

OLD DOMINION UNIVERSITY

The Applied Marine Research Laboratory
College of Sciences
Norfolk, VA 23529-0456

ELIZABETH RIVER MONITORING PROGRAM

**A Baseline Environmental Study for an Assessment of Trends in
Contaminant Concentrations and Effects for the Elizabeth River**

Progress Report for the Period: October 1998 to May 1999

Prepared by

Principal Investigator: Mr. Joseph G. Winfield

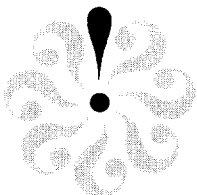
Submitted to

Department of Environmental Quality
Tidewater Regional Office
5636 Southern Blvd.
Virginia Beach, VA 23462

Attn: Mr. Bert W. Parolari, Jr.
Special Programs Manager

AMRL Technical Report Number: 3104

May 1999



ELIZABETH RIVER MONITORING PROGRAM
A Baseline Environmental Study for an Assessment of Trends in Contaminant
Concentrations and Effects for the Elizabeth River

Progress Report for the Period: October 1998 to May 1999

Organization: Applied Marine Research Laboratory
Principal Investigator: Mr. Joseph G. Winfield

I Purpose

The purpose of the Elizabeth River Monitoring Program (ERMP) is to collect data that will provide a baseline for efforts to determine the trend in specific environmental conditions found in the Elizabeth River Watershed. The monitoring plan has followed, to the extent that it was practical, guidance provided in the *Water Quality Monitoring Plan Design* (1997) developed by USR Greiner, Inc. under contract to the Virginia Department of Environmental Quality-Tidewater Regional Office (VA DEQ-TRO). This report describes the accomplishments during the period October 1998 to May 1999 and provides the schedule of activities leading to the completion of the project.

II Background

This ongoing monitoring program was designed to provide data describing the environmental conditions in the Elizabeth River with respect to specific sediment and water quality parameters. The results of monitoring sediments and ambient water for toxicity and specific contaminants are provided in a Microsoft Access® database as the data become available following the analysis of samples and appropriate data quality assessments. A final technical report that summarizes the results from this contract period will be prepared and submitted to VA DEQ-TRO. The final report will be prepared such that it can be easily understood by the public.

This ongoing monitoring program consists of three components during the current contract period (October 1998 to June 1999) : 1) ambient water quality monitoring for nutrients, conventional and physico-chemical parameters; 2) ambient water column toxicity; and 3) sediment contamination and toxicity. Additional data from other research and monitoring programs when available will be captured and combined with the data generated by this program to provide as complete a picture as possible of the present conditions in the Elizabeth River. The AMRL has been monitoring the River for conventional pollutants and physico-chemical parameters since 1989 at five stations under a monitoring program supported by Virginia Department of Environmental Quality (VA DEQ), Chesapeake Bay Office. The stations and period of record for the monitoring programs are provided in Appendix 9.

The ambient water quality monitoring plan consisted of nutrients, conventional and physico-chemical parameters. The monitoring plan conformed to the Chesapeake Bay Mainstem and Tributary Monitoring Program. The ambient water column toxicity component consisted of 7-day chronic water renewal bioassays using the sheepshead minnow and a mysid shrimp. The sediment contaminant analyses targeted selected polychlorinated biphenyls (PCBs) and selected pesticides (including DDT and metabolites), and polyaromatic hydrocarbons (PAHs).

III Summary Statement of Monitoring Completed from October 1998 to May 1999

Ambient Water Quality Monitoring:

All Elizabeth River ambient water quality cruises scheduled for this period have been completed (See Section IV for details). The next and final cruise during this contract period is scheduled for June 24, 1999. Since it will take at least 30 days for the samples to be analyzed, these data will not be available until after the final report is due and the contract period has expired. Every effort will be made to provide the data set at the earliest practical time. Ambient Water Quality data sets submitted to date are described in Section VI. The data set encompassing the period January through March 1999 will be provided within 7 days of receipt of comments from the DEQ project officer regarding the data set submitted for the period October through December 1998. The quality control reports for this sampling period are provided in Appendices 1 through 8.

Ambient Water Column Chronic Toxicity:

Two sampling events were scheduled for this contract period. The first was initiated on December 1, 1998 but the bioassay using mysid shrimp failed because control survival was less than 90%. This bioassay was rerun using ambient water column samples collected on January 19, 1999 and the control survival was acceptable. The second set of bioassays was initiated on April 27, 1999 and control survival with the sheepshead minnow and mysid tests were acceptable. The 14 stations sampled in both events overlapped the stations monitored in the previous contract period.

