCATION	STA. (DMF)	1242	1254
						ng/L	
1184-A	AST. 59, PORE WATER, 6-9 CM	811029	~~11-03-81~~ 2-23-82	INNER HARBOR	84	130	140
	SEDIMENT TRAP						
						µg/gdw	
1185-A	AST. 48, SAMPLE EVERY 6 HR. 1	810722	8-02-81	OUTER HARBOR	93	.038	.120
1186-A	" " " 2	"	8-02-81	" "	"	.170	.500
1187-A	" " " 3	"	8-02-81	" "	"	.230	1.160
1188-A	" " " 4	"	8-02-81	" "	"	.320	.640
1189-A	" " " 5	"	8-16-81	" "	"	.130	.500
1190-A	" " " 6	"	8-16-81	" "	"	.280	.740
1191-A	" " " 7	"	8-16-81	" "	"	.065	.160
1192-A	" " " 8	"	8-16-81	" "	"	.780	1.020
1193-A	AST. 54, SAMPLE EVERY 6 HR. 1	810930	10-12-81	INNER HARBOR	117	8.0	11.0
1194-A	" " " 2	"	10-12-81	" "	"	13.0	12.0
1195-A	" " " 3	"	10-12-81	" "	"	9.0	12.0
1196-A	" " " 4	"	10-12-81	" "	"	13.0	21.0
1197-A	" " " 5	"	10-22-81	" "	"	12.0	19.0
1198-A	" " " 6	"	10-22-81	" "	"	12.0	24.0
1199-A	" " " 7	"	10-22-81	" "	"	9.6	19.0
1200-A	AST. 54, SINGLE 2-DAY SAMPLE	810930	10-22-81	CLARK POINT	37	3.6	4.6

*LOBSTER DATA IS REPORTED X 10^{-6} G/G WET. FROM OTHER DATA, DRY WEIGHT CAN BE CALCULATED (WET X .168 = DRY).

**LOW CONCENTRATIONS SHOWN FOR AROCLOR 1242 ARE APPROXIMATIONS.

ished Results, Woods Hole Oceanograph ..tution
J.W. Farrington, A.C. Davis, J. Sulanowski (1982)

PCB'S IN BUZZARDS BAY/NEW BEDFORD HARBOR SAMPLES.
ALL CONCENTRATIONS ARE REPORTED AS µG/G DRY SAMPLE
STATION LOCATIONS ARE APPROXIMATELY THE SAME AS
SUMMERHAYES (WHOI-76-115), CHART APPENDED. SAMPLES ARE
ORGANIZED BY STATION LOCATION AND ARRANGED CHRONOLOGICALLY WITHIN STATIONS.

	SAMPLE	DATE	STA. LOCATION	STA. (DMF)	µg/gdw 1242	1254
SEDIMENT						
	ACUSHNET R. GRAB, 1 0-4	801114	ABOVE AEROVOX	201	37	36
	" " 2	"	"	202 (A)	NA	NA
	" " 3	"	AT AEROVOX	203 (D)	730	520
	" " 4	"	AT REVERE	205 (E)	NA	NA
	USGS CORE, 0-2	NB84SC5	INNER HARBOR	84	96	66
	" " 2-4	"	" "	"	140	88
	" " 4-6	"	" "	"	138	96
	" " 6-8	"	" "	"	106	61
	" " 14-16	"	" "	"	67	36
	" " 20-22	"	" "	"	26	12
	" " 28-30	"	" "		<.1	<.1
	AST. 28 GRAB, 0-4	800725	" "	84	109	27
	AST. 28 " , 4-8	"	" "	"	113	49
	USGS CORE, 0-2	NB81ASC4	" "	81	11	12
	" " ,20-22	"	" "	"	20	28
	AST. 23 GRAB, 0-4	800618	" "	117 (J)	34	12
	BLUMER GRAB, 0-4	7306 -	BUTLER FLAT	67	NA	8.4
	AST. 23 GRAB, 0-4	800618	" "	"	10.7	3.5
	AST. 16 GRAB, 0-4	790626	OUTER HARBOR	55 (RR)	.20	.30
	AST. 12 GRAB, 0-2	780613	OFF QUICKS HOLE	226 (BC)	<.1	<.1
	AST. 15 " "	790508	" "	" (BC)	<.1	<.1
	AST. 32 " "	800922	" "	" (BC)	<.1	.1

DRAFT

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μg/gdw

	SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
TISSUE						
POLYCHAETA						
	NEPHTYS AST. 26 NEPTHYS INCISA	800723	BUTLER FLAT	67	25	15
	AST. 14 POLYCHAETE SPP.	780925	OFF QUICKS HOLE	226 (BC)	<.1	.96
	AST. 15 CERIANTHUS AMERICANUS	790508	" " "	" "	<.1	.45
	" " " (TUBE)	"	" " "	" "	<.1	<.1
	AST. 20 CERIANTHUS AMERICANUS	791011	" " "	" "	<.1	.71
	NEPHTYS AST. 20 NEPTHYS INCISA	"	" " "	" "	<.1	.85
	AST. 26 NEPTHYS INCISA					
MOLLUSCA						
	ARGO AEQUIPECTEN IRRADIANS (SCALLOP)	780320	CLEVELAND LEDGE	227	<.1	.18
	CRASSOSTREA VIRGINICA (OYSTER)	810504	SLOCUM RIVER	221	<.1	.5
	"	"	LLOYD CENTER	222	<.1	1.0
	MERCENARIA MERCENARIA (QUAHOG)	780311	CLARK POINT	48	1.6	1.5
	"	"	OUTER HARBOR	20	.22	.20
	Geukensia demissus ~~MODIOLUS~~ ~~MODIOLUS~~ (RIBBED MUSSEL)	800327	FORT PHOENIX	105 (LL)	35	7
	MYTILUS EDULIS (BLUE MUSSEL)	780210	" "	" "	16	15
	"	800327	" "	" "	39	10
	"	810504	" "	" "	11	13
	"	810512	WESTPORT RIVER, MOUTH	220	<.1	.17
	"	800327	EAST END BEACH	219	<.1	1.0
	"	810504	" "	"	.44	.92

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μg/gdw

SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
CRASSOSTREA VIRGINICA	800327	SLOCUM RIVER	221	<.1	1.2
"	"	LLOYD CENTER	222	<.1	1.2
MYTILUS EDULIS	760925	CAPE COD CANAL	223	<.1	.22
"	770819	CAPE COD CANAL	"	<.1	.18
"	800114	" " "	"	<.1	.24
"	800214	" " "	"	<.1	.26
"	800310	" " "	"	<.1	.17
"	800424	" " "	"	<.1	.20
"	800522	" " "	"	<.1	.22
"	791205	CUTTYHUNK HARBOR	224	.20	.70
"	"	" WEST POND	225	.20	.70
"	800628	" " "	"	<.1	.20
"	800826	" " "	"	<.1	.30
"	810519	" " "	"	<.1	.10
"	781011	GAY HEAD	229	<.1	.10
"	781026	"	"	<.1	.10
"	790828	"	"	<.1	.10
"	790926	"	"	<.1	.14
"	800717	NANTUCKET HARBOR JETTY	"	<.1	.10
"	800924	" " "	"	<.1	<.1
TRANSPLANTS, MYTILUS					
EXPER. 1 AST. 26, MYTILUS	800721	NARRAGANSETT BAY	"	<.1	.62
DEPLOY	800723	ESL STORAGE	"	<.1	.60
1131,A 1st RETRIEVAL, DAY 34	800827	CAGE 1 (TOP), 31-1	233	<.1	.75
1132,A	"	" " (BOTTOM)	"	<.1	.96
1133,A	"	CAGE 2, 31-2	234	<.1	.91
1134,A	"	CAGE 3, 31-3	237	<.1	1.3
1136,A 2nd " DAY 61	800924	CAGE 2	234	<.1	1.1
EXPER. 2 1137 BACKGROUND, 1980	800717	NANTUCKET ESTER IS.	-	<.1	.10
1138 DAM COLLECTION DAY 0	810519	" " "	-	<.1	<.1
1139 1st RETRIEVAL, DAY 17	810605	OUTER HARBOR	93 (DDD)	1.0**	1.3

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	SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
					µg/gdw	
1140, A	2nd ", DAY 28	810616	" "	93 "	1.4**	1.6
1141, A	3rd ", DAY 57	810715	" "	93 "	1.8**	2.8
1142, A	4th RETRIEVAL, DAY 105	810903	OUTER HARBOR	93 (DDD)	<.1 **	4.8
1143, A	1st RETRIEVAL, DAY 17	810605	PENIKESE IS.	228	<.1 **	.23
1144, A	2nd ", Day 28	810616	" "	"	<.1**	.43
1145, A	3rd ", DAY 57	810715	" "	"	<.1**	.74
1146, A	4th ", Day 105	810903	" "	"	<.1**	.82
1147, A	1st RETRIEVAL, DAY 17	810605	CLEVELAND LEDGE	227	<.1**	.24
1148, A	2nd ", DAY 28	810616	" "	"	<.1**	.37
1149, A	3rd ", DAY 57	810715	" "	"	<.1**	.44
1150, A	4th ", DAY 105	810903	" "	"	<.1**	1.0

CRUSTACEA (LOBSTER)

					µg/gww	
	HOMARUS AMERICANUS (FLESH)	790709	BUTLER FLAT	37 (T)	<.1	2.2*
	" VISCERA	"	" "	"	<.1	84*
	" FLESH	"	" "	"	<.1	1.0*
	" VISCERA	"	" "	"	<.1	43*
	AST. 33-1 HOMARUS AMER. FLESH	800923	BUZZARDS BAY	17	<.1	.30*
	" " VISCERA	"	" "	"	<.1	6.9*
	AST. 33-2 FLESH	"	" "	231	<.1	.30*
	" " VISCERA	"	" "	"	<.1	11.2*
	AST. 22-5 HOMARUS AMER. FLESH	800617	"	233	<.1	.13*

