

DRAFT  
TECHNICAL REVIEW REPORT  
EVALUATION  
OF THE  
NEW BEDFORD WASTEWATER TREATMENT PLANT  
AND  
SEWERAGE SYSTEM  
FOR  
PCB DISCHARGES  
TO THE  
ACUSHNET RIVER ESTUARY, NEW BEDFORD HARBOR  
AND BUZZARDS BAY  
BRISTOL COUNTY, MASSACHUSETTS

SEPTEMBER 1986

E.C. JORDAN CO.  
PORTLAND, MAINE

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## 1.0 INTRODUCTION

The objective of Task 07 in Work Plan Amendment Number One for the New Bedford Harbor Site is to determine if the City of New Bedford Wastewater Treatment Plant and Sewerage System is a source of PCBs to the Acushnet River Estuary, New Bedford Harbor, and Buzzards Bay. This review was done in three parts: 1) evaluation of available PCB sampling results directly associated with the wastewater treatment plant; 2) evaluation of PCB sampling results from the sewer lines, and 3) evaluation of PCB sampling of bottom sediments in the vicinity of the combined sewer overflows.

## 2.0 SUMMARY

The City of New Bedford, located in Bristol County, is an industrialized city with a population of approximately 98,000. New Bedford's municipal wastewater collection system, originally constructed in the mid 1800's, serves about 98 percent of the population. The existing system consists of approximately 128 miles of the original combined sewers in the south and central parts of the city. Additionally, about 76 miles of separate sewers are located mostly in the north end. Sanitary flow and stormwater runoff in the south and central portions of the city is conveyed by the wastewater collection system along an eleven mile interceptor to the Fort Rodman Primary Wastewater Treatment Plant. The treatment consists of grit removal, primary clarification, and chlorination. The plant, constructed in 1972, was designed to treat an average flow of 30 million gallons per day (mgd). Current use averages 22 mgd, with an average daily dry weather flow of 18.5 mgd. Total daily discharge seldom exceeds 60 mgd during wet weather events. Effluent is discharged through a 1,3,300 foot outfall pipe south of Clark Point into Buzzards Bay<sup>1,2</sup>.

Since PCB contamination was first identified in New Bedford Harbor numerous studies including several on the municipal sewerage system have been conducted to identify the sources.

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1. 301(H) Waiver Application, New Bedford Harbor, Part 1 General Information and Basic Data Requirements
  2. Camp, Dresser & McKee, Boston, MA, Interim Summary Report on Combined Sewer Overflows - Phase 1 - December 1983

A list of sampling programs to date is compiled in Appendix I. These sampling programs conducted by various agencies and contractors include incinerator sampling, wastewater treatment plant influent/effluent sampling, municipal sewer line sampling, and sediment sampling in the vicinity of the combined sewer overflow discharge lines. Because numerous agencies have sampled and analyzed for different PCB compounds at varied locations at different times, it is difficult to assess the contribution of the various sources to the Acushnet River Estuary, New Bedford Harbor, and Buzzards Bay over time. With the exception of WWTP sampling, few locations were sampled more than once.

Because existing information on the sediments in the sewers and the wastewater contributing to the overflows indicates PCB levels range from a few micrograms per liter (ug/l) to levels below instrument-detectable limits, the majority of the combined sewer overflows do not appear to be discharge points of significant PCB loadings. However, a number of overflows do warrant sampling and analyses because the contributing sewers contain sediments with PCB concentrations in the milligram per kilogram (mg/kg) to gram per kilogram (g/kg) range.

The most recent sampling and analysis of the New Bedford Wastewater Treatment Plant discharge indicate annual PCB loadings to the bay in excess of 300 pounds per year.

### 3.0 RESULTS AND DISCUSSION

Of the three study areas (Wastewater Treatment Plant, Sewer Lines, and Sediments in the vicinity of the CSOs), the Wastewater Treatment Plant has been sampled the most frequently. Available data for the period from March 1976 through March 1985 are presented in Table 1.