Sediment Toxicity and Contaminant Analysis:

Sediment samples were collected from 12 sites in the Elizabeth River from March 31 through April 2, 1999. Sediment bioassays and contaminant analyses are complete. Ancillary parameters are 90% complete and data entry is underway.

IV Conformance to Sample Collection Schedule

Ambient Water Quality Monitoring:

<u>Cruise Date</u>	<u>Scheduled Dates</u>	<u>Actual Sampling Dates</u>	<u>Notes</u>
BAY272	01/22/98	01/22/98	
BAY273	02/17/98	02/17/98	
BAY275	03/17/98	03/17/98	
BAY276	04/23/98	04/23/98	
BAY278	05/14/98	05/14/98	
BAY280	06/25/98	06/25/98	
BAY282	07/14/98	07/14/98	
BAY284	08/13/98	08/12/98	
BAY286	09/24/98	09/24/98	
BAY288	10/22/98	10/22/98	
BAY290	11/19/98	11/23/98	
BAY291	12/22/98	12/15/98	1
BAY282	01/21/99	01/21/99	
BAY293	02/25/99	02/25/99	
BAY295	03/25/99	03/25/99	
BAY296	04/22/99	04/22/99	
BAY298	05/20/99	05/20/99	
BAY300	06/24/99		2

Notes:

1. Prior approval for the change in cruise date was granted by VA DEQ-CBPO.
2. Scheduled cruise date has not occurred.

V Status of Contaminant Analyses

Water Quality Monitoring for nutrients, conventional and physico-chemical parameters:

Since the next Elizabeth River Quality Monitoring Program cruise (BAY300) has been scheduled for June 24, 1999 it will be impossible to complete the analyses by the end of the contract period. The analysis of ambient water quality samples will continue following the June 1999 cruise and proceed until completion.

Ambient Water Column Chronic Toxicity:

No contaminant analysis required by the contract.

Sediment Toxicity and Contaminant Analysis:

Contaminant analysis for PAHs, PCBs and pesticides has been completed. A data quality assessment is underway and upon completion, the data will be entered into the data set.

VI Conformance to Data Set Submission Schedule

Water Quality Monitoring of nutrients, conventional and physico-chemical parameters:

<u>Cruise No.</u>	<u>Collection Month</u>	<u>Submittal Date</u>	<u>Receipt of Verification</u>	<u>Data Sign-off</u>	<u>Notes</u>
BAY272	01/98	05/29/98	Yes	Yes	
BAY273	02/98	05/29/98	Yes	Yes	
BAY275	03/98	05/29/98	Yes	Yes	
BAY276	04/98	05/29/98	Yes	Yes	
BAY278	05/98	06/30/98	Yes	Yes	
BAY280	06/98	07/31/98			1
BAY282	07/98	10/30/98			1
BAY284	08/98	10/30/98			1
BAY286	09/98	10/30/98			1
BAY288	10/98	05/10/98			2
BAY290	11/98	05/10/98			2
BAY291	12/98	05/10/98			2
BAY292	01/99				3
BAY293	02/99				3
BAY295	03/99				3
BAY296	04/99				4
BAY298	05/99				4,5
BAY300	06/99				5

Notes:

1. Pending review by VA DEQ-TRO
2. Pending review and comments on revised format by VA DEQ-TRO
3. To be submitted within 7 days following receipt of comments from VA DEQ-TRO.
4. Samples being analyzed and data entry in progress.
5. Data may not be available by the end of the contract period due to time required to analyze the samples and enter the data following the cruise in late May and June, 1999.

VII Quality Assurance/Quality Control Status

The quality control (QC) results for the ambient water quality monitoring program are provided in attachments to this report for the months October 1998 through May 1999. The QC data for the ambient water column toxicity and sediment toxicity/contaminant analysis will be presented in the data base submitted to VA DEQ-TRO.

VIII Statement of Work Planned for Next Month

The next Elizabeth River Quality Monitoring Program cruise (BAY300) has been scheduled for June 24, 1999. The analysis of ambient water quality samples will continue following the June 1999 cruise until completion. Data are being entered throughout the month of May and will continue in June until complete. The final report is being prepared in stages as the data and analysis of data are complete. The final report is scheduled to be submitted on or before June 19, 1999.