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SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
				µg/gww	
AST. 22-5 HOMARUS AMER. VISCERA	800617	BUZZARDS BAY	233	< .1	6.8*
AST. 26-1 HOMARUS AMER. FLESH	800723	" "	"	< .1	.13*
AST. 26-1 HOMARUS AMER. VISCERA	"	" "	"	< .1	3.7*
AST. 29-1 HOMARUS AMER. FLESH	800730	" "	"	< .1	.34*
AST. 29-1 HOMARUS AMER. VISCERA	"	" "	"	< .1	8.7*
AST. 26-2 HOMARUS AMER. FLESH	800723	" "	234	< .1	.23*
AST. 26-2 HOMARUS AMER. VISCERA	"	" "	"	< .1	5.9*
AST. 24-1 HOMARUS AMER. FLESH	800626	" "	236	< .1	.10*
AST. 24-1 HOMARUS AMER. VISCERA	"	" "	"	< .1	2.1*
AST. 24-2 HOMARUS AMER. FLESH	"	" "	235	< .1	< .1*
AST. 24-2 HOMARUS AMER. VISCERA	"	" "	"	< .1	4.7*
MARKET SAMPLE HOMARUS AMER. FLESH	800626	CUTTYHUNK	-	< .1	.47*
MARKET SAMPLE HOMARUS AMER. VISCERA	"	"	-	< .1	12.9*
MARKET SAMPLE HOMARUS AMER. FLESH	800717	NANTUCKET HARBOR	-	< .1	< .1*

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SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
					µg/gww
MARKET SAMPLE HOMARUS AMER. VISCERA	800717	NANTUCKET HARBOR	-	<.1	1.6*
MARKET SAMPLE HOMARUS AMER. FLESH	801126	CAPE COD BAY	-	<.1	<.1*
MARKET SAMPLE HOMARUS AMER. VISCERA	"	" " "	-	<.1	5.6*
LOBSTER DEPURATION,					
D-0 FLESH	800923	ESL	-	<.1	.30/.30* Cage 1/ Cage
" VISCERA	"	"	-	<.1	6.9/11.2* "
D-36 FLESH	801029	"	-	<.1	.26/.93* "
" VISCERA	"	"	-	<.1	15.6/4.0* "
D-69 FLESH	801201	"	-	<.1	1.1/.30* "
" VISCERA	"	"	-	<.1	34.0/15.3* "
D-91 FLESH	801223	"	-	<.1	.20/.28* "
" VISCERA	"	"	-	<.1	14.4/10.7* "
TELEOST FLESH					µg/gdw
PSEUDOPLEURONECTES AMERICANUS (WINTER FLOUNDER)	790709	BUTLER FLAT	67 (T)	<.1	18
SCOPHTHALMUS AQUOSUS (WINDOW-PANE)				<.1	
(LARGE)	"	" "	"	<.1	36.0
(SMALL)	"	" "	"	<.1	17.0
MUSTELUS CANIS (DOGFISH)	"	" "	"	<.1	1.2
STENOTOMUS VERSICOLOR (SCUP)	" Stenotomus chrysops	" "	"	<.1	10.0
LEPHOPSETTA MACULATA, 20-28 CM	" Scopthalmus aquosus	" "	"	<.1	36.0
" 12-15 CM	"	" "	"	<.1	18.0
PROTONTUS TRIACANTHUS (BUTTERFISH) Poronotus	" Peprilus triacanthus	" "	"	<.1	8.5

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SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
				µg/gdw	
TAUTOGOLABRUS ADSPERSUS (CUNNER)	790709	BUTLER FLAT	67 (T)	.1	10.3
PSEUDOPLEURONECTES AMERICANUS (WINTER FLOUNDER)	790421	WESTPORT R., EAST	220 e	.1	.48
"	790429	" WEST	220 w	.1	.12
OTHER					
LOLIGO PEALEI (SQUID)	790709	BUTLER FLAT	67 (T)	.1	5.7
NEOPANOGOE TEXONS (CRAB) NEOPANOPE TEXANA SAYI VISCERA & FLESH	790709	BUTLER FLAT	37 (T)	< .1	7.0
WATER-PARTICULATES				ng/L. (µg/gdw)	
AST.49	SURF.WATER 810724	OUTER HARBOR	93	3.9	2.8
"	", DEEP WATER "	" "	"	61	32
"	", SURF. PART. "	" "	"	1.6	2.8
"	", DEEP PART. "	" "	"	1.6	2.6
"	", SURF. WATER "	INNER HARBOR	117	5.2	4.9
"	", DEEP WATER "	" "	"	55	21
"	", SURF. PART. "	" "	"	68	71
"	", DEEP PART. "	" "	"	80	53
AST. 59,	SURF.WATER 811029	" "	"	139	69
"	", DEEP WATER "	" "	"	118	52
"	", SURF. PART. "	" "	"	66 (8.3)	97 (12)
"	", DEEP PART. "	" "	"	28 (3.8)	36 (5.0)
"	", MID WATER "	" "	84	170	95
"	", MID PARTIC. "	" "	"	174 (16)	217 (20)
AST. 59, 0-1 CM	PORE WATER, 811029	INNER HARBOR	84	780	790
" ", " ", " 1-3 CM		" "	"	690	690
" ", " ", " 3-6 CM		"	"	160	50

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SAMPLE	DATE	STA. LOCATION	STA. (DMF)	1242	1254
				ng/L	
AST. 59, PORE WATER, 6-9 CM	811029	INNER HARBOR	84	130	.140
SEDIMENT TRAP					
				µg/gdw	
AST. 48, SAMPLE EVERY 6 HR. 1	810722	OUTER HARBOR	93	.038	.120
" " " 2	"	" "	"	.170	.500
" " " 3	"	" "	"	.230	1.160
" " " 4	"	" "	"	.320	.640
" " " 5	"	" "	"	.130	.500
" " " 6	"	" "	"	.280	.740
" " " 7	"	" "	"	.065	.160
" " " 8	"	" "	"	.780	1.020
AST. 54, SAMPLE EVERY 6 HR. 1	810930	INNER HARBOR	117	8.0	11.0
" " " 2	"	" "	"	13.0	12.0
" " " 3	"	" "	"	9.0	12.0
" " " 4	"	" "	"	13.0	21.0
" " " 5	"	" "	"	12.0	19.0
" " " 6	"	" "	"	12.0	24.0
" " " 7	"	" "	"	9.6	19.0
AST. 54, SINGLE 2-DAY SAMPLE	810930	CLARK POINT	37	3.6	4.6

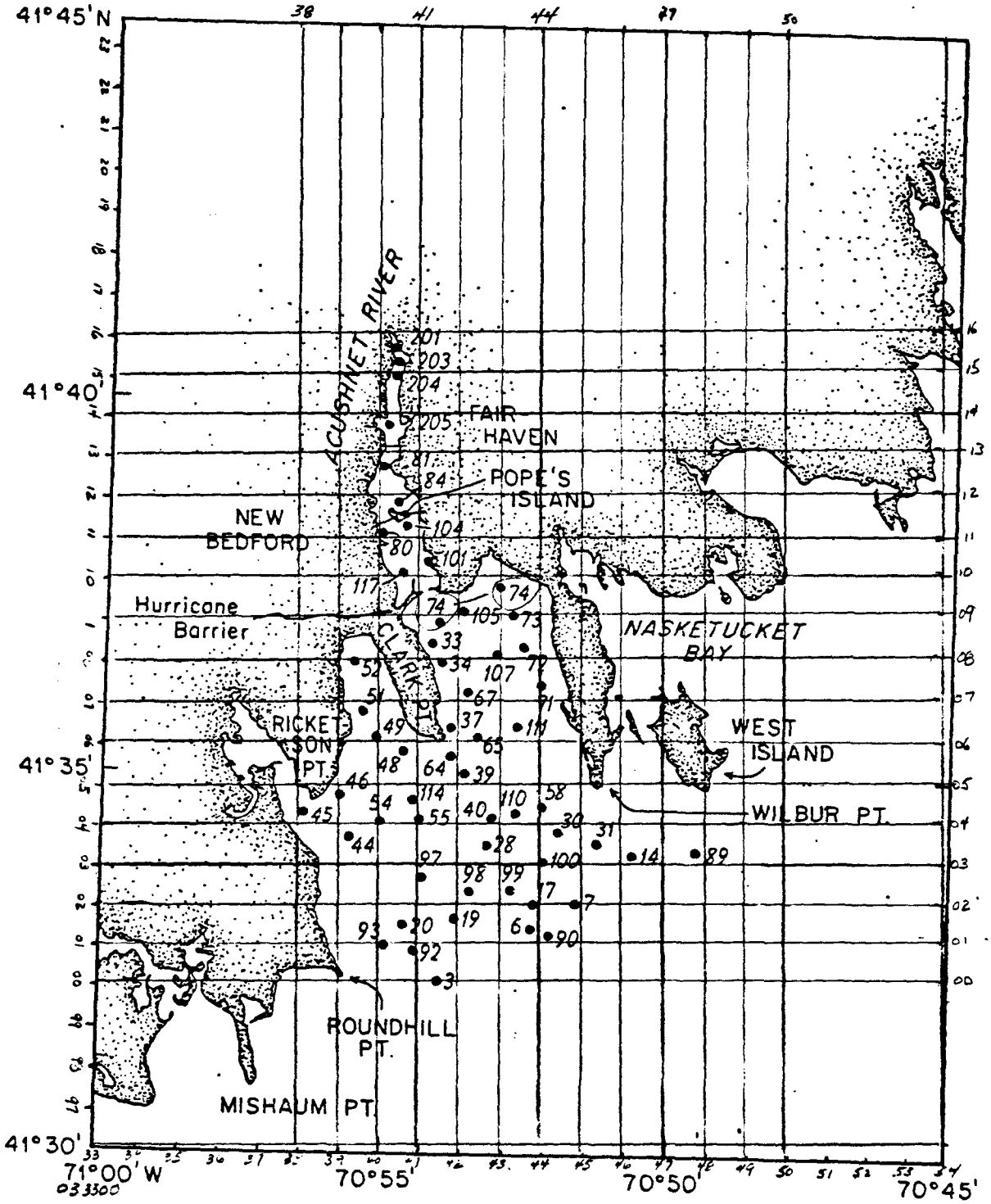
*LOBSTER DATA IS REPORTED X 10^{-6} G/G WET. FROM OTHER DATA, DRY WEIGHT CAN BE CALCULATED (WET X .168 = DRY).