Numerous agencies and contractors have analyzed for PCBs in both the wastewater and sediments in the sewerage system, including the Massachusetts Department of Environmental Quality Engineering (DEQE), GCA Corporation (GCA), Engineering Science, Inc. (ESI), and Camp, Dresser & McKee, Inc. (CDM). With the exception of ESI's sampling program in March 1986, most of the available data was gathered in 1982. There was limited repeated sampling of the various sewer sampling points, so an evaluation of the potential reduction in levels of contaminants within the system over time is not possible. Almost all of the sampling points were sampled on only one occasion. (The sampling conducted by GCA and DEQE was done within the same time frame (6/82), so no evaluation of contaminant reduction is possible

here either). The results of the studies to date are presented in Table 2 and the respective sampling locations are shown in Figure 1.

GCA Corporation, while conducting the sewer sampling program in 1982, also sampled the sediments in the vicinity of the combined sewer overflows. Results of this program are presented in Table 3 and the respective sampling locations are shown in Figure 1. Data from sediment samples collected in the vicinity of the combined sewer overflows as part of the grid sampling programs conducted by the U.S. Army Corps of Engineers (USACE) in the estuary and by NUS Corporation (NUS) in the lower harbor are also included. These locations are identified in Figures 2 and 3, respectively.

### 3.1 Wastewater Treatment Plant

Data presented for the wastewater treatment plant indicate an overall reduction in levels of PCBs in effluent samples since they were first sampled nearly ten years ago. The last data available still shows a discharge of approximately 300 pounds of PCBs into Buzzards Bay annually (6/84-3/85 avg. of 4.375 micrograms per liter (ug/l) @ 22 mgd). A comparison of influent and effluent data suggests that no PCBs are removed during the treatment process.

### 3.2 Sewerage System

DEQE and GCA conducted sampling programs of the municipal sewerage system. These studies concentrated on lines north of Wamsutta Street in downtown New Bedford and south of Rivet Street to the treatment plant. The 1982 results indicated that the section of the system north of Wamsutta Street was relatively free of PCBs and the area south of Rivet Street contained levels of PCBs exceeding 100 micrograms per liter (ug/l) in wastewater and 50,000 (milligrams per kilogram (mg/kg) in sediments.

An Administrative Order issued by the US EPA, dated September 30, 1983, notified Cornell Dubilier Electronics, Inc. (CDE) that it was required to remove PCB contaminated sediments from sewers in the vicinity of its plant along East Rodney French Boulevard. In the Order, EPA alleged that the CDE plant was a major source of PCBs in the sediments of certain sewers. The removal and disposal of the PCB contaminated sediments from the specified sewers were implemented between September 28th and November 7, 1984. The effectiveness of the clean-up was verified by photographing each sewer system following cleaning operations. No sediments were observed during this inspection.

In March 1986, ESI conducted a sewer line sampling program for the City of New Bedford at locations different from previous investigations. The program concentrated on the section of line between Wamsutta Street on the south and Holly Street on the north along Acushnet, Logan, and Front Streets (the area between Route 195 and Route 6). This program identified PCBs in sediments at levels up to 770 mg/kg.

### 3.3 Combined Sewer Overflows

The third area of study included a review of data from sediments in the vicinity of the combined sewer overflows (CSOs). Very limited data was available. GCA identified PCBs in the sediment samples near the CSOs along the northern section of East Rodney French Boulevard. Levels approximated 10 mg/kg (dry weight). Significantly higher levels were found by GCA in the vicinity of the CSOs in the upper estuary, reaching levels up to 900 mg/kg.

