

WORKPLAN/QUALITY ASSURANCE PROJECT PLAN  
FOR MONITORING THE NEW RIVER SYSTEM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION  
PALM DESERT, CA

March 9, 1996

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Appendix 1 Sampling Equipment and Planning - New River Project

Attachment 1 Joint Report of the Principal Engineers, October 25, 1995

Attachment 2 IBWC Minute No. 288

Attachment 3 State Water Resources Control Board Quality Assurance Program Plan

Attachment 4 Regional Water Quality Control Board Quality Assurance Program for the Laboratory

Attachment 5 Chain-of-Custody Forms

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## I. PROJECT DESCRIPTION

### Introduction

In accordance with an interagency agreement with the United States Environmental Protection Agency (USEPA), the Regional Water Quality Control Board (Regional Board) will be conducting a water sampling program of the New River system. The program includes monitoring the New River at two locations in Mexico and one in the United States (Figure 1). These stations were approved for inclusion in the monitoring program by the Joint Report of the Principal Engineers, signed October 25, 1995 (Attachment 1).

An agreement between the International Boundary and Water Commission (IBWC) United States Section and its counterpart in Mexico, Comision Internacional de Limites y Aguas (CILA), requires that sampling be a bi-national effort by teams from Mexico and the United States and that duplicate samples be collected for analysis by laboratories in both the United States and Mexico. In addition, there is to be a complete exchange of data generated by each country and no information or data is to be released or published unless or until both countries concur on its disposition. Analyses to be performed are listed in Table I.

The Regional Board has been working with the USEPA, the United States Section of the IBWC and the State Water Resources Control Board (State Board) to resolve the pollution problem of the New River which has been an international problem for over 50 years.

### Background

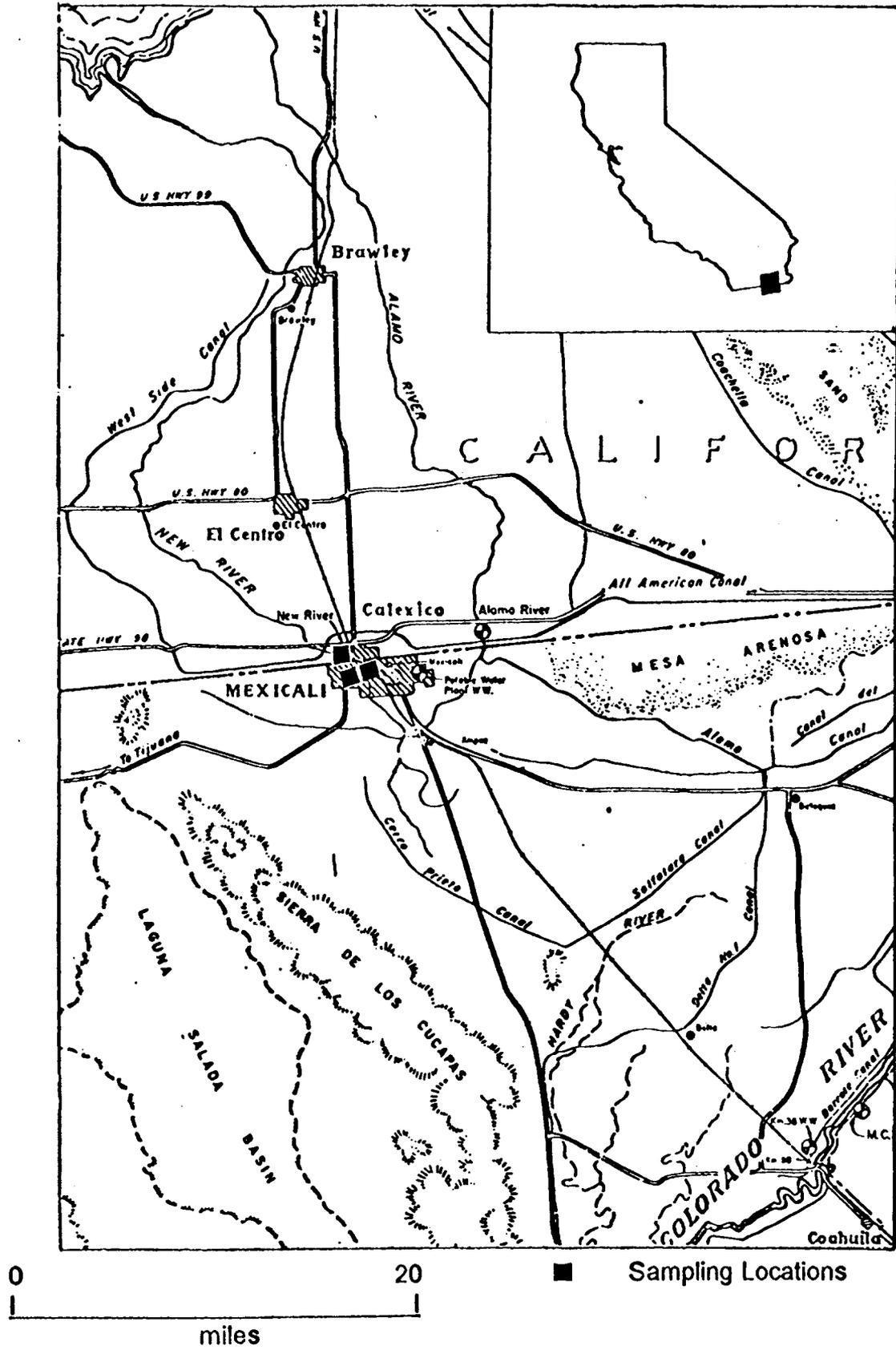
The New River carries wastewater, storm water, and agricultural drainage from the Mexicali Valley in Mexico into Imperial County, California. The River ultimately discharges into the Salton Sea about 100 km north of the border. The quality of the water in the New River at the border, and for many miles downstream, is very poor due mainly to its large load of raw and partially treated sewage from Mexicali. The entire portion of the River in the United States has been posted by the County Health Department with warnings to avoid any contact with the water. The New River is also contaminated with agricultural and industrial chemical pollutants from Mexico and with agricultural pollutants from Imperial Valley farms. The flow of the River at the border is about 6,000 liters per second (lps). Flows from Imperial County contribute about 11,000 lps to the River before it discharges into the Salton Sea.

