

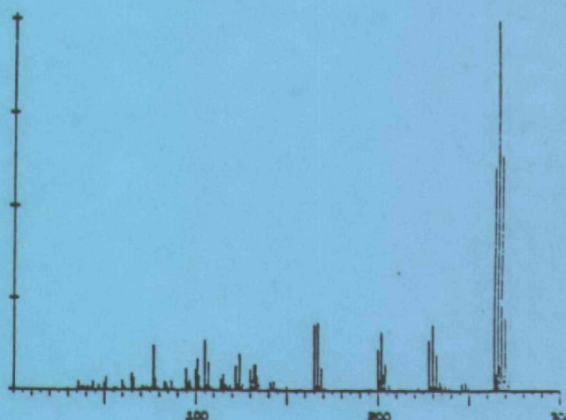
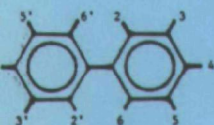
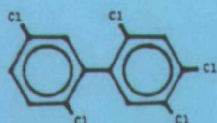
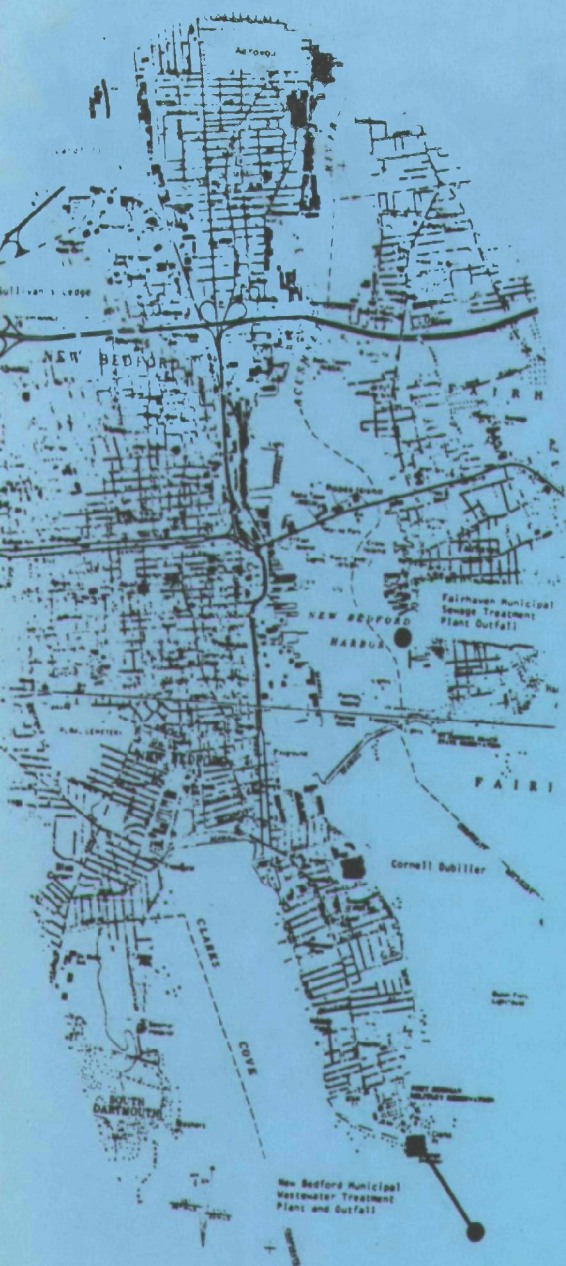
NEW BEDFORD, MA

P C B

DATA MANAGEMENT SYSTEM

PHASE I REPORT

august 1982



**METCALF & EDDY, INC.**  
**ENGINEERS & PLANNERS**  
BOSTON/NEW YORK/PALO ALTO/CHICAGO

Acushnet Estuary Data Management System

Kenneth Wood (WR/EE-2103)  
Environmental Evaluation Section

Gerard Sotolongo (WS/WRC)  
Waste Response & Compliance Branch

The following staff persons and consultant personnel were involved in the subject project from January, 1982 through December, 1983:

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EPA:WR:WOB:EES:K.Wood/rs/4-13-84

U.S. ENVIRONMENTAL PROTECTION AGENCY  
Region I

*RR Mangen  
Porteus  
Mendos*

*copy to*

Date: ~~March 30, 1984~~

Subject: New Bedford, MA Superfund Litigation

From: Merrill S. Hohman, Director  
Waste Management Division *M. Hohman*

To: Regional Division Directors

In anticipation of defendant interrogatories relating to the New Bedford Superfund case, the Office of the U.S. Attorney has requested that EPA prepare a list of the regional divisions and personnel who have been involved with the New Bedford PCB problem since the 1970's. The list should include present and former employees, supervisors, and contractors.

Please submit this information to Gerry Sotolongo, of my staff, by April 15. If you have any questions concerning this, feel free to contact Gerry at 3-1951.

Harley Laing  
David Elerra  
Louis Gitto  
Edward Fitzpatrick



**Metcalf & Eddy, Inc.**  
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August 23, 1982

Mr. Robert E. Mendoza  
Environmental Protection Agency  
Water Management Division  
John F. Kennedy Federal Building  
Boston, Massachusetts 02203

Dear Mr. Mendoza:

The following report is submitted in accordance with Work Order No. 4 of Contract No. 68-04-1009. This report and the September 1, 1982 seminar on use of the Data Management System will complete our Phase 1 work.

Very truly yours,

METCALF & EDDY, INC.

Richard L. Ball, Jr.  
Vice President

OCT 11 1984

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REPORT

## NEW BEDFORD PCB DATA MANAGEMENT SYSTEM

### Introduction

Polychlorinated biphenyl (PCB) contamination in New Bedford Harbor first became acknowledged in 1976 when the U.S. Environmental Protection Agency conducted a New England wide PCB survey.\* Further testing by Massachusetts Agencies, Federal Agencies, research institutions, and others has revealed that the problem is pervasive and that two industries, Aerovox and Cornell Dublier, are major sources of the PCB's.

