CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM
ORDER NO. R5-2003-0826
FOR
COALITION GROUPS
UNDER

RESOLUTION NO. R5-2003-0105
CONDITIONAL WAIVER OF
WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES FROM IRRIGATED LANDS

As conditioned by the *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Waiver) Resolution No. R5-2003-0105*, Coalition Groups shall develop a monitoring program to assess the sources and impacts of waste in discharges from irrigated lands, and where necessary, to track progress in reducing the amount of waste discharged that affects the quality of the waters of the state and its beneficial uses.

The Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) adopts this MRP pursuant to Water Code Section 13267. The Coalition Groups represent individual dischargers that discharge waste to waters of the state. The reports required by this Order are needed to evaluate impacts of discharges of waste to waters of the state and to determine compliance with the Waiver. The Regional Board Executive Officer may revise the MRP as appropriate. Coalition Groups shall comply with the MRP as revised by the Executive Officer.

The purpose of this Monitoring and Reporting Program (MRP) is to describe the minimum requirements for an acceptable Coalition Group Monitoring and Reporting Program Plan (MRP Plan). The purpose of the MRP Plan shall be to monitor the discharge of wastes in irrigation return flows and stormwater from irrigated lands that are enrolled under the Waiver. The Coalition Group shall prepare and submit to the Regional Board for review and approval by the Executive Officer an MRP Plan that meets the minimum requirements of the MRP and includes sites to be monitored, frequency of monitoring, parameters to be monitored, and documentation of monitoring protocols. The Executive Officer will review the MRP Plan to determine if it meets or exceeds the minimum requirements of this Order. The submittal of a MRP Plan is a condition of the Waiver.

The development of a science-based water quality monitoring program is critical for determining actual and potential impacts of discharges of waste from irrigated lands on beneficial uses of water in the Central Valley Region. Determining the existing ecological conditions of agriculturally dominated water bodies is a critical goal of a water

quality monitoring program and should be achieved by multiple assessment tools such as toxicity, chemical monitoring, and bioassessments.[1]

I. MONITORING AND REPORTING PROGRAM REQUIREMENTS

The Coalition Group shall submit to the Regional Board a detailed MRP Plan that supports the development and implementation and demonstrates the effectiveness of the Watershed program to comply with conditions of the Waiver.

The MRP Plan shall be designed to achieve the following objectives as a condition of the Waiver:

a. Assess the impacts of waste discharges from irrigated lands to surface water;
b. Determine the degree of implementation of management practices to reduce discharge of specific wastes that impact water quality;
c. Determine the effectiveness of management practices and strategies to reduce discharges of wastes that impact water quality;
d. Determine concentration and load of waste in these discharges to surface waters; and
e. Evaluate compliance with existing narrative and numeric water quality objectives to determine if additional implementation of management practices are necessary to improve and/or protect water quality.

In order to focus the monitoring effort in a cost effective manner, a phased process is needed for the use of various assessment tools (i.e. chemical monitoring, toxicity testing, and bioassessments). A recent conference sponsored by the California Water Institute entitled "*Understanding Surface Water Monitoring Requirements*" provides excellent guidance on the use of various monitoring tools (California Water Institute, 2002).

1. Types of Monitoring and Evaluation

To achieve the objectives of the MRP, at a minimum, the Coalition Group shall conduct the types of monitoring and evaluation listed below. The monitoring will be conducted during different phases of the monitoring and requirement program.

a. Toxicity Testing;
b. Water Quality (constituents listed in Table 1) and Flow Monitoring;
c. Pesticide Use Evaluation; and
d. Evaluation of the effectiveness of management practices and tracking levels of implementation in the watershed.

[1] *Letter to Art Baggett and Thomas Pinkos from Don Gordon, Agricultural Council of California, August 5, 2002.*

- Toxicity Testing

Activities within the watershed and the use of the receiving waters must be evaluated using aquatic toxicity testing. The purpose of the toxicity testing is to evaluate compliance with the narrative toxicity objective, to identify the causes (e.g., sediment, contaminants, salt, etc.) of toxicity observed, and to determine the sources of the toxicants identified.