Mexicali is a rapidly growing city of about one million people, but lacks an adequate sewage collection and treatment system. The improvements to the system that are needed to protect water quality in the New River are outlined in the International Boundary and Water Commission (IBWC) Treaty Minute No. 288 (Attachment 2) which was approved by both countries in 1992. Most of the pollution currently originates in the Mexicali I area. The treatment system in this area is in need of upgrade and repair. A Mexicali II collection and treatment system is being designed to accommodate future growth in the city which is planned for the east Mexicali area. These new developments in east Mexicali contain significant numbers of industrial facilities.

Funding to construct wastewater collection and treatment infrastructure improvements in Mexicali has been appropriated by the U.S. Congress to the USEPA. Regional Board and State Board staff are working with USEPA, USIBWC, CILA and other agencies in Mexico to expedite the design and construction of the needed infrastructure projects. Regional Board staff make regular site visits of the wastewater system in Mexicali to document the water pollution problems in conjunction with the USIBWC, CILA and other agencies from Mexico. These interagency activities are critical to solving the New River pollution problem.

The Regional Board had been monitoring the New River at the international boundary in Calexico on an infrequent basis under various programs and is now monitoring on a monthly basis through a program funded by USEPA. The Regional Board will continue to monitor this station on a monthly basis although the bi-national monitoring will be quarterly as specified in the Joint Report (Attachment 1). The program will include monitoring another point on the New River in Mexicali and the International Drain in Mexicali which discharges to the New River.

Figure 1  
Sampling Locations



## Objectives

The objectives that the New River sampling program is designed to accomplish are:

1. to establish baseline conditions from which to measure the progress of corrective actions or pollution control projects in Mexicali
2. to assist in determining necessary corrective action
3. to determine the extent of pollution
4. to determine conformance with water quality standards and treaty agreements.
5. to obtain information that may be used in the development of more detailed studies

## II. PROJECT TEAM AND RESPONSIBILITIES

**Project Manager:** Ron Rodriguez (619) 776-8944, responsible for oversight of project at Regional Board level.

**Field Samplers:** Charles Springer (619) 776-8940, responsible for coordinating field sampling activities, delivery of samples to laboratories, maintaining equipment and calibrating instruments. Orlando Gonzalez (619) 776-8962, Kola Olatunbosun, (619) 776-8963, responsible for assistance in field sampling activities as required.

**Data Manager:** Kola Olatunbosun (619) 776-8963, responsible for processing data, maintaining database, and disseminating data.