**LOW CONCENTRATIONS SHOWN FOR AROCLOR 1242 ARE APPROXIMATIONS.

KEY: TRANSFER ALL NEW BEDFORD HARBOR/BUZZARDS BAY STATIONS TO A NUMERICAL SYSTEM EXPANDED FROM SUMMERHAYES ET AL. (WHOI-76-115). COINCIDENCE OF STATION LOCATIONS IS APPROXIMATE.

DMF, SMU, WHOI	STA. LOCATION	SUMMERHAYES NO
A	Achusnet R., 2	203
AA	area II	54
AAA	area III	99
B	Acushnet R.	201
BB	area III	44
BBB, YY	" "	~~17~~
C	Acushnet R.	201
CC, SMU-6, SMU-7	area III, Ricketsons Pt.	45
CCC	area III	~~19~~
D	Acushnet R., 3	204
DD	Apponagansett Bay	207
DDD	area III	92
E	Acushnet R., 4	205
EE	area III	208
EEE	area III	209
F	Acushnet R.	206
FF	area III	~~7~~
G	Popes Island, So.	104
GG	area III	100
GGG	area II	114
H	inner harbor	80
HH	area III	30
HHH	" "	100
I	inner harbor	80
II	area II, Sconticut Nk.	71
III	area III	31
J	inner harbor	117
JJ	area II, Fairhaven	73
JJJ	area III, West I.	210
K	area II, outer harbor	211
KK	area II, Fairhaven	74
KKK	area III	98
L	area II, entrance channel	78
LL	" ", outer harbor	105
LLL	" "	58
M, N	" ", outer harbor	33
MM	inner harbor, Fort Phoenix	212
MMM	area III	~~14~~
NN	inner harbor, Fairhaven	101
O, P, SMU-1	area II, outer harbor	34
OO	Nasketucket Bay	213
PP	Nasketucket Bay, West I.	214
PPP	area III	90
Q, R	area II, Butler Flat	37
QQ	Buzzards Bay, West. I.	215
QQQ	area III	~~6~~
RR	area II	55

DMF, SMU, WHOI	STA. LOCATION	SUMMERHAYES NO.
S	area II, inner harbor	107
SS	area III	97
SSS		216
T	area II, entrance channel	67
TT	area II	40
U	area II, inner harbor	111
UU	area III	~~3~~
V	area II, Butler Flat	65
VV	Buzzards Bay, Mishaum Pt.	217
W	area II	39
WW	Area II, Ricketsons Pts.	46
X	area III	28
Y	area II, Clarks Cove	49
Z, SMU-4	area II, Clarks Cove	52
ZZ	area III, Round Hill	218
2 (Hatch, SMU)	area II, Butler Flat	35
3 " "	area II	63
5 " "	area II, Clarks Cove	50
8 " "	area III, Dartmouth	23
9 " "		
10 " "	area III	96
11 " "	" "	27
12 " "	area II, Clarks Cove	51
13 " "		
14 " "	Slocum R.	
15 " "	" "	
16 " "	" "	
17 " "	" "	
BC (WHOI/DOE)	Quicks Hole	226
WHOI/SG	East End Beach	219
"	Westport R.	220
"	Slocum R.	221
"	Lloyd Center	222
"	Cape Cod Canal	223
"	Cuttyhunk	224
"	Cuttyhunk West Pond	225
"	Cleveland Ledge	227
"	Penikese Island	228
"	Gay Head	229
"	Nantucket	230
"	Ester Island	231
"	Buzzards Bay	232
"	Buzzards Bay, Cage 1	233
"	Buzzards Bay, Cage 2	234
"	Wepecket Island	235
"	" "	236
"	Buzzards Bay, Cage 3	237
"		238
"		239
"	Westport R.	240
"	Westport R.	241


41°45'N
41°40'
41°35'
41°30'
71°00' W
70°55'
70°50'
70°45'
ACUSHNET RIVER
FAIR HAVEN
POPE'S ISLAND
NEW BEDFORD
Hurricane Barrier
CLARK PT.
NASKETUCKET BAY
RICKETSON PT.
WEST ISLAND
WILBUR PT.
ROUNDHILL PT.
MISHAUM PT.

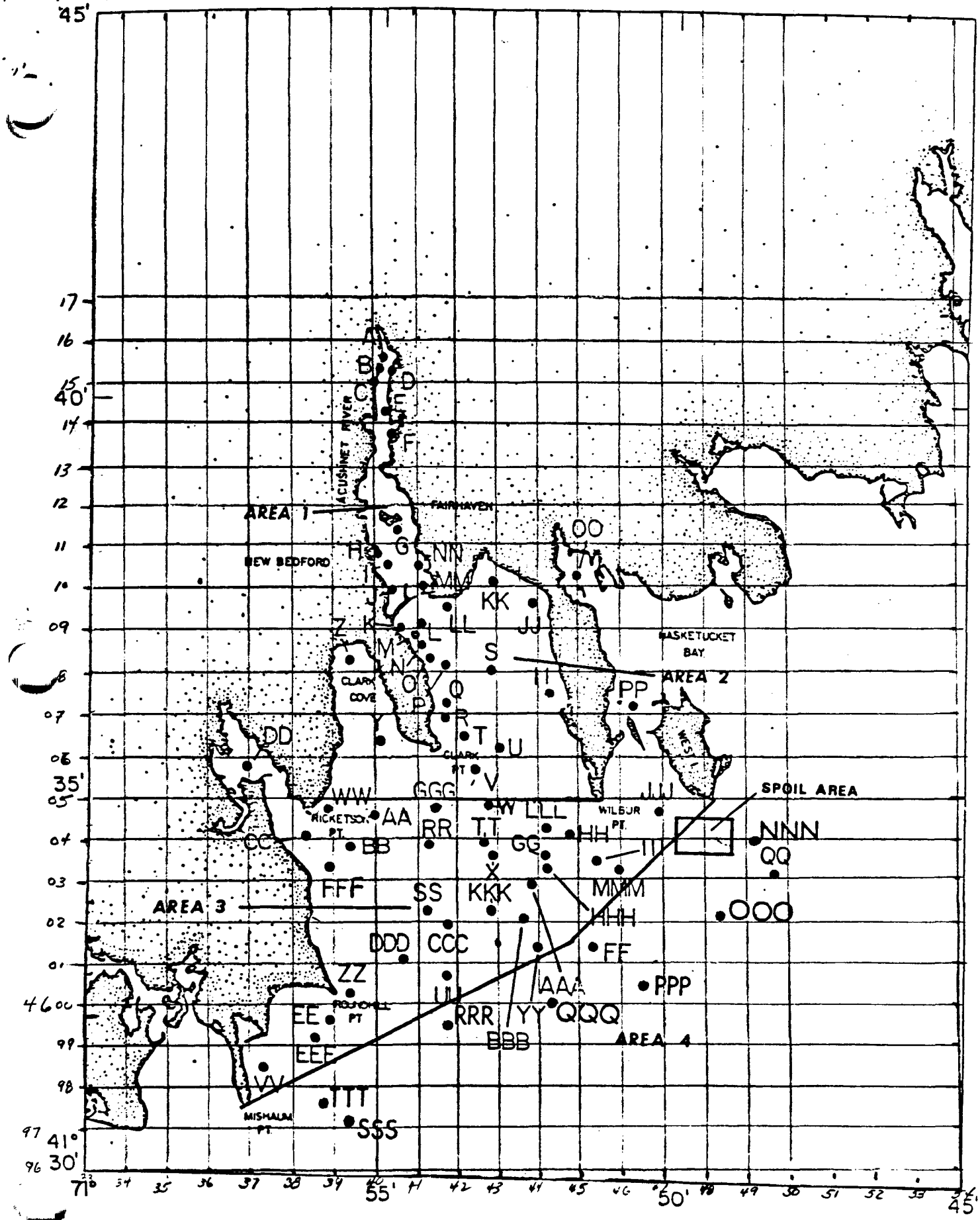


Figure 3. Study area and sampling sites.