A recent report prepared by Grant Weaver, of the Massachusetts Coastal Zone Management (CZM),\* presents a detailed history and overview of the New Bedford problem. Although direct discharge of PCB have been greatly reduced in recent years, it is estimated that the municipal wastewater treatment plant is discharging 135 to 315 kilograms (Kg) of PCB's annually. Sediment concentrations in excess of 100,000 parts per million (ppm) PCB have been reported in New Bedford Harbor, and in Buzzards Bay sediments in excess of 50 ppm have been reported. The New Bedford landfill contains over 227,000 Kg of PCB's and there is indication of high blood levels of PCB's in New Bedford area residents.

In recognition of the extent and complexity of the documented and potential PCB contamination, Secretary Bewick of the Massachusetts Executive Office of Environmental Affairs

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\*Weaver, Grant. 1982. PCB Pollution in the New Bedford, Massachusetts Area: A Status Report. Massachusetts Coastal Zone Management.

established a New Bedford PCB Task Force in 1981. This Task Force, chaired by the Massachusetts Department of Environmental Quality Engineering, has met monthly to coordinate investigation, construction, and permitting activities which might relate to PCB's. The Task Force has also served as a central point for the organization and planning of additional studies and abatement measures.

Recent activities by CZM, Region I EPA, and others have revealed that there is a large volume of PCB-related data for the New Bedford area (over 3,000 data points). Much of the data appears to be poorly organized, sometimes contradictory, and not centrally sited. Although there is an acknowledged need for more information, a comprehensive assessment of existing data is a prerequisite to future decisions regarding development of solutions. Consequently, EPA addressed these needs by developing a New Bedford PCB Data Management System.

#### Overall Scope of Data Management

The EPA Office of Program Support has contracted the consulting firm of Metcalf & Eddy to conduct the first phase of the development and implementation of the Data Management System for all PCB related data from the New Bedford, Massachusetts area. Additional phases are envisioned to delineate data deficiencies and develop alternative strategies for PCB clean up. The advantage of a phased study is that the approach is flexible, with each phase contingent upon the results of the previous phases. Consequently the exact need, timing or scope of additional phases



is not yet exactly defined, but presented below is a general description of the objectives of the three phases envisioned at this time.

Phase 1. Phase-1 is completed with publication of this report and the September 1, 1982, Data Management System demonstration seminar. As part of this phase, categories were established for cataloging the data in the basic Data Management System. All readily available information on PCB's and related parameters from the New Bedford, Massachusetts area was then described and entered in terms of these categories. Data reviewed and cataloged included all PCB species as well as metals or other toxics collected in conjunction with-any PCB related studies. PCB related information from all areas, including sediments, water column, biota, air, land, and sewer system was included.

Also preliminary criteria for evaluating the usability of individual data sets were developed as part of this phase. Throughout this first phase, communication was maintained with the New Bedford PCB Task Force and the member agencies. This communication insured that the data assembled and the management system developed were accessible to the involved state agencies.

Phase 2. As presently conceived under Phase 2, the data evaluation criteria will be-refined and applied to the entire data base. Following an analysis of the data, additional information needed to fully define the-problem and evaluate abatement measures will be identified. A recommended program to supply this missing data will then be developed for implementation by other Federal agencies, State agencies and research institutions. During this

phase, the data file will continue to be expanded with all new data and will be accessible to concerned parties (through EPA Office of Program Support) to address specific inquiries or investigate potential data trends.

Phase 3. Once the PCB problem has been adequately defined in Phases 1 and 2, Phase 3 will be undertaken to develop and evaluate potential cleanup and disposal alternatives.

#### Data Management System - Phase 1

Objective. -The overall objective in the establishment of the Data Management System is to consolidate the existing data from all of the agencies and institutions which have conducted PCB studies and related investigations in the New Bedford, MA area into one, central, computerized data base. The data would be described and filed in such a format that it could be easily accessed; sorted, selected, plotted and evaluated for comparison; assessed in terms of defining the existing problem and identifying gaps in the data base; and supplemented by ongoing studies.

General Description. The Data Management System established by Metcalf & Eddy for the New Bedford PCB data utilizes the Digital Equipment Corporation computer software package, DATATRIEVE-11. DATATRIEVE is an all-purpose data storage and retrieval system which provides direct, easy access to data as well as inquiry and report-writing capabilities.

Data is stored in the DATATRIEVE file in individual data points, or records, with each record described in any number of categorical data fields. Data may be numerical, textual, alphanumeric, or coded. Manipulative capabilities of the program

include easy addition of new records, deletion of old ones and modification of existing data records.

DATATRIEVE's interactive inquiry language permits the user to query the system for the purpose of isolating and sorting data for individual job needs. Some limited statistical capabilities are also incorporated into the system, including average, total, maximum and minimum values. In addition, DATATRIEVE records may be selected and merged with other computer programs, such as a statistical or graphical package.

Finally, DATATRIEVE's report writer permits the user to organize and visually present the data file, or any portion thereof, in an easy to read, understandable format.

Establishment of Data Fields. Each variable and descriptive parameter relating to the generation of the PCB data base was entered into the DATATRIEVE PCB file as an individual data field. Items of information which were too closely associated to warrant separation, (e.g., units of concentration and their designation as wet weight or dry weight), were entered into a single data field. Supplementary descriptive information which could not be specifically categorized was grouped into one "comments" field. Numerical items were separated to optimize the selection and sorting capacity of the system.

Generally, the data were sorted into categories for identification (enumeration); location of sampling; characterization of the sample; time of reference; analytical information and results; referencing and additional comments.

Each sample recorded in the file was assigned a new sample accession number (designated "sample number"), with subscripts indicating replicate analyses of the same sample (e.g., for different parameters). The original sample number assigned by the collector was also filed, as were the original station number (or code) and lab number. The new sample number eliminates duplication between studies and provides an easy way to select specific data points. The subscripting allows each analysis to be entered as individual record, without misconstruing the number of samples actually collected. The original field and lab numbers are kept in the file to aid in cross-referencing and verifying the data file.

All sampling locations were assigned coordinates in the USGS Transverse Mercator 1000 meter grid system. This grid system was selected because of its metric basis and the fact that it is more easily broken into linear distances than are angular coordinates. Distances may be recorded in increments of ten meters, where that level of detail is warranted. In addition, this grid system is the one used on the New Bedford, MA, area base map developed by Massachusetts Coastal Zone Management. Although the coordinates are not actually angular, they were assigned the field names "latitude" and "longitude".