**State Board Quality Assurance Officer:** William R. Ray, (916) 657-1123, responsible for implementing and administering the Quality Assurance Program Plan so that it is in compliance with all USEPA and State Requirements.

**Regional Board Quality Assurance Officer:** Dong Vu, Ph.D., (619) 776-8931, responsible for operation of the Regional Board Laboratory and for administering and coordinating quality assurance activities.

**USEPA Region IX Monitoring Coordinator:** Edwin H. Liu, Ph.D., (415) 744-1305, responsible for designing and coordinating monitoring program.

## III. SAMPLE SITES, FREQUENCY AND TYPE

<u>SAMPLING LOCATIONS</u>	<u>FREQUENCY</u>	<u>PARAMETER SAMPLE TYPE</u>	<u>ANALYZED</u>
1. New River at International Boundary, Calexico (100 meters north of border)	Quarterly	8-Hour Composite	List 1,2,3 <sup>1</sup>
2. New River in Mexicali (300 meters south of border)	Quarterly	8-Hour Composite	List 1,2,3

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<sup>1</sup> see Table 1

3. Mexicali I Lagoon  
Discharge (International Drain)

Quarterly

Grab

List 1,2,3

TABLE 1

LIST OF CONSTITUENTS ANALYZED AND PARAMETERS MEASURED IN WATER

LIST NO. 1

Analyzed by California Department of Health Services Laboratory, Los Angeles

<u>Trace Metals</u>	<u>USEPA Method</u>	<u>Reporting Limits</u>		<u>Units</u>
		<u>Graphite</u>	<u>Flame</u>	
Arsenic	A.A. <sup>2</sup> .	2	none	ug/L <sup>3</sup>
Cadmium	A.A.	1	50	ug/L
Chromium	A.A.	10	100	ug/L
Copper	A.A.	10	50ug/L	ug/L
Lead	A.A.	10	200	ug/L
Mercury	245.1	1	none	ug/L
Selenium	A.A.	5	none	ug/L
Zinc	A.A.	none	50	ug/L

<u>Constituents</u>	<u>USEPA Method</u>	<u>Reporting Limit</u>	<u>Units</u>
MBAS	425.1	0.025	mg/L <sup>4</sup>
Total Phosphate (as P)	365.2	0.01	mg/L
Phenol	420.1	0.002	mg/L
Cyanide	335.2	0.01	mg/L
Ammonia-Nitrogen (NH <sub>3</sub> -N)	50.2	0.05	mg/L

<u>Constituents (Cont'd)</u>	<u>USEPA Method</u>	<u>Reporting Limit</u>	<u>Units</u>
Nitrate-Nitrogen (NO <sub>3</sub> -N)	353.2	0.2	mg/L
Nitrite-Nitrogen (NO <sub>2</sub> -N)	353.2	0.03	mg/L
Hardness	130.2	1.0	mg/L CaCO <sub>3</sub>
Alkalinity	310.1	1.0	mg/L CaCO <sub>3</sub>
Turbidity	180.1	0.1	NTU <sup>5</sup>
Total Dissolved Solids	160.1	10	mg/L
Total Suspended Solids	160.2	10	mg/L

<sup>2</sup> atomic absorption

<sup>3</sup> micrograms per liter

<sup>4</sup> milligrams per liter

<sup>5</sup> nephelometric turbidity units

Volatile Organic Compounds

524.2

0.5

ug/L

Benzene  
Bromobenzene  
Bromochloromethane  
Bromodichloromethane  
Bromoform  
Bromomethane (Methyl bromide)  
n-Butylbenzene  
sec-Butylbenzene  
tert-Butylbenzene  
Carbon tetrachloride  
Chlorobenzene (Monochlorobenzene)  
Chloroethane  
Chloroform  
Chloromethane (Methyl Chloride)  
o-Chlorotoluene (2-Chlorotoluene)  
p-Chlorotoluene (4-Chlorotoluene)  
Dibromochloromethane  
Dibromomethane  
1,2-Dichlorobenzene (o-DCB)  
1,3-Dichlorobenzene (m-DCB)  
1,4-Dichlorobenzene (p-DCB)  
Dichlorodifluoromethane (Freon 12)  
1,1-Dichloroethane (1,1-DCA)  
1,2-Dichloroethane (1,2-DCA)  
1,1-Dichloroethylene (1,1-DACE)  
cis-1,2-Dichloroethylene  
trans-1,2-Dichloroethylene  
1,2-Dichloropropane  
1,3-Dichloropropane  
2,2-Dichloropropane  
1,1-Dichloropropylene  
cis- & trans-1,3-Dichloropropylene  
Ethyl benzene  
Ethylene dibromide (EDB)  
Hexachlorobutadiene  
Isopropylbenzene (Cumene 77356)  
p-Isopropyltoluene (p-Cymene)  
Methylene chloride (Dichloromethane)  
Methyl Ethyl Ketone  
Methyl Isobutyl Ketone  
Naphthalene  
n-Propylbenzene  
Styrene  
1,1,1,2-Tetrachloroethane  
1,1,2,2-Tetrachloroethane  
Tetrachloroethylene (PCE)  
Toluene  
1,2,3-Trichlorobenzene  
1,2,4-Trichlorobenzene  
1,1,1-Trichloroethane (1,1,1-TCA)  
1,1,2-Trichloroethane (1,1,2-TCA)  
Trichloroethylene (TCE)