03

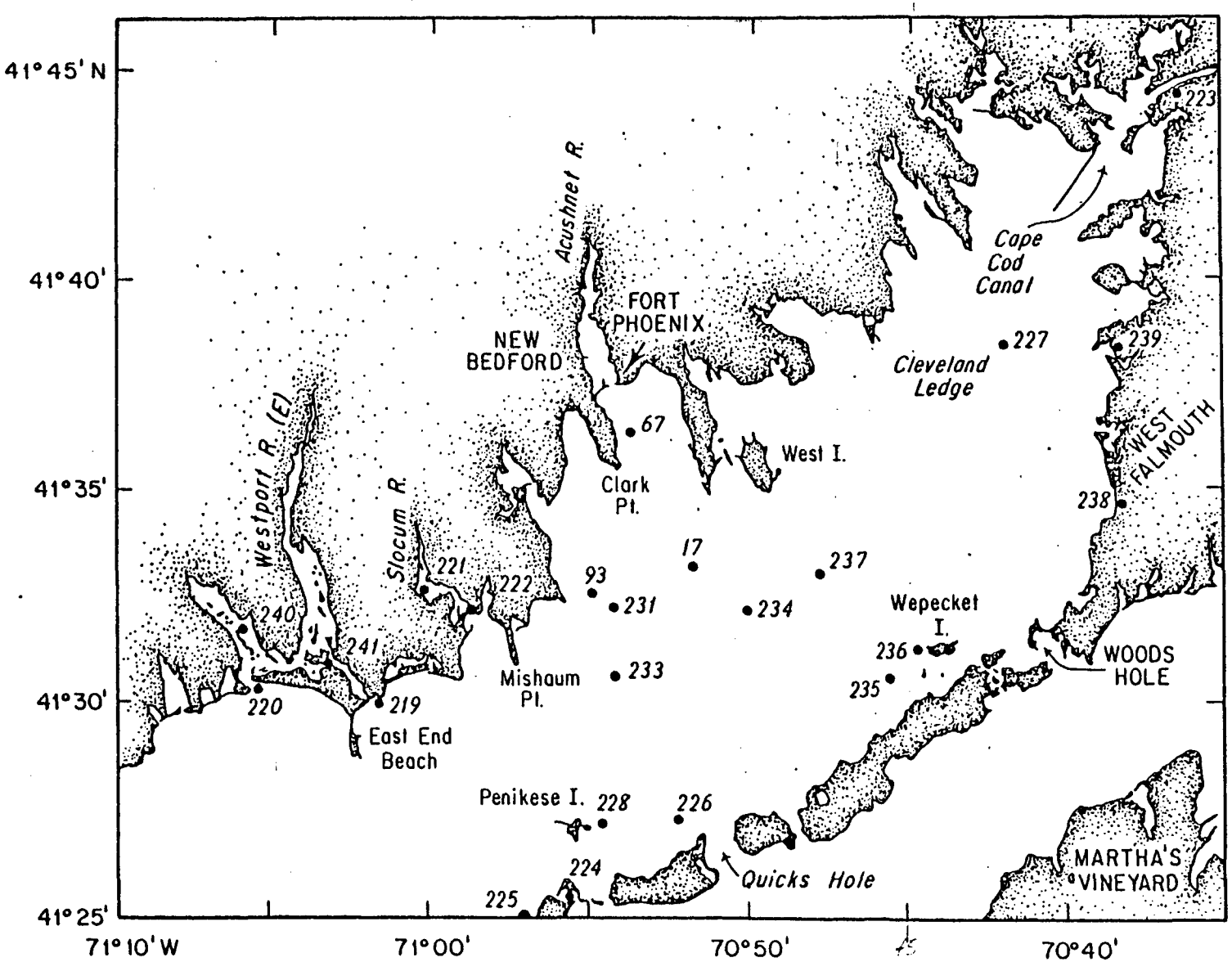

41°45' N
41°40'
41°35'
41°30'
41°25'
71°10' W
71°00'
70°50'
70°40'
Acushnet R.
FORT PHOENIX
NEW BEDFORD
Cape Cod Canal
Cleveland Ledge
WEST FALMOUTH
West I.
Clark Pt.
Westport R. (E)
Slocum R.
Mishaum Pt.
Wepecket I.
WOODS HOLE
East End Beach
Penikese I.
Quicks Hole
MARTHA'S VINEYARD
223
227
239
67
17
93
231
234
237
238
221
222
240
241
220
219
233
236
235
228
226
224
225

TABLE (E)

RESULTS OF SEDIMENT SAMPLE ANALYSES

FOR PCB's IN NEW BEDFORD HARBOR

July and October 1981

Gerald Szal, DWPC, Westboro

Chemical Analysis by Cambridge Analytical Associates

STATION NO.		DATE	TYPE OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254	% DRY WEIGHT
I	a	7/21	Pd	approx. 0-4	34	34	70
	a'	7/22	sc	0-4	35	--	*
	a'	7/22	sc	4-8	1.4	--	*
	b	7/21	Pd	approx. 0-4	14	18	78
	c	7/21	Pd	" "	230	200	71
	c'	7/22	sc	0-4	1300	--	*
	c'	"	sc	4-8	100	--	67
	c'	"	sc	8-12	10	--	*
II	a		sc	0-4	1140	--	*
	a'	"	Pd	approx. 0-4	130	--	43
	b	"	"	0-4	670	--	*
	b'	"	Pd	approx. 0-4	1080	--	41
	c	"	"	0-4	460	--	*
	c	"	"	4-8	10	--	*
	c	"	"	8-12	4.0	--	17
III	a	"	"	0-4	2300	--	*
	a	"	"	4-8	100	--	*
	b	"	"	0-4	500	--	*
	b'	"	Pd	approx. 0-4	1300	--	42
	c	"	"	0-4	150	--	67
	c	"	"	4-8	5.6	--	*
	c	"	"	8-12	3.6	--	52
IV	a	"	"	0-4	190	--	*
	a'	"	Pd	approx. 0-4	135	--	33
	b	7/23	"	0-5	460	--	36
	b	"	"	5-9½	60	--	46
	b	"	"	9½-14	1.5	--	48
	b	"	"	0-5	36	--	79
	c	"	"	5-10	.02	--	74
V	a	"	"	0-7	80	--	38
	a	"	"	15-22	0.8	--	42
	b	"	"	0-7	30	--	41
	b	"	"	7-14	1.0	--	46
	c	"	"	0-8	34	--	38
	c	"	"	8-16	70	--	44
	d	"	"	0-7	4.2	4.4	*
	d	"	"	7-14	100	26	*

Results of Sediment Sampling Analyses

For PCB's in New Bedford Barbor (Cont.)

STATION NO.	DATE	OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254	% DRY WEIGHT
VI a	22 "	"	0-6½	170	22	*
a	-2 "	"	6½-13	1.3	--	*
b	-24 "	Pd	approx. 0-4	12	--	*
c	-25 "	"	" "	8.0	--	*
VII a	7/28	1c	0-4	12	5.3	*
b	-14 "	"	"	8.0	3.6	*
c	"	"	"	13	10	40
VII.1a	-17 "	"	"	11	3.3	*
b	"	"	"	24	34	39
c	-19 "	"	"	10	13	35
VIII a	10/2	"	"	6.7	7.0	45
b	"	"	"	7.5	6.0	37
IX a	10/2	"	"	0.1	0.3	64
b	"	"	"	5.0	5.6	63
c	"	"	"	7.6	6.5	48
X b	7/28	"	"	8.6	13	*
a	"	"	"	5.4	2.3	*
XI a	7/21	Pd	approx. 0-4	1.1	2.4	73
b	"	"	"	2.3	3.7	69
c	"	"	"	0.9	0.69	68
d	"	"	"	2.6	2.4	57
XII a	10/2	1c	0-4	1.8	2.8	62
b	"	"	"	4.2	4.0	59
c	"	"	"	1.4	3.2	57
XIIIa	10/2	"	"	25	5.5	59
b	-2 10/2	"	"	23	6.2	55
XIV a	7/28	"	"	--	--	*
a'	10/1	"	"	6.4	6.8	64
b	7/28	"	"	5.0	5.7	52
b'	10/1	"	"	1.2	1.5	64
c	7/28	"	"	1.4	3.3	*
c'	10/1	"	"	0.6	6.6	69
XV a	7/28	"	"	2.6	3.2	*
a'	10/2	"	"	2.0	5.0	65
b	7/28	"	"	0.7	4.4	*
b'	10/2	"	"	4.5	2.0	68

Results of Sediment Sampling Analyses

For PCB's in New Bedford Harbor (Cont.)

STATION NO.	DATE	TYPE OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254	% DRY WEIGHT
XV c	7/28	lc	0-4	5.5	4.0	*
c'	10/2	"	"	2.1	3.0	67
XVI a	7/27	"	"	9.0	14	43
b	"	"	"	--	15	57
c	"	"	"	3.4	22	50
c'	10/1	"	"	3.4	4.7	*
XVII a	7/27	"	"	1.3	45	50
a'	10/1	"	"	7.0	16	42
b	7/27	"	"	7.7	25	50
b'	10/1	"	"	2.5	7.3	76
c	7/27	"	"	3.0	4.0	65
c'	10/1	"	"	2.2	1.8	62
XVIII a	10/1	"	"	0.7	1.1	68
b	10/1	"	"	0.5	1.2	69
a'	7/27	"	"	1.7	2.2	74
c	10/1	"	"	0.3	0.4	81
d	"	"	"	0.2	0.5	61

Legend:

Pd = Peterson dredge

sc = 24" hand-held core

lc = winch-operated 4' core

Note: An apostrophe after a station represents a second sample taken at that station.

$$\% \text{ Dry Weight} = \frac{\text{dry weight (g)}}{\text{wet weight (g)}} \times 100$$

*insufficient volume of sample to calculate % dry weight

NEW BEDFORD
FAIRHAVEN
ACUSHNET RIVER
NEW BEDFORD HARBOR
Ropes Island
Fairhaven
Radio Towers (WBSM)
Radio Tower (WBSM)
Radio Tower (WNBH)
State Pier
Riverside Cem
Cushman Park
Tidal Flat
Harbor View
BUZZARD
FT PHOENIX BEACH STATE RESERVATION
RURAL CEMETERY
Blue Corner
CLARKS
COVE
BAY
SOUTH DARTMOUTH
Hoshers Pt
Solemar Hospital
Butler Flats Lighthouse
PORT RODMAN MILITARY RESERVATION
Clarks Pt
Sewage Disposal
CORPORATE BOUNDARY
SEAWALL
Floodgate
Lights
Playground
Quarries
Substation
Drive-in Theater
Hospital
Library
Cushman Sch
Anthony Sch
Hastings Jr High Sch
Rogers Sch
Palmer Island
Fish Island
Marine Park
Liveseys Park
Woodside Mem Park
Oxford Park
Brooklawn Park
Tootle Lane
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REVISED COPY

RESULTS OF [redacted] ANALYSES

FOR PCB's IN NEW BEDFORD HARBOR

July and October 1981

Gerald Szal, DWPC, Westboro

Chemical Analysis by Cambridge Analytical Associates

STATION NO.		DATE	TYPE OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254
I	a	7/21	Pd	approx. 0-4	34	34
	a'	7/22	sc	0-4	35	--
	a'	7/22	sc	4-8	1.4	--
	b	7/21	Pd	approx. 0-4	14	18
	c	7/21	Pd	" "	230	200
	c'	7/22	sc	0-4	1300	--
	c'	"	sc	4-8	100	--
	c'	"	sc	8-12	10	--
II	a		sc	0-4	1140	--
	a'	"	Pd	approx. 0-4	130	--
	b	"	"	0-4	670	--
	b'	"	Pd	approx. 0-4	1080	--
	c	"	"	0-4	460	--
	c	"	"	4-8	10	--
	c	"	"	8-12	4.0	--
III	a	"	"	0-4	2300	--
	a	"	"	4-8	100	--
	b	"	"	0-4	500	--
	b'	"	Pd	approx. 0-4	1300	--
	c	"	"	0-4	150	--
	c	"	"	4-8	5.6	--
	c	"	"	8-12	3.6	--
IV	a	"	"	0-4	190	--
	a'	"	Pd	approx. 0-4	135	--
	b	7/23	"	0-5	460	--
	b	"	"	5-9½	60	--
	b	"	"	9½-14	1.5	--
	c	"	"	0-5	36	--
	c	"	"	5-10	.02	--
V	a	"	"	0-7	80	--
	a	"	"	15-22	0.8	--
	b	"	"	0-7	30	--
	b	"	"	7-14	1.0	--
	c	"	"	0-8	34	--
	c	"	"	8-16	70	--
	d	"	"	0-7	4.2	4.4
	d	"	"	7-14	100	26

Results of Sediment Sampling Analyses

For PCB's in New Bedford Harbor (Cont.)