Data fields characterizing samples collected were established in three hierarchical levels of detail, "sample type", "sample source", and "exact source". The sample type category allows for a general grouping of the data; for example as sediment, water or lobster samples. The sample source is an

elaboration of the type, identifying the source of sediment or water samples, or part of the organism sampled. The exact source provides more detailed information, including depth of sediment or water samples or sex and size of an organism, where the information is available.

In order to provide a chronological reference and evaluate the time elapsed between sample-collection and analysis, the dates of each were recorded in the data file. In addition, a "tide or time" field was established for a more detailed reference in studies where tidal fluctuations can influence the data.

Analytical methods and the parameter analyzed, measured concentration, and units reported were assigned individual fields in the data file. Both the lab performing the analysis and the agency conducting the study were also identified. For the latter, the year the study was conducted was also included to provide some delineation between different studies conducted by the same investigating agency.

Twenty fields were used to describe the existing data. Should future data collection become sufficiently detailed to warrant it, or other needs develop, new data fields can be easily added to the system. For example, a field containing a quality control evaluation of the data can be added at a later date.

The twenty data fields currently in the system are:

Sample Number	Date of Analysis
Original Sample Number	Tide or Time
Original Station Number	Parameter

Original Lab Number	Concentration
Latitude	Units
Longitude	Laboratory
Sample Type	Study
Sample Source	Reference Number
Exact Source	Methods Number
Date of Collection	Comments

Filing of the Data Base. Most of the data initially stored in the Data Management System were obtained from the Massachusetts Office of Coastal Zone Management.\* Additional reports were provided by EPA Region I. All data relating to PCB's in the New Bedford area were utilized, as well as readily available PCB data from surrounding areas and analyses of related parameters collected in association with the PCB data.

Much of the data were acquired in the form of xeroxed reports of analytical results, therefore backup documentation was substantially incomplete. A great deal of cross-referencing was required in sorting out the data, matching lab reports to reports of field collection and summary reports, eliminating duplication, etc. A majority of the most vital backup documentation was eventually identifiable. However, no information was available on the sampling and analytical methods employed in any of the studies. No tide or time data were obtained either, but that information is only relevant to water studies in the Acushnet Estuary.

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\*Files of Grant Weaver, Environmental Engineer, CZM.

Sampling locations, where they were identified in the literature, were mostly marked on maps and charts of the area, with varying degrees of precision. Some station locations were identified only by geographical reference (e.g. "Butler Flats" or "off Aerovox"). Sampling stations were assigned grid coordinates by interpolating them on the USGS quadrangle maps for the area. Stations outside of the New Bedford area (which were not mapped) were assigned only general coordinates, since their main purpose is to provide background data. For example, all samples from the Cape Cod Canal were assigned the same coordinates.

In order to expediate verification of the data, units of concentration were stored in the data file as they were originally reported, including a wet weight or dry weight designation where relevant. The units can be converted at a later date to facilitate comparison between samples.

In order to minimize computer storage space and data entry; maintain consistency; and facilitate selection and presentation of the data filed in the system, most of it was put into abbreviated or coded form. Aquatic biota data was coded in the "SAMPLE TYPE" field with a general identifier of "AQB", followed by the first letter of the generic name and the first two letters of the species name. For example, the Northern lobster, or Homarus americanus was coded as AQBHAM. Parameters analyzed were coded using the numeric system adopted by EPA for Priority Pollutants. Analytical methods and references were listed separately and assigned reference code numbers in the file. Definitions of the

file contents and associated codes and abbreviations may be found in Appendix A.

Verification and Completion of the Data Base File. Once the tabulation, coding and storage of the data was completed, all of the data were selected and printed for each individual laboratory and investigating agency. The data file contains data from the following labs, agencies and institutions:

Labs

Versar, Inc.

New England Aquarium

Cat Cove Marine Laboratory

Gidley Laboratories, Inc.

Woods Hole Oceanographic Institute

Cambridge Analytical Associates

Tibbetts Engineering Corporation

GCA Corporation

Lawrence Experimental Station

Monsanto Industrial Chemicals Co.

Woodson-Tenet Laboratories

Environmental Science & Engineering, Inc.

Lycott Environmental Research, Inc.

New England Analytical and Testing Lab

Agencies/Institutions

U.S. Army Corps of Engineers

University of South Carolina

Camp, Dresser & McKee

EG&G, Inc.



Mass Coastal Zone Management

U.S. Environmental Protection Agency

Mass Division of Marine Fisheries

Mass Department of Public Works

Mass Division of Water Pollution Control

Mass Food & Drug Administration

Southeastern Mass University

Aerovox Industries

Copies of the printouts, listing all of the data fields except grid locations and tide/time, were sent to the respective labs and agencies in April, 1982. Included with the printouts was an explanation of the system and codes, identification of information missing from that particular file, and a request that the filed data be verified and the missing information supplied if available. All of the labs and agencies were also asked to document the analytical methodology used in generating the data, and supply any additional data not listed in the file.

By July, 1982, approximately half of the 26 labs and agencies contacted had responded to the request. Of these, eight sent additional data. Based on these responses, corrections and additions were made to the data file and analytical methods were listed, coded and entered into the system.

Data on File. The PCB data base file, as it presently exists in the Data Management System, contains over 3,000 data records, representing 750 individual samples. Approximately 1,500 records (half of the data base) are sediment data; 400 are shellfish; 300 are lobster; 250 are finfish; 200 are water; 50 are

air; and the remainder are miscellaneous types from various waste and industrial processes.

The data represent the investigating efforts of 30 labs and agencies, participating since 1973 in nearly 100 different studies.

Although the present file can be considered complete with respect to the data base cited, PCB research in the New Bedford, MA area continues. It should be noted therefore, that the Data Management System described herein is a dynamic one, subject to continuous updating, assessment and modification.