Data from two separate sediment grid sampling programs (USACE and NUS) were reviewed to determine if any data points were applicable to the CSO study, and to establish any potential elevated pattern of PCB concentrations surrounding the outfall points. The USACE program covered the upper estuary north of the Coggeshall Street bridge. One sampling point adjacent to the Howard Avenue outfall was analyzed at 76,000 mg/kg total PCBs. Other outfall points in the vicinity also had values from 23 to 1,100 mg/kg PCBs. The NUS program concentrated on the lower harbor area. Sediments in the vicinity of Front Street between Washburn Street and Route 6 had levels of PCBs ranging from 5.0 to 100 mg/kg. Sediment samples near outfalls along East Rodney French Boulevard contained concentrations of PCBs generally below 1 mg/kg.

Elevated PCB concentrations in the vicinity of the CSOs suggest prior discharges from the municipal sewer systems.

### 4.0 RECOMMENDATIONS

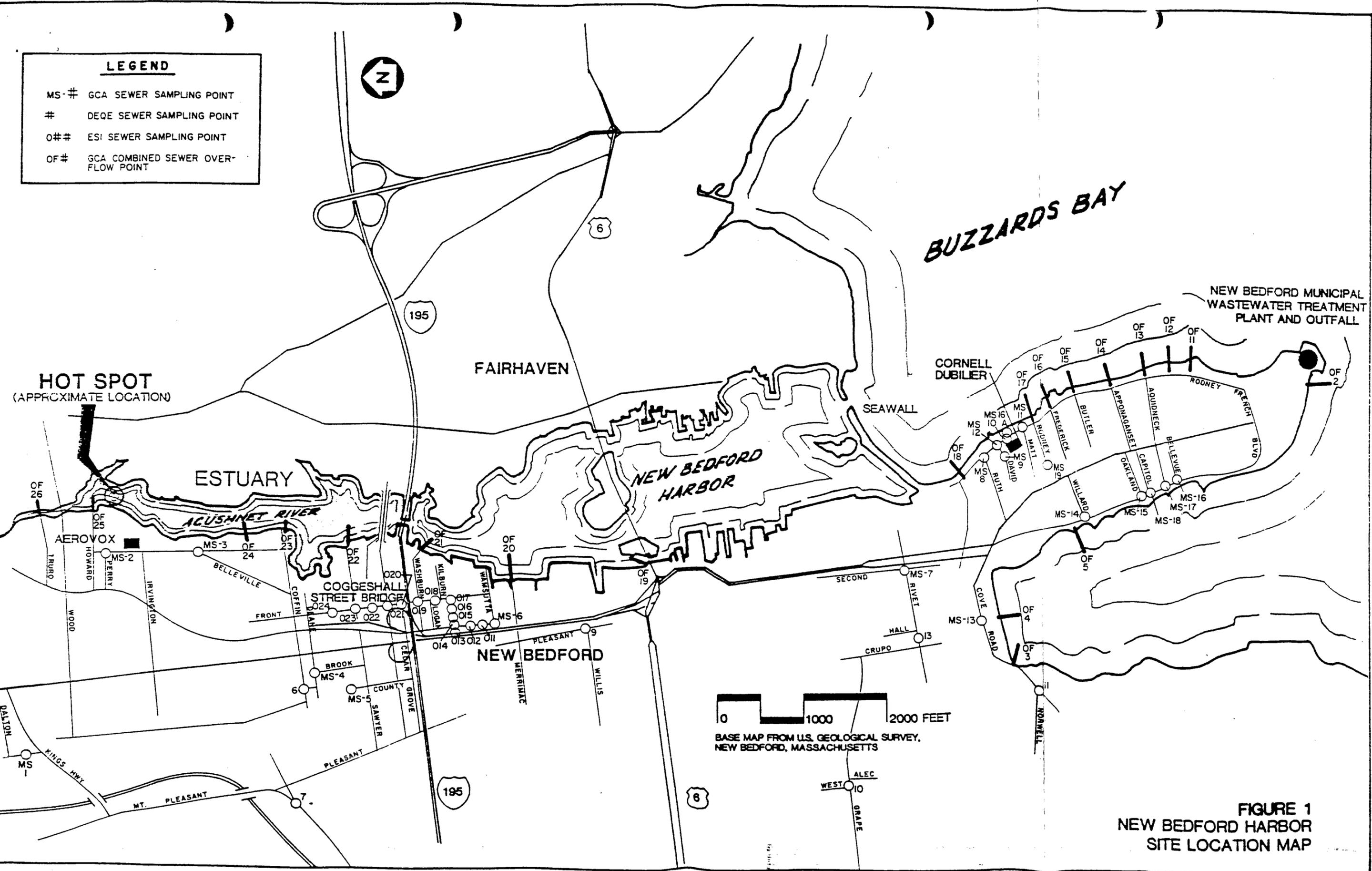
Based upon the sampling programs that have been identified, it may be necessary to conduct at least one additional sampling program in selected areas of the estuary and harbor for an accurate assessment of the current PCB contribution of the combined sewers. The areas which would require sampling are the sewer system and combined sewer overflows between Route 195 and Route 6 and along Belleville Avenue south of Wood Street. The area between Route 195 and Route 6 is the area where recent sample results indicate elevated PCB levels in the sewer line