STATION NO.	DATE	OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254
VI a	"	"	0-6½	170	22
a	"	"	6½-13	1.3	--
b	"	Pd	approx. 0-4	12	--
c	"	"	" "	8.0	--
VII a	7/28	1c	0-4	12	5.3
b	"	"	"	8.0	3.6
c	"	"	"	13	10
VII.1a	"	"	"	11	3.3
b	"	"	"	24	34
c	"	"	"	10	13
VIII a	10/2	"	"	6.7	7.0
b	"	"	"	7.5	6.0
IX a	10/2	"	"	0.1	0.3
b	"	"	"	5.0	5.6
c	"	"	"	7.6	6.5
X b	7/28	"	"	8.6	13
a	"	"	"	5.4	2.3
XI a	7/21	Pd	approx. 0-4	1.1	2.4
b	"	"	"	2.3	3.7
c	"	"	"	0.9	0.69
d	"	"	"	2.6	2.4
XII a	10/2	1c	0-4	1.8	2.8
b	"	"	"	4.2	4.0
c	"	"	"	1.4	3.2
XIIIa	10/2	"	"	25	5.5
b	10/2	"	"	23	6.2
XIV a	7/28	"	"	--	--
a'	10/1	"	"	6.4	6.8
b	7/28	"	"	5.0	5.7
b'	10/1	"	"	1.2	1.5
c	7/28	"	"	1.4	3.3
c'	10/1	"	"	0.6	6.6
XV a	7/28	"	"	2.6	3.2
a'	10/2	"	"	2.0	5.0
b	7/28	"	"	0.7	4.4
b'	10/2	"	"	4.5	2.0

Results of Sediment Sampling Analyses For PCB's in New Bedford Harbor (Cont.)

STATION NO.		DATE	TYPE OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254
XV	c	7/28	1c	0-4	5.5	4.0
	c'	10/2	"	"	2.1	3.0
XVI	a	7/27	"	"	9.0	14
	b	"	"	"	--	15
	c	"	"	"	3.4	22
	c'	10/1	"	"	3.4	4.7
XVII	a	7/27	"	"	1.3	45
	a'	10/1	"	"	7.0	16
	b	7/27	"	"	7.7	25
	b'	10/1	"	"	2.5	7.3
	c	7/27	"	"	3.0	4.0
	c'	10/1	"	"	2.2	1.8
XVIII	a	10/1	"	"	0.7	1.1
	b	10/1	"	"	0.5	1.2
	a'	7/27	"	"	1.7	2.2
	c	10/1	"	"	0.3	0.4
	d	"	"	"	0.2	0.5

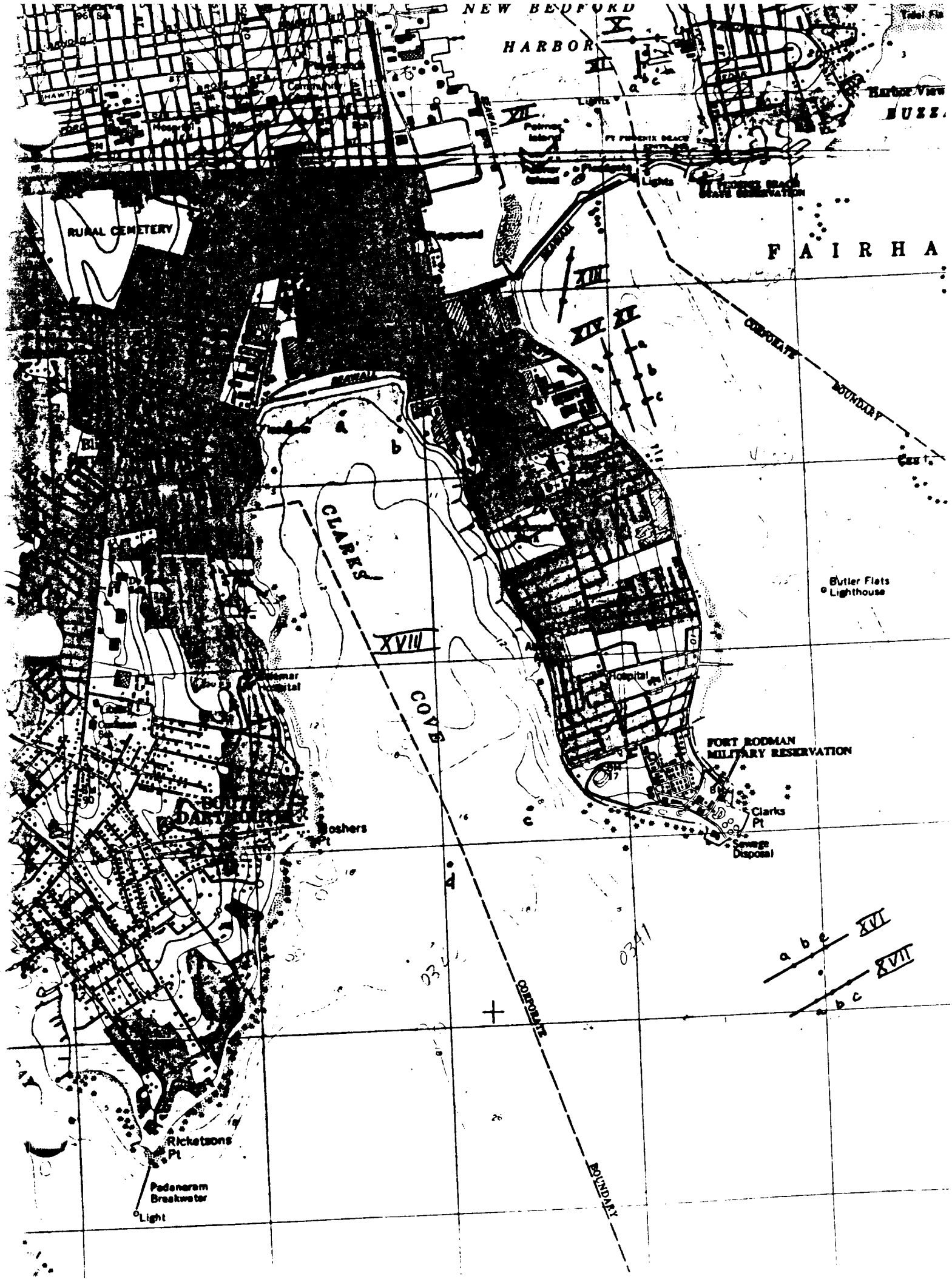
Legend:

Pd = Peterson dredge

sc = 24" hand-held core

1c = winch-operated 4' core

Note: An apostrophe after a station represents a second sample taken at that station.


NEW BEDFORD
HARBOR
Harbor View
RURAL CEMETERY
FAIRHA
CORPORATE BOUNDARY
CLARKS
COVE
Butler Flats
Lighthouse
Hospital
FORT RODMAN
MILITARY RESERVATION
Clarks
Pt
Sewage
Disposal
Boshers
Pt
Ricketsons
Pt
Padanaram
Breakwater
Light
CORPORATE
BOUNDARY

Brooklawn Park
Quarries
Substation
RIVER
TOOTLE LANE
North Fairhaven
Woodside Cem
Livesey Park
Oxford
INTERCHANGE 24
INTERCHANGE 23
INTER 22
Riverside Cem
Radio Towers (WBSM)
ACUSHNET
FAIRHAVEN
Drive-in Theatre
Ropes Island
Radio Tower (WBSM)
Cushman Park
Fairhaven
Marine Park
Fish Island
Island
Radio Tower (WNBH)
State Pier
NEW BEDFORD
HARBOR
Harbor View
RURAL CEMETERY

Ref # 96

tibbetts engineering corp.
210 DEANE STREET, NEW BEDFORD, MASSACHUSETTS 02746,
TELEPHONE (617) 996-5633

RICHARD L. SILVIERA, P.E., R.L.S.
ROBERT C. VERKADE, P.E., R.L.S.
FRED E. TIBBETTS, III, PhD.
HENRY C. GOVONI

DUARTE M. ANDRADE
GERARD G. CHAREST, JR.
JOHN DeMELLO
JOSEPH DOMINGOS
RICHARD A. MUNROE
RICHARD H. SETTELE

April 28, 1982

Metcalf & Eddy, Inc.
50 Stanford Street
Boston, Massachusetts 02114

Attn: Mr. James T. Maughan

Dear Mr. Maughan:

In response to the request to me dated April 26, 1982, I have compared my records of our PCB's analyses (various isomers) performed on various samples over the last five (5) years, with the data written on the computer print out sheet sent to me with the April 26, 1982 letter. I find no errors on your computer print out description of the analyses performed by our firm on our three (3) samples dated February 4, 1980.

For your information, we collected a new set of four (4) shallow surface grab bottom sediment samples on April 22, 1981. Two (2) of these four (4) 1981 samples were collected at the same locations as two (2) of the three (3) 1980 samples, and the other two (2) samples were collected at new locations about fifty (50) feet north of the 1980 samples collection area. These four (4) samples collected on April 22, 1981 were collected for the Fairhaven Marine Co. as part of the same overall project as was collected the first set of samples collected on February 4, 1980 (described above).