Use of the System. The Data Management System containing the PCB data base can be used to isolate data of any specified field contents, either singly or in combination. A specific range in, for instance, latitude or longitude may be selected for study. Any portion of the specified data can then be printed, sorted, counted, etc.

The data can be combined and cross-referenced in a number of ways with user-input queries. For example, one may wish to plot or summarize in tabular form all of the sediment data collected in the past 2 years; or all lobster data with PCB concentrations in the meat greater than 5.0 mg/kg wet weight, and so on.

It is anticipated that this interactive querying capacity of the system will prove invaluable in sorting information in the data base, so that it can be used for specific purposes, and identifying where information gaps exist.

A sample interactive query session using the Data Management System is contained in Appendix B. Also attached are samples of several report formats which have been used with the system.

#### Development of Data Evaluation Criteria

The major objective in establishing Data Evaluation Criteria with relation to PCB's in the New Bedford area is to determine the data's-usability in defining problems related to the flux of PCB's in the environment, and in developing solutions related to public health concerns. The criteria are developed to determine the quality of the PCB data (accuracy and precision) as related to the analytical considerations as well as to the field collection of the samples. Since there is a great potential for contamination of the sample during the pretreatment steps of sample collection, handling, preservation and storage, sample collection methodology affects the quality and utility of the resultant data. Application of the Data Evaluation Criteria will permit a critical review of the data to better define the PCB problem in the New Bedford Area; determine the areas where additional data is required; detail the specifics as to how and where the data should be collected; and to identify and evaluate cleanup strategies.

The basic approach in the development of a data evaluation procedure is to establish criteria against which each data set\*

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\*Data set as used here is defined as the results of analysis of the same sample type (e.g. air, lobsters, sediment, etc.) by the same laboratory within a given time period conducted.

can be compared to determine the data's usefulness in decision making. The first step is to define the critical areas of sample analysis and collection.

The critical areas identified to date are:

Analytical

Extraction

Clean Up

Analytical Instrumentation and proper operation

Standardization-including spiked samples, replication, and split samples, and mixtures of compounds

Correction for percent recovery

Date of analytical procedure utilized

Collection

Sample type specificity

Collection methodology

Pretreatment handling including preservation, & cross contamination avoidance

Replication

Time of collection

The methods used in each of these critical areas, for each data set, are then scrutinized to determine if they are acceptable. To the extent feasible, acceptable methods for each category will be defined in advance. However, in many cases, particularly with regard to collection, methods used for a specific data set will have to be reviewed individually. When this occurs, the review process will be clearly documented and be

considered when similar situations arise on other data sets, to maintain consistency. The results of the data scrutiny will be to classify the data for each critical area as:

RELIABLE - of proven consistency in producing satisfactory results, i.e. data that is trustworthy or possessing a reliability worthy of fullest confidence.

INCOMPLETE - the method used is not defined and reported in enough detail to judge the adequacy of the method; or the data reporting is incomplete or suspect (such as typographical error or calculation); so that the data cannot be assessed to determine its reliability.

UNUSABLE - data possessing collection and/or analytical deficiencies which preclude their use in making any decisions.

If a data set is deemed acceptable in each analytical area, it is RELIABLE and a code of R can be attached to each point in the set as part of the Data Management System. If, however, the data is acceptable in some areas, incomplete in others, and unacceptable in still others a decision must be made as to whether to classify the data as R, I (INCOMPLETE), or U (UNUSABLE). This decision will be based on the importance, sensitivity, and vulnerability of the areas involved. Although every effort will be made to make the decision totally objective, some subjective judgment will ultimately be required. It is vital, therefore, that this judgment be made by a reviewer trained and experienced in that particular area. After this decision is made it will be reviewed by other experienced personnel where warranted.

A procedure identical to the one described above would be followed for each collection area. The designation for Collection Evaluation would be a lower case r for RELIABLE, i for INCOMPLETE, etc.

The evaluation of a particular datum would thus result in a two letter designation code attached to the data report in the Data Management System. (Upper case representing the Data Evaluation Criteria based on analytical considerations, and lower case representing the Data Evaluation Criteria based on the collection considerations). For example, "Ri" would denote that the data is based on "reliable" analytical procedures, but is "incomplete" based on collection documentation.

For data sets coded as -I or i every effort will be made to contact the appropriate agencies or institutions to obtain the information required to place the data in the R (or r) or U (or u) classification.

As presently conceived, in Phase 2 of the New Bedford study, these Data Evaluation Criteria will be further detailed, re-evaluated and modified as necessary based on their implementation and utilization. After screening existing data based on this evaluative procedure, recommendations will be made regarding all new data to be acquired under separate contracts. The new data, once collected, will be screened with the same Data Evaluation Criteria so as to document the utility and applicability of the data in making decisions regarding the mitigation and clean up of PCB's in the New Bedford area.

In summary, the PCB Data Management System has been designed to not only efficiently characterize all components of the PCB data related to New Bedford, MA, but also to be responsive to user needs in answering inquiries, and aiding in the development of short term and long term solutions. The flexibility of entering, updating, and screening the data as well as the simplicity of providing output in the form of tables and graphics, make it especially useful in applications related to problem solving. A demonstration of the system will be held September 1, 1982, at Metcalf & Eddy, Inc., 50 Staniford Street, Boston, MA 02114 starting at 1000 hours in Room 200.

The New Bedford, MA PCB Data Management System has been developed as an interactive, ongoing system. Its overall utility will be determined by its application. Use of the system is encouraged for a multiplicity of purposes related to the cost effective development of solutions in the New Bedford area. For further information regarding the sytem or to access data, all inquiries should be addressed to:

Office of Project Support  
Water Management Division  
U.S. Environmental Protection Agency Region I  
John F. Kennedy Federal Building  
Boston, Massachusetts 02203  
(617)223-5611

## APPENDIXES



## APPENDIX A

FILE DEFINITIONS  
ABBREVIATIONS AND CODES  
LIST OF METHODS  
LIST OF REFERENCES

# APPENDIX A

## DATATRIEVE NEW BEDFORD PCB FILE DEFINITIONS

SAMPLE NUMBER - (5 alphanumeric characters)  
Assigned by M&E, with subscripts for replicate samples or analyses.