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for October 22, 1998.

	<u>Accuracy</u>		
	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	96-101	99	0
Dissolved Phosphate	92-96	95	0
Particulate Phosphate	103-104	104	0
Nitrate + Nitrite	100-102	101	0
Ammonia	100-102	101	0
Total Dissolved Nitrogen	98-99	99	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for October 1998

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
	x	1. Changes in organizational structure.
	x	2. Changes in staffing arrangements.
	x	3. Performance in external audits.
	x	4. Problems with field/lab blanks.
x		5. Changes in calibration procedures or frequency.
	x	6. Changes in analytical procedures.
x		7. Changes in data reduction, validation, or reporting.
	x	8. Internal quality control.
	x	9. Preventive maintenance problems.
	x	10. Problems with sample acceptance criteria.
	x	11. Changes in procedures to assess data precision and accuracy.
	x	12. Corrective actions applied.
	x	13. Revisions of SOPs, QA manuals, etc.
	x	14. New instrumentation.
	x	15. Training.
	x	16. Change in current percent of samples duplicated.
	x	17. Change in the current percent of samples spiked.

Comments:

5. Starting with the October 1998 Chesapeake mainstem cruise, winkler dissolved oxygen samples were not collected for every sample due to the Virginia Department of Environmental Quality's request. They will be collected at the beginning and end of the day to ensure the calibration and performance of the sonde unit.
7. See following page for a list of changes that affect data reduction, validation and reporting.

ITEM 7. A list of changes that affect data reduction, validation and reporting for the October 1998 and later data submittals.

1. The measurement of dissolved oxygen by the Winkler titration method for the purpose of validating the data captured by the dissolved oxygen meter is no longer reported to the CBP. Thus, the parameter DISOX2 is no longer submitted. These data are maintained internally and are available upon request.
2. The parameters VOL, PAD and DRY, used to calculate total suspended solids (TSS) is no longer be submitted to the CBP. The calculated value for the parameter TSS will still be submitted. The parameters VOL, PAD and DRY, are maintained internally and are available upon request.
3. The individual fields for MONTH, DAY and YEAR have been deleted as redundant to the data provided in the DATE field. The parameter DATE is submitted as a date/time field as MM/DD/YYYY, a Y2K compliant format. This format enhances the ability to search the period of record.
4. The parameter TIME is now submitted as a date/time field rather than as a text field to enhance the ability to search the period of record.
5. The field sheets used to collect event data about each station have been modified to correspond to codes and parameters required by the Chesapeake Bay Program. The WEATHER field (a field which contained CLOUD, PRECIP_K, WINDIR, WINDSPD and WAVHGT) has been dropped. These parameters will be recorded and submitted individually. The numeric code for TIDE has been dropped and abbreviations (H = high slack tide, L = low slack tide, E = ebb tide and F = flood tide) have be substituted in their place.
6. A new table (MDL Table) is included. This table contains the following fields: PARAMETER, MDL, UNITS, START DATE and END DATE. This table replaces the "Detection Limits 1998" table by recording the dates to which a detection limit applies.
7. A new table named "PARAMETERS" is included. This table includes the following fields: PARAMETER, BAY PROGRAM PARAMETER, STORET_CODE, and DESCRIPTION. The Chesapeake Bay Program has recently changed the names of several parameters. This table shows these new parameter names as compared to the older parameter names.

Item 7 (continued)

8. The following queries have been added to view the QC data: QCO98, QCN98 and QCD98. In addition to other QC assessments that may be conducted by the data users, these queries will allow for a direct comparison of the measured and reported values for each parameter as compared to the method detection limit applicable to that measurement. It should be noted that these data are not censored at the method detection limit.
9. The format of station depth SDEPTH in the light attenuation tables has been set to fixed at 1 decimal. The format for station depth SDEPTH in the field data tables has been set to fixed and 0 decimal places.
10. The format of extract volume EXVOL_ML has been set to fixed at 1 decimal place.
11. The method detection limit table (MDL TABLE) now has MDL as a text field with the appropriate decimal places for each parameter and only includes parameters sampled in the Elizabeth River.
12. With the addition of the new stations for the October 1998 to present monitoring program, a revised lookup table is required as has been provided. The lookup table is named WATER QUALITY STATIONS.
NOTE: The station designated EBE1 funded by DEQ-CBP is located very close to the ERMP station EB-B-01 that is currently monitored by DEQ-TRO personnel. There is the potential for this station to become a split-sampling station, at DEQ's discretion, where comparisons could be made between co-located sample collections and analysis.
13. The data for the parameters SAVALUE, UWVALUE, and UDVALUE is presented in the number of decimal places reported by the light attenuation measuring device. The decimal places vary by the stepped sensitivity mode used by the device. These are raw data and should not be altered.