On each of the four (4) samples collected on April 22, 1981, an EP Toxicity Test solution was prepared per the procedure specified under the Federal RCRA (Fed. Register, Vol. 45 #98 dated May 19, 1980). The analysis of each of the April 22, 1981 sample solutions was performed in a Massachusetts DEQE Approved Laboratory for PCB's analytical work.

	SAMPLE NO.	COLLECTION DATE	PCB's ANALYSIS*
1201	S1112G	4/22/81	less then 1 part per billion
1202	S1112H	4/22/81	" " "
1203	S1112I	4/22/81	" " "
1204	S1112J	4/22/81	" " "

*The PCB analysis concentration limit was 1 part per billion based upon the Aroclor Standard 1016, 1221, 1232, 1242, or 1248. A comparison was performed against each of the specified Aroclor Standards.

METCALF & EDDY, INC.
FILE ____ SUBJ. ____
APR 30 1982
REF'D TO ____ ACK. BY ____
ANS. BY ____ NOTED ____

For your information, I have enclosed brochure information which describes our TEC State Approved Anylitical Laboratory and our full service Engineering Firm, and my own résumé. Please telephone me directly if we can ever assist you with any projects being performed by your firm.

Very truly yours,
TIBBETTS ENGINEERING CORP.

Fred E. Tibbetts III

FET/js

Fred E. Tibbetts, III, Ph.D., CPC
Director
Research & Environmental Affairs

Encl: TEC, M and E Lab Brochures
Résumé of Dr. Tibbetts

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration

Ref. # 97

Boston District
585 Commercial Street
Boston, Massachusetts 02109
Telephone: 617-223-5699

MAY 17 1982

May 11, 1982

Mr. Robert E. Mendoza
U.S. Environmental Protection Agency
Region I, Room 2203
J. F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Mendoza:

This is in response to your letter of April 26, 1982 which requested certain information regarding our analyses of lobsters collected from New Bedford Harbor for PCB's. We have reviewed our records and have the following comments in reply to the five items noted in your request:

1. This item lists 15 samples which were collected on various dates. The numbers listed appear to be State of Mass. sample identification numbers (from specific locations in New Bedford Harbor; eg. "3-SS"), however, none of the numbers listed match the state identification tag numbers submitted to our laboratory. Although they are similar, the samples analyzed by our lab did not have a numerical prefix before the letters. Therefore, we are not sure whether these specific numbers were analyzed by our Boston District Laboratory.

Since the state agencies did not submit any collection report records to us along with the samples, we do not know the exact dates of collection of any of the samples. This information would have to be obtained from the agencies that collected the samples. However, we do know the dates that we received the samples which we analyzed. When they were received by our Boston District Laboratory they contained only a state identification tag number. All of these samples were immediately assigned an FDA sample number (eg. 81-253-946).

In answer to your question as to whether the units are in wet weight or dry weight, all of Boston District's analytical results for PCB's are on a wet weight basis.

	FDA Sample Number	Date Received by Boston-DO	Part of Organism Analyzed
2.	81-253-946 thru 81-253-953	6/8/81 - 6/24/81	
3.	80-159-161 80-159-162 80-159-163	10/31/79	Edible portion only (includes tamale)
	80-159-306 thru 80-159-310*	10/19/79	"
4.	80-159-879	10/2/79	"
	79-159-301** thru 79-159-305	9/19/79	"
	80-158-841	10/5/79	"
	80-158-842	"	"
	80-158-844	"	"
	80-158-846	"	"
5.	79-106-188 (Eel)		Edible portion only (skin & bones discarded)

*We have no record of 80-159-311 which is listed in your letter. This group of samples was numbered from 80-159-306 to 80-159-310.

**Incorrectly listed on your letter as 80-159-301 to 80-159-305.

Method of Analysis (Revised 1979)

Pesticide Analytical Manual (PAM) Vol. I, Sections 212.13(a), 212.14(d) with modification: Elute with 150 ml Petroleum Ether prior to the 6% Ethyl Ether/ Petroleum Ether elution step.

Preparation of Samples

Fresh or frozen whole lobsters are placed in steam cabinet or autoclave and steamed for 20-30 minutes (depending on whether fresh or frozen). Edible portion of lobster meat (including tamale) is picked from the lobster. The edible meat and tamale is composited with a Hobart meat grinder. This ground composite is then used for the analysis. The shell and inedible portions are discarded.

For your information we have enclosed a list of lobster samples (Attachment A) which were collected by state agencies from the New Bedford Harbor area and subsequently analyzed by our Boston District laboratory. This list contains the FDA sample numbers, the state identification tag numbers (as received in Boston District lab), the dates received, and our lab results.

If we can be of any further assistance, please feel free to contact my office.

Sincerely yours,

Louis L. Gershman
Laboratory Director
Boston District Office

Att.

Attachment A

Date Collected from Ref 54 79-106 series

Sample Number	Product	State ID No.	Date Received	Collected From: (Area, if known)	PCB's (Aroclor 1254, ppm) (wet wt. basis)
INV 79-106-178	Fresh Lobster	HH-79-1	8/14/79	Tom Petelle State of Mass., D.E.Q.E. Lawrence Experimental Sta. Lawrence, MA (New Bedford Harbor)	12.4
INV 79-106-179	Fresh Lobster	HH-79-2	8/14/79	"	11.6
INV 79-106-180	Fresh Lobster	T-79-1	8/08/79	"	68.2
INV 79-106-181	Fresh Lobster	S-79-2	8/08/79	"	15.4
INV 79-106-183	Fresh Lobster	Q-79-3	8/16/79	"	30.3
INV 79-106-184	Fresh Lobster	Q-79-4	8/16/79	"	31.1
INV 79-106-185	Fresh Lobster	Q-79-5	8/16/79	"	29.6
79-106-186	Fresh Lobster	M-79-6	8/16/79	"	63.4
INV 79-106-187	Fresh Lobster	M-79-7	8/16/79	"	37.4
INV 79-106-189	Fresh Lobster	Q-79-2	8/16/79	"	23.8
INV 80-158-842	Frozen Lobster	RR	10/15/79	John Fisk Mass. Div. Marine Fisheries Boston, MA -given to M. Dowgert, CSO (New Bedford Harbor)	12.3 (Orig.) 10.6 (Check)
INV 80-158-841	Frozen Lobster	TT	10/15/79	"	9.4
80-158-843	Frozen Lobster	SS	10/15/79	"	2.9
INV 80-158-844	Frozen Lobster	VV	10/15/79	"	10.4 (Orig.) 6.8 (Check)
INV 80-158-845	Frozen Lobster	UU	10/15/79	"	2.3

Documents for this sample were not available for submission to Dr. John Gates

Sample Number	Product	State I.D. No.	Date Received	Collected From: (Area, if known)	PCB's (Aroclor 1254, ppm) (wet wt. basis)
INV 80-158-846	Frozen Lobster	WW	10/15/79	John Fisk Mass. Div. Marine Fisheries Boston, MA (given to M. Dowgert, CSO) (New Bedford Harbor)	35.2 (Orig.) 26.7 (Check)
INV 80-158-847	Frozen Lobster	ZZ	10/16/79	" (given to A. Warchut, CSO)	3.8
INV 80-159-306	Fresh Lobster	1, 2, 3,	10/19/79	Elise Comproni Mass. Div. Environmental Health Boston, MA (New Bedford Harbor)	Sub ppm 914 (1) 19.5 (orig. 915 (2) 8.3 916 (3) 6.3 Ave. 11.3 914A (1) 11.2 (check 915A (2) 6.5 916A (3) 5.7 Ave. 7.8
INV 80-159-307	Fresh Lobster	4	10/19/79	"	917 15.3 (Orig.) 917A 9.2 (Check)
80-159-308	Fresh Lobster	5	10/19/79	"	918 7.6 (Orig.) 918A 7.1 (Check)
INV 80-159-309	Fresh Lobster	6	10/19/79	"	919 6.0 (Orig.) 919A 6.5 (Check)
INV 80-159-310	Fresh Lobster	7	10/19/79	"	920 6.7 (Orig.) 920A 5.6 (Check)
INV 80-159-161	Frozen Lobster	LLL	10/31/79	Andrew Kolek Mass. Div. Marine Fisheries Sandwich, MA (given to A. Warchut, CSO) (New Bedford Harbor	7.9
INV 80-159-162	Frozen Lobster	MMM	10/31/79	"	4.9
INV 80-159-163	Frozen Lobster	YY	10/31/79	"	4.7
NV 80-159-164	Frozen Lobster	JJJ	10/31/79	"	10.6
80-159-165	Frozen Lobster	KKK	10/31/79	"	7.1

Sample Number	Product	State ID No.	Date Collected	Collected From: (Area, if known)	PCB's Aroclor 1254, ppm) (wet wt. basis)
INV 80-159-612	Frozen Lobster	RRR	1/28/80	John Fisk Mass. Div. Marine Fisheries Boston, MA (given to Mr. Dowgert, CSO) (New Bedford Harbor)	9.3
INV 80-159-613	Frozen Lobster	OOO	1/28/80	"	4.3
INV 80-159-614	Frozen Lobster	SSS	1/28/80	"	2.9
INV 80-159-615	Frozen Lobster	NNN	1/28/80	"	7.9
INV 80-159-616	Frozen Lobster	QQQ	1/28/80	"	2.8
INV 80-159-617	Frozen Lobster	PPP	1/28/80	"	7.0
INV 81-253-946	Fresh Lobster	PPP-81	6/15/81	Al Comproni Mass. Dept. Public Health Boston, MA (New Bedford Harbor)	2.6
81-253-947	Fresh Lobster	QQQ-81	6/8/81 6/15/81	"	6.8
81-253-948	Fresh Lobster	SS-81	6/8/81 6/12/81	"	8.9
81-253-949	Fresh Lobster	SSS	6/8/81 6/15/81	"	1.5
81-253-950	Fresh Lobster	TT	6/8/81 6/12/81	"	5.9
81-253-951	Fresh Lobster	UU	6/16/81 6/24/81	"	4.0
81-253-952	Fresh Lobster	VV-81	6/15/81 6/24/81	"	1.98
81-253-953	Fresh Lobster	YY-81	6/8/81 6/12/81 6/16/81	"	4.79
79-106-188	Eel		8/16/79	Tom Pettelle Ma-Lawrence Exp. Sta. (New Bedford Harbor)	41.3

Ref #18

Aerovox®
AN RTE COMPANY
INCORPORATED

P.O. Box B-970
740 Belleville Ave.
New Bedford, MA 02741 — U.S.A.
Tel. (617) 994-9661
TELEX/TWX 710-344-6985

May 7, 1982

METCALF & EDDY, INC.
FILE_____ SUBJ_____
MAY 10 1982
REF'D TO_____ ACK. BY_____
ANS. BY_____ NOTED_____

Metcalf & Eddy Inc.
50 Staniford Street
Boston, Ma. 02114

ATTENTION: Mr. James Maughan

Dear Mr. Maughan:

We are contacting you at the request of Mr. Robert Mendoza of the EPA, relative to the PCB data your company has accumulated for the New Bedford area.