- Water Quality and Flow Monitoring

Such monitoring is used to assess the sources of wastes and loads in discharges from irrigated lands to surface waters, and to evaluate the performance of management practice implementation efforts. Monitoring data shall be compared to existing numeric and narrative water quality objectives.

- Pesticide Use Evaluation

The most significant factors influencing the amount of pesticides in surface waters are the timing of pesticide applications, the application rates, the amounts of pesticide applied, and the points of application (all of these factors can be referred to as "use pattern"). This information can be found in the pesticide use reports submitted by the applicators to the County Agricultural Commissioners and Department of Pesticide Regulations (DPR). Changes in pesticide concentrations at specific monitoring sites in the waterbodies need to be compared to pesticide use patterns in land areas upstream of the monitoring sites. By comparing these changes, it may be determined how changing the pesticide use patterns could impact water quality. Changing pesticide use patterns can also provide an indicator of the degree of implementation of certain management practices.

- Management Practice Effectiveness and Implementation Tracking

Information must be collected from Dischargers on the type of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state. Data should be collected in four broad areas; 1) pesticide mixing, loading, and application practices; 2) pest management practices; 3) management practices to address others wastes (salt, sediment, nitrogen, etc.), and 4) cultural practices. This information may be used to compare the effectiveness of management practices in reducing loading of constituents of concern.

2. Monitoring Phases

The MRP Plan shall describe a phased monitoring approach and provide documentation to support the proposed monitoring program. The program shall not consist of more than three phases. Phase 1 monitoring shall, at a minimum, include analyses of physical parameters, drinking water constituents, pesticide use evaluation, and toxicity testing. Phase 2 monitoring includes chemical analyses of constituents that were identified in toxicity testing in phase one that may include pesticides, metals, inorganic constituents and nutrients and, additional monitoring site in the watershed. Phase 3 monitoring includes management practice effectiveness and implementation tracking and additional water quality monitoring sites in the upper portions of the watershed.

A. Monitoring Phase 1

Monitoring Phase 1 shall include analyses of physical parameters, drinking water constituents, pesticide use evaluation, and toxicity testing. Phase I monitoring parameters shall include all 303(d) pollutants identified in downstream waterbody(s) and discharged to land or surface water within the watershed. Phase I monitoring parameters shall also include all pesticides listed in the Pesticide Implementation Plan contained within the Regional Board's Basin Plan if used within the watershed. General water quality parameters such as temperature, electrical conductivity, pH, and dissolved oxygen indicate contaminants in the watershed. Pesticide Use Evaluation must be conducted to determine the pesticide use pattern in land areas upstream of the monitoring sites. This will also identify the types of pesticides used in the watershed to assist in determining the selection of appropriate species for toxicity testing. Acute toxicity testing shall be conducted using the invertebrate, *Ceriodaphnia dubia*, and the larval fathead minnow, *Pimephales promelas*, according to standard USEPA acute toxicity test methods[2]. In addition, to identify toxicity caused by herbicides, 96-hr toxicity tests with the green algae, *Selenastrum capricornutum*, shall be conducted[3]. The water column toxicity testing will be used as an indicator for wastes that are water-soluble. Sediment toxicity testing using the invertebrate species *Hyalella azteca* or *Chironomus tentans* according to USEPA methods[4] shall be conducted for hydrophobic (sediment bound) wastes that are present in the waterbody.

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[2] USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012.
[3] USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.
[4] USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024.

For this initial screening, 100% (undiluted) sample shall be tested. If 100% test organism mortality is detected within 24 hours during the initial screening toxicity test, then a multiple dilution test including a minimum of five sample dilutions shall be conducted to determine the magnitude of the toxic response.