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for November 23, 1998.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	93-98	96	0
Dissolved Phosphate	89-90	89	0
Particulate Phosphate	95-100	98	0
Nitrate + Nitrite	91-99	95	0
Ammonia	101-107	104	0
Total Dissolved Nitrogen	100-105	103	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for November 1998

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
	x	1. Changes in organizational structure.
x		2. Changes in staffing arrangements.
	x	3. Performance in external audits.
	x	4. Problems with field/lab blanks.
	x	5. Changes in calibration procedures or frequency.
	x	6. Changes in analytical procedures.
	x	7. Changes in data reduction, validation, or reporting.
	x	8. Internal quality control.
	x	9. Preventive maintenance problems.
	x	10. Problems with sample acceptance criteria.
	x	11. Changes in procedures to assess data precision and accuracy.
	x	12. Corrective actions applied.
	x	13. Revisions of SOPs, QA manuals, etc.
	x	14. New instrumentation.
	x	15. Training.
	x	16. Change in current percent of samples duplicated.
	x	17. Change in the current percent of samples spiked.

Comments:

2. Starting with the November 1998 Elizabeth River cruise, Denise Kelley is now a Chief Scientist.

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for December 15, 1998.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	94-98	96	0
Dissolved Phosphate	89-94	91	0
Particulate Phosphate	96-99	97	0
Nitrate + Nitrite	93-95	94	0
Ammonia	98-116	105	0
Total Dissolved Nitrogen	98-103	100	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for December 1998

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
x		1. Changes in organizational structure.
x		2. Changes in staffing arrangements.
x		3. Performance in external audits.
x		4. Problems with field/lab blanks.
x		5. Changes in calibration procedures or frequency.
x		6. Changes in analytical procedures.
x		7. Changes in data reduction, validation, or reporting.
x		8. Internal quality control.
x		9. Preventive maintenance problems.
x		10. Problems with sample acceptance criteria.
x		11. Changes in procedures to assess data precision and accuracy.
x		12. Corrective actions applied.
x		13. Revisions of SOPs, QA manuals, etc.
x		14. New instrumentation.
x		15. Training.
x		16. Change in current percent of samples duplicated.
x		17. Change in the current percent of samples spiked.

Comments:

Sampling date was changed from December 22, 1998 to December 15, 1998 to ensure the completion of the mainstem Chesapeake Bay cruise. Rick Hoffman of the VDEQ approved the date change prior to sampling.

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for January 21, 1999.

	<u>Accuracy</u>		<u>Out-of-Control</u>
	<u>% Recovery</u>		
	<u>Range</u>	<u>Average</u>	
Orthophosphate	95-96	95	0
Dissolved Phosphate	90-95	93	0
Particulate Phosphate	97-101	99	0
Nitrate + Nitrite	96-97	96	0
Ammonia	100-104	102	0
Total Dissolved Nitrogen	96-100	98	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for January 1999

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
	x	1. Changes in organizational structure.
x		2. Changes in staffing arrangements.
	x	3. Performance in external audits.
	x	4. Problems with field/lab blanks.
	x	5. Changes in calibration procedures or frequency.
x		6. Changes in analytical procedures.
	x	7. Changes in data reduction, validation, or reporting.
	x	8. Internal quality control.
	x	9. Preventive maintenance problems.
	x	10. Problems with sample acceptance criteria.
	x	11. Changes in procedures to assess data precision and accuracy.
	x	12. Corrective actions applied.
	x	13. Revisions of SOPs, QA manuals, etc.
	x	14. New instrumentation.
	x	15. Training.
	x	16. Change in current percent of samples duplicated.
	x	17. Change in the current percent of samples spiked.

Comments:

2. Carly Moritz, a Chief Scientist, is no longer working at the Water Quality Laboratory.

6. Starting with samples collected in January, 1999 a 2 cm cuvette will be used for the chlorophyll analysis to increase the absorbance unit readings obtained for the analysis.