sediments. Sewer lines along Belleville Avenue south of Wood Street are upstream of the recently identified PCB contaminated lines along Front Street. Although recent sampling results for sewers and CSOs in the vicinity of Cornell Dubilier Electronics is not available, it is assumed that additional sampling is not necessary because the clean-up program was completed and accepted by EPA.

Sewer and combined sewer overflow sampling should be conducted in two phases; a dry period and a wet period. This will enable us to discern if PCB discharges from the combined sewer overflows (CSO) vary during dry and wet periods. Numerous CSOs have been identified as continuously active as a result of dry weather sanitary flow from contaminated storm drains connected to the outfall. Both sediment and wastewater samples should be collected.

**LEGEND**

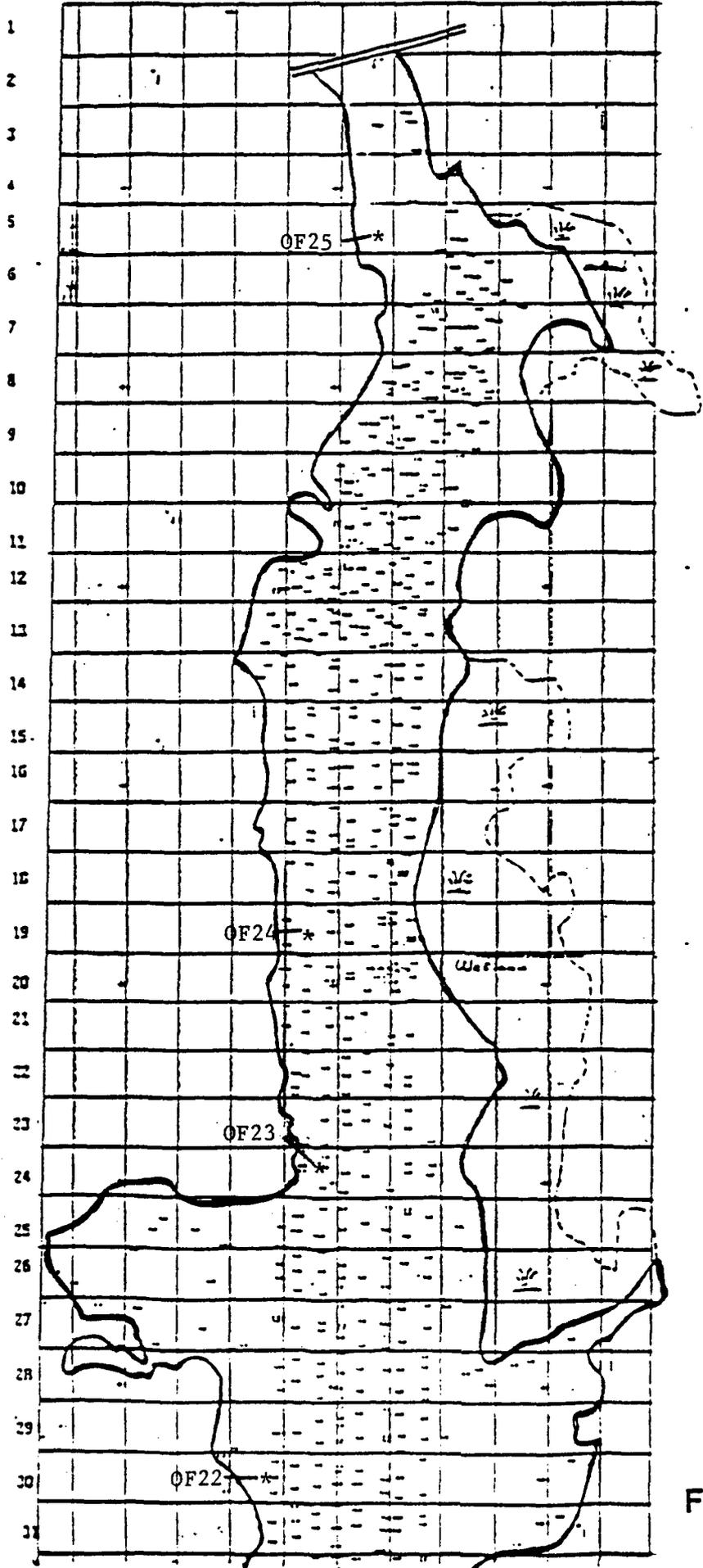
- MS-# GCA SEWER SAMPLING POINT
- # DEQE SEWER SAMPLING POINT
- O## ESI SEWER SAMPLING POINT
- OF# GCA COMBINED SEWER OVER-FLOW POINT