A review of the data sheet sent to us would indicate that you have captured all of the data submitted by us to EPA, etc. to date. We were unable to add any missing parameters.

We are enclosing an additional (11) analytical sheets for other samples we have had analyzed. Six relate to discharges to the City Sewer system, two to our emergency discharge pipe to the Acushnet River, two to incoming water levels and one to a liquid sample taken from mid-river in back of Aerovox. The groups are stapled together and prominently identified,

We hope these will assist in obtainance of your comprehensive overview of the New Bedford PCB.

Sincerely,

Norman Butterworth

Norman Butterworth
Mgr. Environmental Control

NB/gd
Encl.

cc: C. Tuttle

GAS CHROMATOGRAPHY DATA SHEET

CLIENT Acrovox Industries, Inc. ADDRESS P.O. Box [illegible]0, New Bedford, MA 02741

SAMPLE 436-78 SAMPLE DISCRIPTION #2, Incoming Water 3-78 (Received 2-22-78) (Incoming wa[illegible])

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 200ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2 X 16 ELECTROMETER SS X E2

			STANDARD INJECTION			SAMPLE INJECT.					
PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	PICO-GRAMS	PEAK HT. OR AREA	ATTENU-ATION	PEAK HT. OR AREA	ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1230 Aroclor 1016	7	5	100	8.8	10^2x16	5.4	10^2x16			.286	436-78

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

Lee D. Lyman March 7, 1978
SIGNATURE OF CHEMIST DOING WORK / DATE

Lee D. Lyman March 7, 1978
SIGNATURE OF LABORATORY DIRECTOR / DATE

PUBLIC HEALTH CERTIFICATION NUMBER F5858

GAS CHROMATOGRAPHIC ANALYSIS

CLIENT ox Industries, Inc. ADDRESS 740 Bell Ave., New Bedford, MA 02741

SAMPLE # 541 SAMPLE DISCRIPTION #4, Incoming Water Received 3-14-78

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2X 16 ELECTROMETER ___ SS X E2

			STANDARD INJECTION			SAMPLE INJECT.					
PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	PICO-GRAMS	PEAK HT. OR AREA	ATTENU-ATION	PEAK HT. OR AREA	ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1231 Aroclor Compounds	8	5	100	8.6	10^2x16	0.4	10^2x16			.025	541

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

Lee O. Lyman 13-23-78
SIGNATURE OF CHEMIST DOING WORK / DATE

Lee O. Lyman
SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

AS Chemistry

CLIENT (ovox Industries, Inc. ADDRESS 740 Belleville Avenue, New Bedford, MA 02741

SAMPLE (2159 SAMPLE DISCRIPTION #1 River (1 (a River in back of Aerovox) (

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2x 16 ELECTROMETER SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1232 PCB COMPOUND	10	5	100	8.8	10^2x16	3.8	10^2x16			.432	2159

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
LYCOTT

SIGNATURE OF CHEMIST DOING WORK / DATE

SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

Industries, Inc. ADDRESS 740 Belleville Ave., New Bedford, MA 02741

SAMPLE 15-1 SAMPLE DISCRIPTION Pipe Sample, V, #1 (Emergency discharge to r)

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 200°C COL. LENGTH 6 FT. DETECT. TEMP. 320°C INLET TEMP. 250°C

CARRIER FLOW 70 ml/min. PURGE FLOW 20 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 445 ml

PREVALENT STAND. CURRENT 85 %f.s.d. AT ATTENUAT. OF 10^2 X 16 ELECTROMETER SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1233 Aroclor 1016	10	5	1000	10.1cm	10^2x16	19.2cm	10^2x16			8.544	

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis Of Pesticide Residues In Human And Environmental Samples, Section 10,A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any. None

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown X Kuderna-Danish ___Simple Soiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

SIGNATURE OF CHEMIST DOING WORK / DATE

SIGNATURE OF LABORATORY DIRECTOR / DATE

PUBLIC HEALTH CERTIFICATION NUMBER F5858

[illegible] Industries, Inc. ADDRESS P.O. Box [illegible], New Bedford, MA 02741

SAMPLE 72-78 SAMPLE DISCRIPTION Pipe

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 200°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 70 ml/min. PURGE FLOW 60 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 200 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2 x 16 ELECTROMETER ___ SS x E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
Aroclor 1016	8.	5	100	7.1	10^2 x 16	3.4	10^2 x 16			.38	

Ent

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

None

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish x Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY

BOX 535, STURBRIDGE, MA. 01566

617-347-9152

Lee O. Larson / Jan 19, 1978

SIGNATURE OF CHEMIST DOING WORK / DATE

Lee O. Larson / "

SIGNATURE OF LABORATORY DIRECTOR / DATE

PUBLIC HEALTH CERTIFICATION NUMBER F5858

[illegible] Industries, Inc. ADDRESS 740 Bellevue Ave., New Bedford, MA 02741

SAMPLE 3549 SAMPLE DISCRIPTION Sewerage West T (Discharges To City Sewer Sy[illegible])

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2X 16 ELECTROMETER SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1234 Aroclor	100	5	.1	21	10^2x16	5.3	10^2x16			1.682	3549

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA 01566
617-347-9152

[illegible] / [illegible]
SIGNATURE OF CHEMIST DOING WORK / DATE

[illegible] /
SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

CLIENT Novox Industries, Inc. ADDRESS 740 Belleville Avenue, New Bedford, MA 02741

SAMPLE 4779 SAMPLE DISCRIPTION Sample #2 Pump sewage

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2 X 16 ELECTROMETER SS X E2

			STANDARD INJECTION			SAMPLE INJECT.					
PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	PICO-GRAMS	PEAK HT. OR AREA	ATTENU-ATION	PEAK HT. OR AREA	ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1235 Aroclor	6	5	.1	4.9	10^2x16	5.3	10^2x16			3.933	4779

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues in Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised.

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152

SIGNATURE OF CHEMIST DOING WORK / DATE

SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

CLIENT Aerovox Industries, Inc. ADDRESS 740 Belleville Ave., New Bedford, MA 02741

SAMPLE 4417 SAMPLE DISCRIPTION Sewerage Pump #1

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2x 16 ELECTROMETER ___ SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1236 Aroclor	50	5	.1	6.7	10^2x16	2.8	10^2x16			11.649	4417

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

Lee Lyman 11-22-79
SIGNATURE OF CHEMIST DOING WORK / DATE

Lee Lyman
SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

GAS CHROMATOGRAPHY ANALYSIS

CLIENT Novox Industries, Inc. ADDRESS 740 Belleville Ave., New Bedford, MA 02741

SAMPLE 3093 SAMPLE DISCRIPTION #1 Pump House S East

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2X 16 ELECTROMETER ___ SS X E2

			STANDARD INJECTION			SAMPLE INJECT.					
PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	PICO-GRAMS	PEAK HT. OR AREA	ATTENU-ATION	PEAK HT. OR AREA	ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1237 Aroclor	100	5	.1	22.0	10^2x16	16.4	10^2x16			4.97	3093

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

Les Lawson 19-25-78
SIGNATURE OF CHEMIST DOING WORK / DATE

Les Lawson
SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

Industries, Inc. ADDRESS P.O. Box [illegible], New Bedford, MA 02741 1/9/78

SAMPLE 73-78 SAMPLE DISCRIPTION Pump house, sew (East 1)

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 200°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 70 ml/min. PURGE FLOW 60 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 200 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2 X 16 ELECTROMETER SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1243 Aroclor 1016	.8	5	100	7.1	10^2 x16	12.2	10^2x 16			1.37	(East)

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues In Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised

2. Briefly state modifications, if any.

None

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
_x_ Simple Boiling ___Rotor-Vac. Other_____ Temp._____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152

Lee E. Lyman / Jan 19, 1978
SIGNATURE OF CHEMIST DOING WORK / DATE

Lee E. Lyman / "
SIGNATURE OF LABORATORY DIRECTOR / DATE

PUBLIC HEALTH CERTIFICATION NUMBER F5858

ndustries, Inc. ADDRESS 740 Belleville Avenue, New Bedford, MA 02741

SAMP 4882 SAMPLE DISCRIPTION Sample #2 Sew om west pump

COLUMN 1.5%OV-17 1.95%QF-1 COL. TEMP. 225°C COL. LENGTH 6 FT. DETECT. TEMP. 350°C INLET TEMP. 225°C

CARRIER FLOW 60 ml/min. PURGE FLOW 65 ml/min. CHART SPEED ½ in/min ORIG. SAMPLE SIZE 300 ml

PREVALENT STAND. CURRENT 81 %f.s.d. AT ATTENUAT. OF 10^2 X 16 ELECTROMETER ___ SS X E2

PESTICIDE COMPOUND	VOL. OF FINAL EXTR. (ml)	INJECT VOLUME (ul)	STANDARD INJECTION PICO-GRAMS	STANDARD INJECTION PEAK HT. OR AREA	STANDARD INJECTION ATTENU-ATION	SAMPLE INJECT. PEAK HT. OR AREA	SAMPLE INJECT. ATTENU-ATION	RETENTION REL. TO ALDRIN STD.	RETENTION REL. TO ALDRIN SAMPLE	(ppb) RESIDUE	CHROMATOGRAM NUMBERS
1239 Aroclor	10	5	.1	4.9	10^2x16	3.7	10^2x16			.503	4882

1. Source of method used (Cite journal, volume, page, year or other source) Manual of Analytical Methods For The Analysis of Pesticide Residues in Human And Environmental Samples, Section 10, A, U.S. EPA, 1974, Revised.