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for February 25, 1999.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	94-96	95	0
Dissolved Phosphate	97-98	97	0
Particulate Phosphate	102-103	103	0
Nitrate + Nitrite	96-96	96	0
Ammonia	101-105	103	0
Total Dissolved Nitrogen	101-104	102	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for February 1999

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
	<input checked="" type="checkbox"/>	1. Changes in organizational structure.
	<input checked="" type="checkbox"/>	2. Changes in staffing arrangements.
	<input checked="" type="checkbox"/>	3. Performance in external audits.
	<input checked="" type="checkbox"/>	4. Problems with field/lab blanks.
	<input checked="" type="checkbox"/>	5. Changes in calibration procedures or frequency.
	<input checked="" type="checkbox"/>	6. Changes in analytical procedures.
	<input checked="" type="checkbox"/>	7. Changes in data reduction, validation, or reporting.
	<input checked="" type="checkbox"/>	8. Internal quality control.
	<input checked="" type="checkbox"/>	9. Preventive maintenance problems.
	<input checked="" type="checkbox"/>	10. Problems with sample acceptance criteria.
	<input checked="" type="checkbox"/>	11. Changes in procedures to assess data precision and accuracy.
	<input checked="" type="checkbox"/>	12. Corrective actions applied.
	<input checked="" type="checkbox"/>	13. Revisions of SOPs, QA manuals, etc.
	<input checked="" type="checkbox"/>	14. New instrumentation.
	<input checked="" type="checkbox"/>	15. Training.
	<input checked="" type="checkbox"/>	16. Change in current percent of samples duplicated.
	<input checked="" type="checkbox"/>	17. Change in the current percent of samples spiked.

Comments:

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for March 25, 1999.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	92-94	93	0
Dissolved Phosphate	98-99	98	0
Particulate Phosphate	98-100	99	0
Nitrate + Nitrite	95-99	97	0
Ammonia	101-110	106	0
Total Dissolved Nitrogen	101-102	101	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for March 1999

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
x		1. Changes in organizational structure.
x		2. Changes in staffing arrangements.
x		3. Performance in external audits.
x		4. Problems with field/lab blanks.
x		5. Changes in calibration procedures or frequency.
x		6. Changes in analytical procedures.
x		7. Changes in data reduction, validation, or reporting.
x		8. Internal quality control.
x		9. Preventive maintenance problems.
x		10. Problems with sample acceptance criteria.
x		11. Changes in procedures to assess data precision and accuracy.
x		12. Corrective actions applied.
x		13. Revisions of SOPs, QA manuals, etc.
x		14. New instrumentation.
x		15. Training.
x		16. Change in current percent of samples duplicated.
x		17. Change in the current percent of samples spiked.

Comments:

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for April 22, 1999.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	94-96	95	0
Dissolved Phosphate	95-100	97	0
Particulate Phosphate	103-106	105	0
Nitrate + Nitrite	89-95	93	0
Ammonia	97-105	101	0
Total Dissolved Nitrogen	93-98	95	0

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for April 1999

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES · NO

- x 1. Changes in organizational structure.
- x 2. Changes in staffing arrangements.
- x 3. Performance in external audits.
- x 4. Problems with field/lab blanks.
- x 5. Changes in calibration procedures or frequency.
- x 6. Changes in analytical procedures.
- x 7. Changes in data reduction, validation, or reporting.
- x 8. Internal quality control.
- x 9. Preventive maintenance problems.
- x 10. Problems with sample acceptance criteria.
- x 11. Changes in procedures to assess data precision and accuracy.
- x 12. Corrective actions applied.
- x 13. Revisions of SOPs, QA manuals, etc.
- x 14. New instrumentation.
- x 15. Training.
- x 16. Change in current percent of samples duplicated.
- x 17. Change in the current percent of samples spiked.

Comments:

QA/QC data for nutrient determinations.

Elizabeth River Water Quality Monitoring for May 20, 1999.

Accuracy

	<u>% Recovery</u>		<u>Out-of-Control</u>
	<u>Range</u>	<u>Average</u>	
Orthophosphate	*		
Dissolved Phosphate	96-98	97	0
Particulate Phosphate	*		
Nitrate + Nitrite	*		
Ammonia	*		
Total Dissolved Nitrogen	96-101	99	0

*Data not yet available.

Precision

All precision data met AMRL and Chesapeake Bay Program data quality objectives.