1,2,3-Trichloropropane  
 Trichloroflouromethane (Freon 11)  
 1,2,4-Trimethylbenzene  
 1,3,5-Trimethylbenzene  
 1,1,2-Trichloro-triflouoroethane (Freon 113)  
 Vinyl chloride (VC)  
 m,p-Xylenes  
 o-Xylene

LIST NO. 2

Analyzed by California Regional Water Quality Control Board Laboratory

<u>Constituents</u>	<u>USEPA Method</u>	<u>Reporting Limit</u>	<u>Units</u>
20°C BOD <sub>5</sub>	405.1	2	mg/L
COD	410.4	5	mg/L
Fecal Coliform	Multiple Tube Fermentation		MPN/100 ml <sup>6</sup>

LIST NO. 3

Parameters Measured in the field by Regional Board Staff

	<u>Method</u>	<u>Units</u>
	Hydrolab Multiprobe	
Temperature		°C
Dissolved Oxygen		mg/L
Hydrogen Ion		pH
Conductivity		umhos/cm <sup>7</sup>
Flow (Imperial Irrigation District)		cfs <sup>8</sup>

IV. ANALYTICAL AND QUALITY CONTROL PROCEDURES

The United States Environmental Protection Agency approved methods and procedures are used for field and laboratory analysis and quality control checks as prescribed in the State Board Quality Assurance Program Plan (QAPP) (Attachment 3). The State Board requires that all environmental measurement activities performed by the Regional Board and its contract laboratories comply with procedures and guidelines outlined in their QAPP. It further requires that the contract laboratories have a written Quality Assurance Laboratory Manual. The laboratory manual for the Regional Board is contained in Attachment 4. Constituents analyzed and reporting limits by respective

<sup>6</sup> most probable number per 100 milliliter

<sup>7</sup> micromhos per centimeter

<sup>8</sup> cubic feet per second

laboratories are listed in Table 1. Quality control samples will be collected annually. Trip blanks, equipment or field bottle blanks will check for cross-contamination during sample collection and shipment. The calibration and maintenance of laboratory instruments and the general operation of the Regional Board and contract laboratories are subject to the requirements of the State Board Quality Assurance Program Plan, the Regional Board Quality Assurance Program for the Laboratory, and the Department of Health Services Laboratory Quality Assurance Manual.

## V. SAMPLE COLLECTION

Standard sampling protocols are employed as described in the references cited below. Specific instructions are outlined in a checklist used for advance planning and preparation of field activities, sampling and decontamination procedures to ensure that all required items are available and to ensure adherence to sampling protocols (Appendix 1). Field personnel are trained by other experienced personnel and periodically evaluated.

Samples are collected from midstream with a dipper, stainless steel bucket or pump. Grab samples are collected hourly for the composite samples. A polyethylene churn sample splitter is used for splitting samples. Pole-mounted sample containers are used for collecting coliform and VOC samples. Hydrolab readings, which include temperature, dissolved oxygen, pH, and specific conductance, are taken at the time the grab samples are collected. Samples are maintained in a chilled condition (4°C) at all times during the sampling and shipping until delivery to the laboratories. Sample holding times, as prescribed by USEPA, 40CFR136, are strictly observed.

Field personnel are trained in the operation, calibration, and maintenance of the field instruments. The manufacturer's instruction manuals are readily available. The instruments are cleaned and calibrated before each field trip or in accordance with the manufacturer's instructions and recommendations.