0 1000 2000 FEET  
 BASE MAP FROM U.S. GEOLOGICAL SURVEY,  
 NEW BEDFORD, MASSACHUSETTS

**FIGURE 1**  
**NEW BEDFORD HARBOR**  
**SITE LOCATION MAP**

C D E F G H I J K L M N



—\* Approximate location of the Combined Sewer Overflows (CSOs) (OF#)

Acushnet River Estuary  
New Bedford Harbor  
North of Coggshall Street Bridge  
Arbitrary Sampling Grid

FIGURE 2



TABLE 1  
NEW BEDFORD HARBOR  
WWTP PCB ANALYSIS

DATE	Inciner. Flue Gas ug/m <sup>3</sup>	Ash Feed ug/g	Scrubber Water Effluent ug/l	Inciner. Sludge Feed ug/g	Scrubber Water Feed ug/l	WWTP Influent ug/l	WWTP Effluent ug/l (*)	Sludge before Inciner. ug/g	Grit Chamber Solids ug/g	Inciner. Ash ug/g	(Aroclor found)** Agency
03/26/76								73.6			EPA/NERL
04/ /76								30.8			EPA/NERL
07/19/76						106	119				EPA/NERL
02/09/77	3.08	2.00	3.00	5.40	3.50						GCA
03/01/77	10.56	0.95	2.50	2.25	8.25						GCA
03/01/77	5.11	2.35	3.50	2.20	3.00						GCA
03/03/77	7.00	1.70	2.75	1.40	5.75						GCA
04/4-9/79								10			(1254) CDM
05/9-10/79								9.3			(1232) CDM
06/3-8/79						ND	ND				CDM
06/15/81						43	33	70	30	<1	(1242) GCA
07/13/81		<10									Tibbetts Engineering
08/28/81						0.41	0.41				(1254) EPA/NERL
09/12/81				9.0							(1254) DEQE
09/13/81				14.0							(1254) DEQE
09/15/81				29.0							(1254) DEQE
10/06/81				9.9							(1254) DEQE
10/07/81				16.0							(1254) DEQE
10/08/81				16.0							(1254) DEQE
03/31/82						<1	<1				(1254)
03/31/82						1	1				(1254)
03/31/82						2	2				(1254)
06/14-18/82						5	6 (31)				(1242/1254) MA DEQE
06/20-25/82						7	10 (25)	<1			(1242/1254) MA DEQE
06/15/83							ND				CDM
08/11-12/83							ND				CDM
02/01/84				9.0							GCA
02/06/84				8.1							GCA
02/07/84				6.4							GCA
06/25-28/84								12.5 (32)			(1254) YWC
09/25-28/84								1.0 (23)			(1254) YWC
12/18-22/84								4.0 (29)			(1254/1242) YWC
03/18-21/85								<0.2 (25)			YWC