ORIGINAL SAMPLE NUMBER - (14 mixed characters)

ORIGINAL STATION NUMBER - (14 mixed characters)

ORIGINAL LAB NUMBER - (10 mixed characters)

LATITUDE & LONGITUDE - (6 numeric characters each)  
Based on U.S.G.S. 1000-meter Universal  
Transverse Mercator Grid  
-XX - XX - XX  
(100,000) (1,000) (10)  
M M M

SAMPLE TYPE (6 alphanumeric characters) CODE

MISCELLANEOUS		MIS
WATER		WTR
AIR		AIR
SEDIMENT		SED
WASTE (WATER & SOLIDS)		WST
HUMAN		HUM
AQUATIC BIOTA:		AQB
American eel	<u>Anguilla rostrata</u>	AQBARO
Cunner	<u>Tautogolobrus adspersus</u>	AQBTAD
Summer flounder	<u>Paralichthys dentatus</u>	AQBPDE
Windowpane	<u>Scophthalmus aquosus</u>	AQBSAQ
Winter flounder	<u>Pseudopleuronectes</u>	
	<u>americanus</u>	AQBPAM
Silver hake	<u>Merluccius bilnearis</u>	AQBMBI
Scup	<u>Stenatomus chrysops</u>	AQBSCH
Bluefish	<u>Potamus saltatrix</u>	AQBPSA
Tautog	<u>Tautoga onitis</u>	AQBTON
Striped bass	<u>Morone saxatilis</u>	AQBMSA
Fourspot flounder	<u>Paralichthys oblongus</u>	AQBPOB
Butterfish	<u>Peprilus triacanthus</u>	AQBPTR
Black seabass	<u>Centropristis striata</u>	AQBCST
Black dogfish	<u>Centroscyllium fabricii</u>	AQBCFA

Red hake	<u>Urophycis chuss</u>	AQBUCH
Northern lobster	<u>Homarus americanus</u>	AQBHAM
Long-finned squid	<u>Loligo pealer</u>	AQBLPE
Blue crab	<u>Callinectes sapidus</u>	AQBCSA
Quahog	<u>Mercenaria mercenaria</u>	AQBMME
Blue mussel	<u>Mytilus edulis</u>	AQBMED
Common Oyster	<u>Crassostrea virginica</u>	AQBCVI
Softshell clam	<u>Mya arenaria</u>	AQBMAR
American smelt	<u>Osmerus mordox</u>	AQBOMO
Mud Crab	<u>Neopanope texans</u>	AQBNTE
Scallop	<u>Aequipecten irradians</u>	AQBAIR
Smooth dogfish	<u>Mustelus canis</u>	AQBMCA
(teleost fish)	<u>Lephopsetta malaculata</u>	AQBLMA
(polychaete)	<u>Nepthys incisa</u>	AQBNIN
(polychaete)	<u>Cerianthus americanus</u>	AQBCAM
Miscellaneous		AQBMIS

SAMPLE SOURCE (3 alphanumeric characters)

GROUNDWATER	GWR
RIVER	RVR
INNER HARBOR	IHB
OUTER HARBOR	OHB
BUZZARDS BAY	BZB
CLARKS COVE	CLC
NASKETUCKET BAY	NAS
MATTAPOISSITT HARBOR	MAT
LITTLE BAY	LIB
RAW DRINKING WATER	RDW
FINISHED DRINKING WATER	FDW
COOLING WATER	COO
COMBINED SEWER OVERFLOW	CSD
RUNOFF	RNO
RAW WASTEWATER	RWW
TREATED WASTEWATER	TWW
INDUSTRIAL WASTEWATER	IWW
GENERAL WASTEWATER	WWR
SLUDGE	SLG
GRIT	GRT
ASH	ASH
LAND	LND
AMBIENT AIR	AMB
EMISSIONS (AIR)	AMB
FLESH	FLE
VISCERA	VIS
EDIBLE MEAT (e.g. lobster claw)	EDI
WHOLE ORGANISM	WHO
BLOOD	BLO
MISCELLANEOUS	MIS

EXACT SOURCE (3 alphanumeric characters)

SURFACE	SUR
SHALLOW	SHA
MID-DEPTH	MID
DEEP	DEP
DOWNWIND OF SOURCE	DNW
UPWIND OF SOURCE	UPW
AT SOURCE	SRC
FEMALE	F
MALE	M
JUVENILE	JU
MATURE	MA
(eg. mature female)	(FMA)

DATES OF COLLECTION & ANALYSIS (6 numeric characters)

MMDDYY

TIDES (5 mixed characters)

SLACK, EBB BEGINS (HIGH TIDE)	SEB
SLACK, EBB BEGINS + 1 HOUR	SEB+1
SLACK, EBB BEGINS + 2 HOURS	SEB+2
SLACK, EBB BEGINS + 3 HOURS	SEB+3
SLACK, EBB BEGINS + 4 HOURS	SEB+4
SLACK, EBB BEGINS + 5 HOURS	SEB+5
SLACK, FLOOD BEGINS (LOW TIDE)	SFB
SLACK, FLOOD BEGINS + 1 HOUR	SFB+1
SLACK, FLOOD BEGINS + 2 HOURS	SFB+2
SLACK, FLOOD BEGINS + 3 HOURS	SFB+3
SLACK, FLOOD BEGINS + 4 HOURS	SFB+4
SLACK, FLOOD BEGINS + 5 HOURS	SFB+5

TIME

(IN MILITARY NOTATION)

XXXX

PARAMETER (3 numeric characters)

(See code numbers attached)

XXX

CONCENTRATION (11 mixed characters, 3 decimal places)

NOT DETECTABLE	ND
TRACE	TR

UNITS (8 mixed characters)

PARTS PER MILLION  
PARTS PER BILLION  
MILLIGRAMS PER LITER  
MILLIGRAM PER KILOGRAM  
GRAM/GRAM  
NANOGRAM/METER  
MICROGRAM/LITER  
WEIGHT WEIGHT  
DRY WEIGHT  
NANOGRAMS/LITER

CODE  
PPM  
PPB  
MG/L  
MG/KG  
G/G  
NG/M3  
UG/L  
WW  
DW  
NG/L

IAB: (4 alphanumeric characters)