### References

APHA, AWWA, WEF, 1992. Standard Methods for the Examination of Water and Wastewater, 18th edition.

USEPA SW-846, 1992. Test Methods for Evaluating Solid Waste. 3rd edition.

USEPA, 1992. Report No. 600/4-82-029. Handbook for Sampling and Sample Preservation of Water and Wastewater.

USGS, 1994. Work Plan / Quality Assurance Project Plan For Monitoring Quality of the Lower Colorado and New River Systems; Roy A Schroeder, Ph.D.

## VI. SAMPLE CUSTODY

Samples are retained in the custody of the Regional Board sampling personnel, the transporter or laboratory personnel. Samples for the Department of Health Services Laboratory or the Regional Board laboratory are delivered by Regional Board staff or shipped in taped ice chests. All samples are delivered with chain-of-custody forms ( Attachment 5 ).

## VII. DATA PROCESSING, MANAGEMENT, AND DISSEMINATION

The data is reviewed for completeness and acceptability before it is processed and submitted to participating agencies. The data will be processed as received from the field and analytical

laboratories; that is, there will be no reduction of data. At present the field and laboratory analytical data is submitted in tabular form; however a personal computer database is being developed that will be easily accessible electronically to authorized users by use of a password. The data must be maintained in confidential status until its release to the public as authorized by the terms of the agreement previously discussed. At that time the data can then be entered and archived in USEPA's and the State Board's mainline STORET system.

#### VIII. PERFORMANCE AND SYSTEMS AUDITS

Performance and systems audits will be initiated by the State Board and Regional Board project managers and conducted periodically within the guidelines established by the State Board Quality Assurance Program Plan (Attachment 3). Qualitative audits are necessary to check the accuracy of the data produced. The project managers will notify the State Board Quality Assurance Officer when problems are discovered and corrective action is required. The Quality Assurance Officer is responsible for ensuring that the project managers take corrective action when necessary.

#### IX. SITE SAFETY PLAN

The State Board industrial hygienist has evaluated conditions at the Calexico and Mexicali sampling sites and has prescribed personal protective equipment to be used and procedures to be followed (Attachment 6). The general concern at these sites is exposure to pathogens and toxicants. The samplers are required to wear tyvek coveralls or gowns, face shield and gloves. During sampling a decontamination area is maintained with clean water, anti-bacterial soap and towels. All exposed equipment is cleaned at the site or properly packaged and cleaned at the Regional Board facilities. Contaminated wastes are packaged and properly disposed.

**APPENDIX 1**

**Sampling Equipment and Planning - New River Project**

## APPENDIX 1

### SAMPLING EQUIPMENT and PLANNING

#### ADVANCED PLANNING

- Reserve vehicle (van is best if traveling overnight)
- Make hotel reservations if necessary
- Schedule logistics with appropriate Regional Board staff
- Inform all laboratories of sampling and sample submittal dates two weeks in advance

#### EQUIPMENT PREPARATION

Equipment used for sampling should be cleaned and functioning properly. All sampling equipment that comes into contact with the sample water should be washed with hot soapy water, rinsed thoroughly and then washed with a 5% HNO<sub>3</sub> solution and rinsed with distilled water. The equipment should be air dried then placed in clean plastic bags and sealed. All sampling equipment should be rinsed three times with river water prior to collecting water samples.

#### Personal Protective Equipment

In accordance with the Industrial Hygiene & Safety Report (Attachment 6), the following personal protective equipment should be used for sampling at the New River:

- Face Shield
- Gloves (outer)
- Glove Liners
- Tyvek Suit or isolation gown - short pants may be worn under a full suit, if wearing long pants an isolation gown (ties in back with sleeves) can be worn. Try to use tyvek suits in winter and save isolation gowns for summer.
- Boot covers

#### Sampling and Miscellaneous Field Equipment

- Bucket, stainless steel (2 ea) or ISCO pump
- Churn sample splitter, 14 liter, polyethylene (2 ea)
- Sample dipper, 1 liter, polyethylene, with 12 ft handle
- Rope
- Pitcher, stainless steel
- Funnel, stainless steel
- Graduated cylinders, 100 ml and 250ml, polypropylene
- Settleable solids cone and stand
- Ice Chests for field (enough to hold all sample containers; include large ice chest)
- Ice Chest for food and beverages (clean and left in vehicle or away from contaminated area)
- Glass beaker (1000 ml)
- Key for gate
- Hydrolab (Calibrate before each sampling event)
- Sampling poles (for VOCs and fecal coliform grabs)
- Camera/Film
- Field notes, table and clipboard
- Shade canopy, poles, stakes, rope, claw hammer