2. Briefly state modifications, if any.

3. Method and temperature of extract concentration ___Air Blowdown ___Nitrogen Blowdown ___Kuderna-Danish
X Simple Boiling ___Rotor-Vac. Other _____ Temp. _____

LYCOTT ENVIRONMENTAL RESEARCH COMPANY
BOX 535, STURBRIDGE, MA. 01566
617-347-9152
LYCOTT

SIGNATURE OF CHEMIST DOING WORK / DATE

SIGNATURE OF LABORATORY DIRECTOR / DATE

STATE CERTIFIED LABORATORY

1

Form #2

Request By: J. Fiske

Date: June 1, 1977

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Finfish

Analysis For: PCB's

Methods Used: G.C. - E.C.

No. of Analyses: 2

Results:

	Species*	Location	M+E NO	PCB's**	Collected
VP-17	Striped Bass	Site H-3A	278	3.0	5-6-77 ✓
✓P-18	Bluefish	Site H	280	1.0	5-21-77 ✓

Comments: *Fillet without skin

**ppm - wetwt. (average of 2 determinations)

Rept 6/9/77

Ref #99

Form #2

1

Request By: J. Fiske

Date: June 1, 1977

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Finfish

Analysis For: PCB's

Methods Used: G. C. - E. C.

No. of Analyses: 4

Results:

	Species*	Location	M+E NO	PCB (ppm)**	Collected
P-13	Blue Fish	Site H	281	1.6	5/21/77
P-14	Striped Bass	Site D	279	2.7	5/20/77
P-15	Striped Bass	Site H1A	276	0.4	4/28/77
P-16	Striped Bass	Site H2A	277	0.5	5/5/77

Comments: * Fillet Without Skin

** ppm - wet wt. (average of 2 determinations)

Date: June 6, 1977

R. Serabian & J. DerHovanesian
Chemist

Lam 11/17/81

Form #2

Request By: A. E. Peterson

Date:

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Bluefish

Analysis For: PCB's

Methods Used: G.C. - E.C.

No. of Analyses: 8

Results:

	Date Collected	Location	Size*	MTE No.	PCB's (ppm) Wet wt. basis	PCB's (ppm) Dry wt. basis
P-42	10/7/77	Cape Cod Canal	--	14-A	1.2	4.7
P-43	"	Cape Cod Canal	6 lbs.	15-A	0.5	1.3
P-44	"	Cape Cod Canal	26 1/2"	16-A	0.6	2.0
P-45	"	Cape Cod Canal	24"	17-A	0.5	1.8
P-52	10/18/77	Martha's Vineyard Wasque, S. Side	27" (8 lbs)	18-A	0.5	1.6
P-53	10/16/77	Barnstable Sandy Neck	18.5" (2 - 3 lbs)	19-A	0.4	1.3
P-58	8/77	Cape Cod Bay	29.5" (14 lbs)	20-A	0.9	2.2
P-59	10/18/77	Martha's Vineyard Wasque, South Side	29" (11 1/2 lbs)	21-A	1.2	4.8

Comments:

*Sample provided as frozen fillets; size information from collector's tag.

Date: November 4, 1977

R. Serabian and J. Der Hovanesian

Chemist

REF: #101

The Commonwealth of Massachusetts

Department of Fisheries, Wildlife and Recreational Vehicles
Division of Marine Fisheries
Cat Cove Marine Laboratory
92 Fort Avenue, Salem 01970

METCALF & EDDY, INC.
SUBJ.
FILE
NOV 17 1982
REF'D TO ACK. BY
ANS. BY NOTED

November 12, 1982

Robert J. Reimold, Ph.D.
Project Manager
Metcalf & Eddy, Inc.
50 Staniford Street
Boston, MA 02114

Dear Dr. Reimold:

In response to your letter of November 5, 1982, please find enclosed your forms marked in with references to the various laboratory reports included as attachments.

The procedures that we follow are those in the U.S. F.D.A. Pesticide Analytical Manual. The gas chromatograph used is a Tracor Model MT 220. Detection limits for arochlor depend, to an extent, on available sample and sample matrix type but in general are below 0.1 ppm. Quality control measures included replication of samples, spiking and recovery studies.

All of our samples from the New Bedford area were collected by the Division of Marine Fisheries biologists under the direction of Mr. Fiske. Questions about the collection of specific samples should be directed to him at the Division of Marine Fisheries, 449 Route 6A, East Sandwich, MA 02537.

Sincerely,

John DerHovanesian, Ph.D.
Senior Chemist

:mg

Enclosures

NONREPRODUCIBLE GRID FORM 145

METCALF & EDDY, ENGINEERS

Project ____ Subject ____ Detail ____

Acct. No. 8157 Comptd. By AM Ck'd. By ____

Page 1 of 4 Date ____ Date ____

Sample Identification	Number	Date Collected	Reference	Information Needed: Date Analyzed	Information Needed: Copy of Lab Report	
Striped Bass, Bluefish (3/6)	P13 — P18 ✓	5/20 — 5/21/77	Farrington, J.W. (WHOI) PCB Analysis of Marine Organisms in the New Bedford Area, Appendix 2 Jan. 1981	✓ (See attachment 1)	✓	
Bluefish	P42 - P45 ✓ ~~P58 - P59~~ P61 - P67 ?	8/10/77 10/7/77 10/18/77	~~EPA, PCB Analysis~~ Results, Fish / Lobsters, Table 8 and 9, 1977	✓ (See attachment 2) all stripped bass		See * Ref. 48
Lobsters	P108 — P125 ✓	7/6/78	Farring, J.W. as above.	✓ 7/20/78 - 7/26/78		
Aquatic biota	P153 - P259 ✓	7/10/79 — 10/17/79	DMF, Analytic Chemistry Reports 8/2/79 — 10/3/79	✓ 8/5/79 - 11/5/79		
Flounder	P401 - 414 ✓	11/25/80	DMF, Analytic Chemistry Report, 4/3/81	✓ 4/3/81		
Lobsters	P474 - P519 ✓ P359 - P370 ✓ P372 - P374 ✓ P376 - P383 ✓	Nov 1991, 12/8/80	DMF Analytic Chemistry Report 12/21/81 ?	✓ (See attachment 3)		

METCALF & EDDY, ENGINEERS

Sample Identification	Number	Date Collected	Reference	Information Needed: Date Analyzed	Copy of Lab Report	Date Collected
Lobster	81-253-946 — 81-253-953 P415-P431 ?	June 1981	Coates, P. (DMF), 8/4/81, Letter to G. Parker (DPH). PCB Analysis of Lobsters	✓	✓	✓
Flounder	P274 P280	5/29/80 6/4/80	Farrington, J.W. Report as above.	✓	See Attachment 5	
Quahogs	D1 — D3 NB1 — NB6 F1 — F6 SS-1	Oct. — Nov 1976	EPA, "Summary of PCB Analytical Results, May-Nov 1976" Nov 1976	✓	✓	✓ 9/24/76
Sediments	NBS1 — NBS2 FS1 — FS4	Oct-Nov 1976	EPA - as above	See Attachment 6	✓	9/24/76
Lobsters	B-1, C-1, D-1, F-1, F-2	5/6/77	Farrington, J.W. "PCB Analysis - Results of Samples Take in New Bedford Harbor and Buzzards Bay", 1979	✓	probably DEQE / LES	
Lobsters	See enclosed sheet — 3AAA etc		Farrington, J.W. PCB Analysis of Marine Organisms in the New Bedford Area, Appendix 2 Jan 1981	✓	✓ ?	

Project ____ Subject ____ Detail ____ Acct. No. ____ Comptd. By ____ Ck'd. By ____ Page 2 of 4 Date ____ Date ____

95A

RESULTS OF SEDIMENT SAMPLE ANALYSES

FOR PCB's IN NEW BEDFORD HARBOR

July and October 1981

Gerald Szal, DWPC, Westboro

Chemical Analysis by Cambridge Analytical Associates

STATION NO.		DATE	TYPE OF SAMPLE	DEPTH OF SAMPLE (inches)	PCB CONCENTRATION (ppm wet wt.) 1248	1254	% DRY WEIGHT
I	a	7/21	Pd	approx. 0-4	34	34	70
	a'	7/22	sc	0-4	35	--	*
	a'	7/22	sc	4-8	1.4	--	*
	b	7/21	Pd	approx. 0-4	14	18	78
	c	7/21	Pd	" "	230	200	71
	c'	7/22	sc	0-4	1300	--	*
	c'	"	sc	4-8	100	--	67
	c'	"	sc	8-12	10	--	*
II	a		sc	0-4	1140	--	*
	a'	"	Pd	approx. 0-4	130	--	43
	b	"	"	0-4	670	--	*
	b'	"	Pd	approx. 0-4	1080	--	41
	c	"	"	0-4	460	--	*
	c	"	"	4-8	10	--	*
	c	"	"	8-12	4.0	--	17
III	a	"	"	0-4	2300	--	*
	a	"	"	4-8	100	--	*
	b	"	"	0-4	500	--	*
	b'	"	Pd	approx. 0-4	1300	--	42
	c	"	"	0-4	150	--	67
	c	"	"	4-8	5.6	--	*
	c	"	"	8-12	3.6	--	52
IV	a	"	"	0-4	190	--	*
	a'	"	Pd	approx. 0-4	135	--	33
	b	7/23	"	0-5	460	--	36
	b	"	"	5-9½	60	--	46
	b	"	"	9½-14	1.5	--	48
	c	"	"	0-5	36	--	79
	c	"	"	5-10	.02	--	74
V	a	"	"	0-7	80	--	38
	a	"	"	15-22	0.8	--	42
	b	"	"	0-7	30	--	41
	b	"	"	7-14	1.0	--	46
	c	"	"	0-8	34	--	38
	c	"	"	8-16	70	--	44
	d	"	"	0-7	4.2	4.4	*
	d	"	"	7-14	100	26	*