(\*) = Flow Rate for WWTP - million gallons per day

\*\* = PCB values a given as Total PCBs unless specific isomer is identified otherwise.

Blank spaces indicate no data present.

TABLE 2  
MUNICIPAL SEWER LINES

Station No.	Station Location	Wastewater ug/l		Sediments mg/kg			Waste-	Sediments
		06/14-19/82	06/20-25/82	12/10/82	12/14/82	11/27/85	water ug/l	mg/kg
							11/27/85	03/13/86
DEQE 4	Duchaine Blvd. in N.B. Industrial Park	(1248) 2	(1248) 4					
GCA MS-01	Worchester St. Catch Basin (DEQE 5)	(1248) 2	(1248) 3			<2		
MS-02	Perry St./Belleville Ave. + (DEQE 3)	<1	<1			<2		
MS-03	Belleville St./Belleville Ave.	<1	<1			<2		
DEQE 7	Nauset St./Hathaway Road +	<1	<1					
6	Coffin Ave./Brook St. +	(1248) 1	(1248) 3					
GCA MS-04	Brook St./Deane St.					<2		
MS-05	County St./Purchase St. (DEQE 8)	(1248) 1	(1248) 3	(1248) 2				
ESI 024	Holly/Front							No Sediment
023	Front/Sawyer							No Sediment
022	Front/Beetle							No Sediment
021	Front/Coggeshall							No Sediment
020	Front @ Cedar Grove							(1016) 530
019	Front @ Washburn							(1016) 550
018	Front @ 120'N Kilburn							(1016) 770
013	Acushnet/Logan							No Sediment
014	Logan @ 140'E Acushnet							No Sediment
015	Logan @ 180'E Howe							(1232) 140
016	Logan @ Front							(1016) 220
017	Front @ Logan							(1016) 100
012	Acushnet @ 600'N Wamsutta							No Sediment
011	Acushnet @ 300'N Wamsutta							(1232) 400
				(1242)				
GCA MS-06	Acushnet Ave./Wamsutta + (DEQE 1)	<1	<1	(1254) 11				(1016) 120
DEQE 9	Pleasant St./Willis St. +	<1	<1					
10	Grape St. (between West & Alec)	<1	<1					
13	Rivet St. (between Hall & Crapo)	<1	<1					
GCA MS-07	Rivet St./Second St. + (DEQE 14)	<1	(1248) 2			(1260) 5		
		(1242)	(1242)					
MS-13	Cove Rd. Pump Station (DEQE 12)	(1254) 5	(1254) 5			<2		
DEQE 11	Cove Rd./Norwell St. +	<1	<1					

+ = INTERSECTION

Blank spaces indicate no data present.

TABLE 2  
MUNICIPAL SEWER LINES  
(Con't)