- Distilled water (3 gallons recommended)
- Tap water (5-gallon carboy with spigot)
- Squeeze bottle
- Paper towels
- Cotton towels
- Antibacterial Soap
- Trash bags
- Zip-lock bags
- Card table (cover table with plastic sheeting)
- Folding chairs
- Cellular phone
- Ice Chests for shipping
- Ice (purchase before beginning sample collection)
- Water resistant marking pens
- Labels for all sample containers

**\* Backups and extras are recommended for those items which may be lost or broken**

#### Sample containers

- Department of Health Services Lab: M, N, P, C, G1, G2, T(large and small), VC , T(small for turbidity), (see Table 2)
- Regional Board Lab: 1/2 gallon (plastic), B fecal coliform

#### Lab Preparation

- Lab sheets and chain-of-custody forms completed for each lab, each lab sheet should contain the statement "New River Contains Raw Sewage and Industrial Waste"

##### Regional Board

- Composite 1/2 gallon - COD, BOD
- Grab - B (4 ea) fecal coliform

##### Department of Health Services

- Composite: (M) MBAS & Total Phosphate, (G2) Hardness, Alkalinity, TDS, TSS, Turbidity, (P) Phenol, (C) Cyanide, (N) Ammonia, Nitrate and Nitrite, (T, large and small) Trace Metals: As, Cu, Cr, Cd, Pb, Zn, Se, and Hg
- Grab: (VOCs) VOA Scan EPA Method 524.2, (T,small, 8 ea) Turbidity

### **SAMPLING PROCEDURES**

#### Upon Arrival at the site:

**Hydrolab:** Place the probe at footbridge or wooden bridge in center of stream at proper depth; secure cable to bridge. The display unit should be easily accessible; allow the D.O. reading to stabilize prior to recording the readings; turn display off while not in use.

**Decontamination:** Set up wash water, soap, paper towels, trash bags, etc. in designated decontamination area. Place all contaminated waste material in trash bags for proper disposal.

Sampling: Use ISCO pump, bucket or dipper to collect water from mid stream; pour 1/8 aliquot into sample containers for the 8-hour composite samples. If split samples are to be taken, pour appropriate volume of water sample for an eight hour composite into churn sample splitter. All sampling, pouring and measuring devices should be rinsed three times with river water prior to sample collection. Take extra care that the proper aliquot is poured into each container (see Table 2). Use pump or dipper with churn sample splitter.

VOCs should be collected on the 3rd and 6th hour (2 vials per sample), use sample pole, leave no air space or bubbles (turn vial upside down and tap to look for bubbles)

Fecal coliform samples should be collected during last 4 sample collections, using the sample pole to fill bottle 2/3 full (leave 1/3 air space) by placing the bottle under the surface with an upstream sweeping motion; place samples into zip-lock bags.

All samples should be stored in ice chests with plenty of wet ice; keep water drained to avoid soaking container labels.

All samples will be 8-hour composites except the VOCs, Fecal Coliform and hourly Turbidity samples (Turbidity is also measured from composite).

#### **DECONTAMINATION PROCEDURES**

Take care to avoid spreading or spilling the New River water. Maintain a clean and dirty zone from a personal hygiene standpoint. Between sample collections, anything which has come into contact with the water or handled with gloves should be rinsed and placed in a separate area. Outer rubber gloves should be washed with antibacterial soap prior to removal. Do not enter the clean areas with dirty outer gloves. Tyvek suit can be carefully removed and stored in the dirty zone (be sure not to let skin contact the outside of the suit). Remove glove liners without touching outside of the glove with bare skin. Thoroughly wash hands with antibacterial soap. Everything that is touched (pens, pencils, rinse water bottles, hydrolab monitor, etc.) with dirty gloves could be contaminated. Avoid contact of these items with bare skin.

#### **AFTER SAMPLING**

Place samples into Regional Board lab refrigerator or keep in an ice chest filled with wet ice; keep water drained from ice chests to avoid soaking container labels. Make copies of field notes and put original in New River binder. Contaminated equipment should be packed in designated containers for transport to the Regional Board office. Decontaminate and properly clean **ALL** items, for the next sampling trip, which were exposed in the field.