Internal Performance Audits

Internal performance audits were completed during each analytical run when available. No reference standards are available for nitrite. All results fell within acceptable variance limits established by the EPA.

QA Checklist for May 1999

Conformance to CBP quality assurance objectives. Comments provided for any YES response.

YES	NO	
x		1. Changes in organizational structure.
x		2. Changes in staffing arrangements.
x		3. Performance in external audits.
x		4. Problems with field/lab blanks.
x		5. Changes in calibration procedures or frequency.
x		6. Changes in analytical procedures.
x		7. Changes in data reduction, validation, or reporting.
x		8. Internal quality control.
x		9. Preventive maintenance problems.
x		10. Problems with sample acceptance criteria.
x		11. Changes in procedures to assess data precision and accuracy.
x		12. Corrective actions applied.
x		13. Revisions of SOPs, QA manuals, etc.
x		14. New instrumentation.
x		15. Training.
x		16. Change in current percent of samples duplicated.
x		17. Change in the current percent of samples spiked.

Comments:

ATTACHMENT 9

Station designations and period of record for existing data and data to be made available under Contract No. 949900358 and the previous contract period.

Ambient Water Quality Monitoring: 071989 to 061999

<u>Station Designation</u>	<u>Branch</u>
EBE1	Eastern Branch
ELI2	Mainstem
SBE2	Southern Branch
SBE5	Southern Branch
WBE1	Western Branch

Note: The stations identified above have been funded by VA DEQ-CBP but the data are included in the data set provided under this contract to VA DEQ-TRO. The VA DEQ-CBP station locations are very close to the VA DEQ-TRO Elizabeth River Monitoring Program stations shown below.

<u>ODU</u>	<u>ERMP</u>
EBE1	EB-B-01
ELI2	EL-C-01
SBE2	SB-B-01
SBE5	SB-D-02
WBE1	WB-B-01

Ambient Water Quality Monitoring: 011998 to 061999

<u>Station Designation</u>	<u>Branch</u>
SB-A-01	Southern Branch
SB-D-04	Southern Branch

Ambient Water Quality Monitoring: 101998 to 061999

<u>Station Designation</u>	<u>Branch</u>
SB-C-01	Southern Branch
SB-D-01	Southern Branch

Appendix 9 (continued)

Ambient Water Column Chronic Toxicity - 05011998 (both species)
- 12011998 (Sheepshead minnow only)
- 01191999 (Mysid shrimp only)
- 04271999 (both species)

<u>Station Designation</u>	<u>Branch</u>
EL-C-01	Mainstem
EL-D-01	Mainstem
EL-F-01	Mainstem
LF-A-01	Lafayette River
LF-B-01	Lafayette River
SB-A-01	Southern Branch
SB-B-01	Southern Branch
SB-D-02	Southern Branch
SB-D-04	Southern Branch
EB-B-01	Eastern Branch
WB-B-01	Western Branch
WB-B-05	Western Branch

Sediment Bioassay and Contaminant Analysis - 02261998 (Sample Collection Date)
- 03311999 (Sample Collection Date)

<u>Station Designation</u>	<u>Branch</u>
EL-C-01	Mainstem
EL-D-01	Mainstem
LF-A-01	Lafayette River
LF-B-01	Lafayette River
SB-A-01	Southern Branch
SB-D-02	Southern Branch
SB-D-04	Southern Branch
WB-B-01	Western Branch
WB-B-05	Western Branch

Sediment Bioassay and Contaminant Analysis: AMBTOX 1997

Ambient Water Column Chronic Toxicity and Contaminant Analysis AMBTOX 1997:

This study was performed at 4 stations in the Elizabeth River during the fall of 1997 by Dr. Lenwood Hall, University of Maryland and Dr. Alan Messing, Old Dominion University. Data for these stations will be included in the final data base submitted to VA DEQ-TRO with the permission of the Principal Investigator and the funding source, USEPA Chesapeake Bay Program. The data, however, are in draft form and will not be approved for full release until late in 1999. This is because the final report, and the associated data, is still under review.

	Approximate	
AMBTOX	ERMP	
<u>Station Designation</u>	<u>Station Designation</u>	<u>Branch</u>
EL	TBD	Mainstem
EB	TBD	Eastern Branch
SB	TBD	Southern Branch
WB	TBD	Western Branch

TBD = to be determined in consultation with the Project Manager.