EPA - REGION I  
CAMP, DRESSER & McKEE  
WOODS HOLE OCEANOGRAPHIC INSTITUTE  
FDA - BOSTON DISTRICT OFFICE  
MASS FOOD & DRUG  
LAWRENCE EXPERIMENTAL STATION (DEQE)  
CAT COVE MARINE LAB (DMF)  
SOUTHEASTERN MASS. UNIVERSITY  
UNIVERSITY OF SOUTH CAROLINA  
ENVIRONMENTAL SCIENCE & ENGINEERING  
WOODSON - TENET LABORATORIES  
MONSANTO CORP.  
NEW ENGLAND ANAL. & TESTING LAB  
LYCOTT ENVIRONMENTAL RESEARCH, INC.  
TIBBETTS ENGINEERING CORP.  
VERSAR  
CAMBRIDGE ANALYTICAL ASSOCIATES  
GCA CORPORATION  
GIDLEY LABORATORIES

CODE  
EPA  
CDM  
WHOI  
FDAB  
MFD  
LES  
CATC  
SMU  
USC  
ESEI  
WOTE  
MONS  
NEAT  
LYCO  
TIBB  
VERS  
CAA  
GCA  
GIDL

STUDY (AGENCY & YEAR): (7 mixed characters)

FOOD & DRUG ADMINISTRATION  
MASS DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING  
DIVISION WATER POLLUTION CONTROL  
ENVIRONMENTAL PROTECTION AGENCY  
WOODS HOLE OCEANOGRAPHIC INSTITUTE  
DIV. MARINE FISHERIES  
MASS. FOOD & DRUG  
CAMP, DRESSER & McKEE  
SOUTHEASTERN MASS. UNIVERSITY  
FAIRHAVEN MARINE

FDA  
DEQE  
DWPC  
EPA  
WHOI  
DMF  
MFD  
CDM  
SMU  
FAIR

STUDY (AGENCY & YEAR) - Continued

CODE

AEROVOX INCORPORATED  
CORNELL - DUBLIER ELECTRONICS  
MASS. DEPT. PUBLIC WORKS  
ARMY CORPS OF ENGINEERS  
MASS. COASTAL ZONE MGMT.  
GIDLEY LABORATORIES  
TOXIC SUBSTANCE CONTROL ACT  
UNIVERSITY OF SOUTH CAROLINA

AVOX  
CODU  
MDPW  
ACE  
CZM  
GIDL  
TSCA  
USC

REFERENCE NUMBER (4 numeric characters)

See attached List of References

METHODS NUMBER (2 numeric characters)

See attached List of Methods

COMMENTS (50 mixed characters)

DATATRIEVE "EPA 1" PARAMETER CODES

VOLATILE ORGANICS

100

101 Chloromethane  
102 Dichlorodifluoromethane  
103 Bromomethane (methyl bromide)  
104 Vinyl Chloride  
105 Chloroethane

106 Methylene Chloride  
107 Acrolein  
108 Trichlorofluoromethane  
109 Acrylonitrile  
110 1, 1 - Dichloroethylene

111 1, 1 - Dichloroethane  
112 Trans - 1, 2 - dichloroethylene  
113 Chloroform  
114 1, 2 - Dichloroethane  
115 1, 1, 1 - Trichloroethane

116 Carbon Tetrachloride  
117 Bromodichloromethane  
118 1, 2 - Dichloropropane  
119 Trans - 1, 3 - Dichloropropylene  
120 Trichloroethylene

121 Benzene  
122 Cis - 1, 3 - - dichloropropylene  
123 Dibromochloromethane  
124 1, 1, 2 - Trichloroethane  
125 Bromoform

126 1, 1, 2, 2 - Tetrachloroethane  
127 1, 1, 2, 2 - Tetrachloroethylene  
128 Toluene  
129 Chlorobenzene  
130 Ethyl Benzene

## ACID EXTRACTABLES

200	-
201	2 - Chlorophenol
202	2 - Nitrophenol
203	Phenol
204	2, 4 - Dimethylephenol
205	2, 4 - Dichlorophenol
206	2, 4, 6 - Trichlorophenol
207	4 - Chloro - 3 - Cresol
208	2, 4 - Dinitrophenol
209	4, 6 - Dinitro - 2 - Cresol
210	Pentachlorophenol
211	4 - Nitrophenol

## BASE - NEUTRAL EXTRACTABLES

300	
301	Dichlorobenzenes
302	1, 4 - Dichlorobenzene
303	1, 2 - Dichlorobenzene
304	Hexachloroethane
305	Bis (chloromethyl) ether
306	Bis (chloroethyl) ether
307	Bis (2 - chloroisopropyl) ether
308	N - Nitrosodimethylamine
309	Nitrosodi - N - propylamine
310	Nitrobenzene
311	Hexachlorobutadiene
312	1, 2, 4 - Trichlorobenzene
313	2 - Chloroethyl vinyl ether
314	Bis (2 - Chloroethoxy) Methane
315	Naphthalene
316	Isophorone
317	Hexachlorocyclopentadiene
318	2 - Chloronaphthalene
319	Acenaphthylene
320	Acenaphthene
321	Dimethyl phthalate
322	2, 6 - Dinitrotoluene
323	4 - Chlorophenyl phenyl ether
324	Fluorene
325	2, 4 - Dinitrotoluene



326	Diethyl phthalate
327	1, 2 - Diphenylhydrazine
328	N - Nitrosodiphenylamine
329	Hexachlorobenzene
330	4 - Bromophenyl phenyl ether
331	Anthracene/Phenanthrene
332	Phenanthrene
333	Di - N - Butyl phthalate
334	Fluoranthene
335	Pyrene
336	Benzidine
337	Butyl Benzyl Phthalate
338	Bis (2 - Ethylhexyl) Phthalate
339	Di - N - Octyle Phthalate
340	Chrysene
341	Benzo (A) anthracene
342	3, 3 - Dichlorobenzidine
343	Benzo (B) fluoranthene
344	Benzo (K) fluoranthene
345	Benzo (A) Pyrene
346	Indeno (1, 2, 3 - C, D) Pyrene
347	dibenzo (A, H) Anthracene
348	Benzo (G, H, I) Perylene
349	TCDD
350	