		MUNICIPAL SEWAGE LINES						
Station No.	Station Location	Wastewater ug/l		Sediments mg/kg			Waste-	Sediments
		06/14-19/82	06/20-25/82	12/10/82	12/14/82	11/27/85	water ug/l	mg/kg
							11/27/85	03/13/86
						(1242)}		
GCA MS-08	E.R. French Blvd. (between Ruth & David)					(1254)}		
						52,000		
						(1242)}		
MS-09	David St. @ E.R. French Blvd.					(1254)}	340	
						(1242)}		
MS-12	E.R. French Blvd./David St. + (DEQE 15)	(1254)}	23	(1254)}	67	(1254)}	3,400	
		(1242)}		(1242)}				
MS-10	E.R. French Blvd. (between David & Mott) (16)	(1254)}	99	(1254)}	120			47,000
		(1242)}		(1242)}				
DEQE MS-16A	E.R. French Blvd. (across from CDE)	(1254)}	85	(1254)}	71			
						(1242)}		
GCA MS-11	E.R. French Blvd./Mott St. +					(1254)}	20	
MS-19	Rodney St. (between E.R.F. & Cleveland) (17)	(1254)	2	(1254)	3			
MS-14	W. Rodney French Blvd./Willard St. +							<2
MS-15	W. Rodney French Blvd./Oaklawn St. +							<2
MS-18	W. Rodney French Blvd./Capitol St. +							<2
MS-17	W. Rodney French Blvd./Aquidneck St. +							<2
MS-16	W. Rodney French Blvd./Bellevue St. +							<2
							(1248)}	
CDM	Howard Avenue Pump Station						(1260)}	129
								<20

+ = INTERSECTION

Blank spaces indicate no data present.

TABLE 3  
 PCB Results: Bottom Sediments in Vicinity  
 of Combined Sewer Overflows mg/kg

Station No.	Location	GCA (1) 10/20/82	GCA (1) 10/21/82	USACE 09/5-15/85	NUS (2) 12/85-1/86
OF 1	Treatment Plant Primary Overflow	<1			
OF 3	E. of intersection of Cove Rd. and Padanaram Ave.	<1 <1			
OF 4	NB Hurricane Barrier, Clark Cove Pumping Station	(1254) 2			
OF 5	Dudley St. and W. Rodney French Blvd.	<1 <1			
OF 11	Freedom Blvd. (extended and E. Rodney French Blvd.	<1 <1			
OF 12	Seaview Terrace & E. Rodney French Blvd.	<1 (1256) 2			0.2 (181)
OF 13	Aquidneck St. and Rodney French Blvd.	<1 <1			0.3 (179)
OF 14	Apponagansett St. and E. Rodney French Blvd.	<1			5.6 (175)
OF 15	Butler St. and E. Rodney French Blvd.	(1242) } 8 (1254) } 8			1.0 (171)
OF 16	Frederick St. and E. Rodney French Blvd.	(1242) }13 (1254) }14			1.1 (169)
OF 17	Rodney St. and E. Rodney French Blvd.	(1242) } 8 (1254) } 8			1.1 (167)
OF 18	Cove St. and E. Rodney French Blvd.	(1242) }10 (1254) }10			0.3 (149)

TABLE 3  
 PCB Results: Bottom Sediments in Vicinity  
 of Combined Sewer Overflows mg/kg  
 (con't)

Station No.	Location	GCA (1) 10/20/82	GCA (1) 10/21/82	USACE 09/5-15/85	NUS (2) 12/85-1/86
OF 19	Rte 6 - E. of Front St. at Acushnet River		(1242) } 10 (1254) } 12		5.0 (063)
OF 20	Merrimac St. (extended) of Herman Melville Blvd. at Acushnet River		(1242) } 48 (1254) } 47		101 (012)
OF 21	Washburn St. at Acushnet River		(1242) } 53 (1254) } 70		40 (004) 58 (005)
OF 22	Sawyer St. at Acushnet River		(1242) } 10 (1254) } 8	23 (G-29) <sup>(3)</sup> 0.55	
OF 23	Coffin Ave. at Acushnet River		(1242) } 78 (1254) } 66	160 (H-25) <sup>(4)</sup> 0.16	
OF 24	Manomet St. at Acushnet River		(1242) } 360 (1254) } 440	1,100 (G-17) <sup>(5)</sup> 500 (H-17)	
OF 25	Howard Ave. at Acushnet River		(1242) } 900 (1254) } 540	280 (J-5) <sup>(6)</sup> 76,000 (J-7)	
OF 26	Truro St. (extended) - East of River Rd. at Acushnet River		(1242) } 5 (1254) } 11		

(1) Results: 0-4 cm 4-8 cm (2) Results: 0-6" (NUS Grid Location) (3) Results: 0-15" (Grid Location) 15-27" (USACE)

(4) Results: 0-12" (Grid Location) 14-33" (USACE) (5) Results: 0-24" (Grid Location) 0-6" (USACE) (6) Results: 0-24" (Grid Location) 5.5-6.5" (USACE)

"}" indicates combination of PCB isomers @ both depths  
 Blank spaces indicate no data present.