#### PESTICIDES & PCBS

400

401	Alpha - BHC
402	Gamma - BHC
403	Heptachlor
404	Beta - BHC
405	Delta - BHC
406	Aldrin
407	Heptachlorepoxyde
408	Endosulfan I
409	DDE
410	Dieldrin
411	Endrin
412	DDD
413	Endosulfan II
414	DDT
415	Endrin aldehyde

416	Endosulfan Sulfa
417	Chlordane
418	Toxaphene
419	PCB - Aroclor 1221
420	PCB - Aroclor 1232
421	PCB - Aroclor 1242
422	PCB - Aroclor 1248
423	PCB - Aroclor 1254
424	PCB - Aroclor 1260
425	PCB - Aroclor 1016
426	PCB - Aroclor non-specific
427	PCB - Aroclor 1262
428	PCB - Aroclor 1268
429	PCB - Aroclor 1242/1016

#### METALS

500

501	Antimony
502	Arsenic
503	Beryllium
504	Cadmium
505	Chromium

506	Copper
507	Lead
508	Barium
509	Mercury
510	Nickel

511	Selenium
512	Silver
513	Thallium
514	Zinc
515	Cobalt

516	Iron
-----	------

#### INORGANIC & PHYSICAL ANALYSIS

601	Chemical Oxygen Demand
602	Redox potential
603	Oil & Grease

## MISCELLANEOUS ORGANICS

800

801 Monochlorobenzene

802 Trichlorobenzenes

803 Tetrachlorobenzenes

804 Pentachlorobenzenes

805 Monochlorotoluenes

806 Dichlorotoluenes

807 Monochlorobenzotrifluoride

808 Octachlorocyclopentene

809 Trichlorophenols

810 M - Chlorobenzoic Acid

811 O - Chlorobenzoic Acid

812 Hexachlorocyclohexanes (BHC)

813 Mirex

815

## LIST OF ANALYTICAL METHODS

<u>No.</u>	<u>Description</u>	<u>Reference</u>
00	Unknown	
01	Gas chromatograph with electron capture detector	USFDA Pesticide Analytical Manual Vol. 1, Revised periodically from 1968-1982
02	Gas chromatograph with electron capture detector; mass spectrometer	Methods for PCB's in Industrial Effluent USEPA, NERC, 1973
03	Gas chromatograph with electron capture detector	Method for Organochlorine and Organophosphorus Pesticides in Soil, EPA/Pesticide Monitoring Laboratory Building 1105 NSTL/NASA, Bay St. Louis, MO
04	Gas chromatograph with electron capture detector	Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples, USEPA, June, 1980 EPA 600/8-8-038
05	Gas chromatograph with electron capture detector	American Association of Analytical Chemists, 13th Edition, 1980, Sect 29.001-29028
06	Gas chromatograph with electron capture detector; mass spectrometer	Denver Method for Chlorinated Pesticides in Surface Waters, USEPA, NFIC
07	Gas chromatograph with electron capture detector; mass spectrometer	Determination of Total PCBS Emmissions from Municipal and Industrial Effluents USEPA, 1976
08	Gas chromatograph with electron capture detector	ASTM Method D3534; Standard Test for PCB's in water (Revised annually)
09	Gas chromatograph with electron capture detector; mass spectrometer	USFDA Pesticide Analytical manual Vol. 1, Revised 1979; Sections 212.13(a), 212.14(d) with modification.
10	Gas chromatograph with electron capture detector	Manual of Analytical Methods for the Analysis of Pesticide Residues in Human and Environmental Residues Section 10, A USEPA 1974

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APPENDIX B  
SAMPLE OUTPUTS

# SAMPLE QUERY SESSION

DTR>  
FIND PCB WITH TYPE = "IF" !FIND ALL AIR SAMPLES  
[63 records found]

DTR>  
FIND ICR WITH TYPE = "WTh"  
[176 records found]

DTR>  
FIND CURRENT WITH LAT CT "463950" AND LONG BT "034000" AND "034100"  
[74 records found]

!FIND WATER DATA FROM ABOVE HURRICANE BARRIER

DTR>  
REPOPT CURRENT SCKED BY COLL  
RW>  
AT BOTTOM OF COLL PRINT COLL,COUNT

!FIND OUT HOW MANY SAMPLES WERE COLLECTED WHEN

RW>  
END-REPORT  
Enter REPORT-NAME:  
"DATES OF WATER SAMPLE COLLECTION"

DATES OF WATER SAMPLE COLLECTION

19-Aug-82  
Page 1

DATE  
COLLECTED

011476	1
071781	60
102981	10
120574	3

DTR>  
FIND CURRENT WITH COLL = "120574"  
[3 records found]

!WANT TO SEE MORE OF THE 1974 DATA

DTR>  
PRINT ALL LAT,LONG,PARAM,CONC,UNITS,LAB,STUDY,COMMENTS

LATITUDE	LONGITUDE	PARAMETER CODE	CONCENTRATION	UNITS	LAB	STUDY
461450	034010	426	2.5	PPF	MONS	AVOX,74
GRAB-DRINKING FOUNTAIN						
461450	034010	426	26.	PPF	MONS	AVOX,74
GRAB-S. OF MAIN PLANT EFF.						
461450	034010	426	18	PPR	MONS	AVOX,74
GRAB-SHORE LINE						