APPENDIX I  
SAMPLING PROGRAMS

Date	Activity	Company
03/26/76	Incinerator Sludge Sampling	EPA/NERL
04/ /76	Incinerator Sludge Sampling	EPA/NERL
07/19/76	WWTP Influent/Effluent Sampling	EPA/NERL
02/09/77	Incinerator Sampling	GCA Corp.
03/01/77	Incinerator Sampling	GCA Corp.
03/03/77	Incinerator Sampling	GCA Corp.
04/4-9/79	WWTP Effluent Sampling	CDM
05/9-10/79	WWTP Effluent Sampling	CDM
06/3-8/79	WWTP Effluent Sampling	CDM
06/15/81	WWTP/Incinerator Sampling	GCA Corp.
07/13/81	Incinerator Ash Sampling	Tibbetts Engineeri
08/28/81	WWTP Influent/Effluent Sampling	EPA/NERL
09/12/81	Incinerator Sludge Sampling	MA DEQE
09/13/81	Incinerator Sludge Sampling	MA DEQE
09/15/81	Incinerator Sludge Sampling	MA DEQE
10/06/81	Incinerator Sludge Sampling	MA DEQE
10/07/81	Incinerator Sludge Sampling	MA DEQE
10/08/81	Incinerator Sludge Sampling	MA DEQE
03/31/82	WWTP Influent/Effluent Sampling	EPA/NERL
06/14-18/82	WWTP Influent/Effluent Sampling	MA DEQE
06/14-19/82	Municipal Sewer Line Sampling	GCA Corp., MA DEQE
06/20-25/82	Municipal Sewer Line Sampling	GCA Corp., MA DEQE
06/20-25/82	WWTP Influent/Effluent Sampling	MA DEQE
10/20/82	CSO Sediment Sampling	GCA Corp.
10/21/82	CSO Sediment Sampling	GCA Corp.
12/10/82	Municipal Sewer Sediment Sampling	MA DEQE
12/14/82	Municipal Sewer Sediment Sampling	GCA Corp.
06/15/83	WWTP Effluent Sampling	CDM
08/11-12/83	WWTP Effluent Sampling	CDM
02/01/84	Incinerator Sludge Sampling	GCA Corp.
02/06/84	Incinerator Sludge Sampling	GCA Corp.
02/07/84	Incinerator Sludge Sampling	GCA Corp.
06/25-28/84	WWTP Effluent Sampling	YWC
09/25-28/84	WWTP Effluent Sampling	YWC
12/18-22/84	WWTP Effluent Sampling	YWC
03/18-21/85	WWTP Effluent Sampling	YWC
09/05-15/85	Grid Sampling of Sediments in Estuary	USACE
11/27/85	Pump Station Wastewater Sampling	CDM
12/85-1/86	Grid Sampling of Sediments in Lower Harbor	NUS
03/13/86	Municipal Sewer Sediment Sampling	ESI

- \* EPA/NERL: Environmental Protection Agency (Region I)/  
New England Regional Laboratory
- \* GCA Corp.: GCA Corporation, Technology Division for EPA Region I
- \* CDM: Camp, Dresser, and McKee, Inc. for City of New Bedford
- \* MA DEQE: Massachusetts Department of Environmental  
Quality Engineering
- \* YWC: York Wastewater Consultants, Inc. for City of New Bedford
- \* ESI: Environmental Solutions, Inc. for City of New Bedford
- \* USACE: United States Army Corps. of Engineers
- \* NUS: NUS Corporation