DTR>  
CLOSE

SAMPLE DATA OUTPUT

SAMP. NO.	ORIGINAL SAMP. NO.	STATION AND LAB NO.	SAMPLE TYPE	SOURCE AND EXACT SOURCE	DATES COLLECT. ANALYSIS	PARAM. CODE	CONCENTRATION AND UNITS	LAB AND STUDY	REF. NO.	METH. NO.	COMMENTS
			AIR	AMB DNW		429	259 NG/M3	EPA,78	72		DOWNWIND OF AEROVOX
1A	1		AIR	AMB DNW		423	9 NG/M3	EPA,78	72		DOWNWIND OF AEROVOX
2	2		AIR	AMB SRC		429	703 NG/M3	EPA,78	72		LANDFILL SITE
2A	2		AIR	AMB SRC		423	23 NG/M3	EPA,78	72		LANDFILL SITE
3	3		AIR	AMB DNW		429	18 NG/M3	EPA,78	72		DOWNWIND OF LANDFILL
3A	3		AIR	AMB DNW		423	ND NG/M3	EPA,78	72		DOWNWIND OF LANDFILL
4	4		AIR	AMB UPW		429	27 NG/M3	EPA,78	72		APPROX.VALUE, UPWIND OF LANDFILL
4A	4		AIR	AMB UPW		423	ND NG/M3	EPA,78	72		APPROX.VALUE, UPWIND OF LANDFILL
5	5		AIR	AMB UPW		429	41 NG/M3	EPA,78	72		UPWIND OF AEROVOX
5A	5		AIR	AMB UPW		423	ND NG/M3	EPA,78	72		UPWIND OF AEROVOX
6	7		AIR	AMB DNW		429	21 NG/M3	EPA,78	72		DOWNWIND OF LANDFILL
6A	7		AIR	AMB DNW		423	ND NG/M3	EPA,78	72		DOWNWIND OF LANDFILL
7	8		AIR	AMB SRC		429	334 NG/M3	EPA,78	72		LANDFILL SITE
7A	8		AIR	AMB SRC		423	33 NG/M3	EPA,78	72		LANDFILL SITE
8	9		AIR	AMB SRC		429	ND NG/M3	EPA,78	72		LANDFILL SITE
8A	9		AIR	AMB SRC		423	ND NG/M3	EPA,78	72		LANDFILL SITE

B-2

## NEW BEDFORD SEDIMENT DATA

SAMPLE NO.	PATAP CODE	CONCENTRATION AND UNITS	DATE OF COLLECT	STUDY	LATITUDE	LONGITUDE	SAMPLE SOURCE	EXACT SOURCE
628D	419	ND PG/KG WW	072181	DWPC,81	461015	034130	KVR	SUR
629D	419	ND MG/KG WW	072181	DWPC,81	461020	034130	KVR	SUR
630D	419	ND MG/KG WW	072281	DWPC,81	461530	034045	KVR	SUR
631D	419	ND PG/KG WW	072281	DWPC,81	461530	034040	KVR	SUR
632B	419	ND MG/KG WW	072281	DWPC,81	461505	034050	KVR	SUR
632D	419	ND MG/KG WW	072281	DWPC,81	461505	034050	KVR	SUR
633D	419	ND MG/KG WW	072281	DWPC,81	461505	034050	KVR	SUR
634D	419	ND MG/KG WW	072281	DWPC,81	461455	034025	KVR	SUR
636D	419	ND MG/KG WW	072281	DWPC,81	461455	034025	KVR	SUR
637D	419	ND MG/KG WW	072281	DWPC,81	461530	034045	KVR	SUR
638D	419	ND MG/KG WW	072281	DWPC,81	461530	034045	PVR	SHA
639D	419	ND MG/KG WW	072281	DWPC,81	461530	034045	KVR	DEP
640D	419	ND MG/KG WW	072281	DWPC,81	461530	034035	KVR	SUR
641D	419	ND MG/KG WW	072281	DWPC,81	461530	034035	KVR	SHA
642D	419	ND PG/KG WW	072281	DWPC,81	461530	034045	KVR	SUR
643D	419	ND PG/KG WW	072281	DWPC,81	461530	034055	KVR	SUR



REVISED CAT COVE DATA

SAMP. NO.	ORIGINAL SAMP. NO.	STATION AND LAB NO.	SAMPLE TYPE	SOURCE AND EXACT SOURCE	DATE'S COLLECT., ANALYSIS	PARAM. CODE	CONCENTRATION AND UNITS		LAB AND STUDY	REF. NO.	METH. NO.	COMMENTS
B-4	865A	472	WST	IWW	032780 040180	423	0.1 UG/L		CATC DEQL,80	0064	00 C-II NO. 6 PRESS ROOM	
	866	473	WST	IWW	032780 040180	423	NI UG/L		CATC DEQE,80	0064	00 C-II BLDG G	
	866A	473	WST	IWW	032780 040180	423	0.1 UG/L		CATC DEQE,80	0064	00 C-II BLDG G	
	867	474	WST	IWW	032780 040180	423	NI UG/L		CATC DEQE,80	0064	00 C-II NO. 8	
	867A	474	WST	IWW	032780 040180	423	NI UG/L		CATC DEQE,80	0064	00 C-II NO. 8	
	868	475	WST	IWW	032780 040180	423	NI UG/L		CATC DERC,80	0064	00 C-II NO. 9	
	868A	475	WST	IWW	032780 040180	423	0.4 UG/L		CATC DEQE,80	0064	00 C-II NO. 9	
	869	476	WST	IWW	032780 040180	423	NI UG/L		CATC DERE,80	0064	00 C-II BOILER ROOM	
	869A	476	WST	IWW	032780 040180	423	NI UG/L		CATC DEQE,80	0064	00 C-II BOILER ROOM	
	870	477	WST	TWW	032780 040180	423	NI UG/L		CATC DEQE,80	0064	00 NB WWTP, CHLORINE CONTACT CHAMBER	
	870A	477	WST	TWW	032780 040180	423	0.1 UG/L		CATC DEQE,80	0064	00 NB WWTP, CHLORINE CONTACT CHAMBER	
	905	80-159-612 P264	AQBHAM	EDI	020680	423	6.8 PPM	WW	CATC FDA, 80	0058	00 F.D.A. HOMOGENATES	
	906	80-159-613 P265	AQBHAM	EDI	020680	423	4.4 PPM	WW	CATC FDA, 80	0058	00 F.D.A. HOMOGENATES	
	907	80-159-614 P266	AQBHAM	EDI	020680	423	2.7 PPM	WW	CATC FDA, 80	0058	00 F.D.A. HOMOGENATES	
	908	80-159-615 P267	AQBHAM	EDI	020680	423	5.1 PPM	WW	CATC FDA, 80	0058	00 F.D.A. HOMOGENATES	