Further, if toxicity is detected during the initial screening test, then Toxicity Identification Evaluation[5] (TIE) and chemical monitoring shall be conducted to determine the cause of toxicity. At a minimum, a Phase I TIE[6] should be conducted to determine the general class (i.e., metals, non-polar organics such as pesticides, surfactants, etc.) of chemical causing toxicity. This minimum TIE effort will determine the type of chemical monitoring necessary to identify the specific agents causing toxicity. Phase II[7] TIEs may also be utilized to identify specific toxic agents.

In addition to TIEs, sites identified, as toxic in the initial screen shall be re-sampled to estimate the duration of the toxicant in the waterbody. Additional samples collected upstream of the original site should also be collected to determine the potential source(s) of the toxicant in the watershed.

Information must be collected from dischargers on the type of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state through all phases of monitoring.

B. Monitoring Phase 2

Monitoring Phase 2 will include general physical parameters, pesticide use evaluation, and chemical analyses of pesticides, metals, inorganic constituents and nutrients. Phase 2 will be designed based on the results of phase 1 monitoring. It is expected that this phase will begin no later than 2 year after the start of the first phase. This phase of monitoring will include general water quality parameters such as temperature, electrical conductivity, pH, and dissolved oxygen to indicate contaminants in the watershed. Pesticide Use Evaluation must be conducted to determine the pesticide use pattern and changes in land areas upstream of the monitoring sites. This will also identify any additional or new pesticides used in the watershed to be monitored. Chemical analyses will be conducted in Phase 2 to assess the sources of waste and pesticide loads in discharges from irrigated

[5] A TIE is a set of sample manipulation procedures designed to identify the specific causative agent(s) responsible for the observed toxicity.
[6] USEPA. 1998. Methods for Aquatic Toxicity Identification Evaluations. Phase I Toxicity Characterization Procedures. Office of Research and Development, Duluth, MN. EPA-600-3-88-034.
[7] USEPA. 1998. Methods for Aquatic Toxicity Identification Evaluations. Phase II Toxicity Identification Procedures. Office of Research and Development, Duluth, MN. EPA-600-3-88-035.

lands to surface waters, and to evaluate performance of management practice implementation efforts. Wastes include the constituents that cause toxicity in Phase 1 monitoring.

Information must be collected from dischargers on the type of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state through all phases of monitoring.

C. Monitoring Phase 3

Phase 3 shall determine statistically significant changes in waste concentrations based on various management practices. Phase 3 monitoring shall begin no later than two years from the start of Phase 2 monitoring. This phase of monitoring will include general water quality parameters such as temperature, electrical conductivity, pH, and dissolved oxygen to indicate contaminants in the watershed. Pesticide Use Evaluation must be conducted to determine the pesticide use pattern and changes in land areas upstream of the monitoring sites. Information collected from dischargers on the type of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state through the previous phases of monitoring. Due to the various land use patterns and rainfall/runoff factors that can affect waste concentrations on an annual basis, it may be difficult to determine success (waste reductions) from single or multiple management practices based on only a year of sampling. Phase 3 shall determine if statistically significant changes in waste concentrations result from the implementation of various management practices. Data should be collected in four broad areas; 1) pesticide mixing, loading, and application practices; 2) pest management practices; 3) management practices to address waste (salt, sediment, nitrogen, etc.), and 4) cultural practices. This information may be used to compare the effectiveness of management practices in reducing waste loads.

Based on the results of the data collected during the three phases of monitoring, any of the above types of monitoring may be required to be repeated at a specific site or watershed.

3. Historical Data

Historical water quality data has been used for listing various water bodies as impaired. Therefore, synthesis and statistical analysis of all historical data by site and date is a critical first step for designing a science based monitoring program in a watershed. Historical analysis will provide a benchmark for measuring change (progress) in reducing concentrations of wastes due to management practices and will provide rationale for the

site selection process (i.e. continue to monitor sites with extensive temporal data for a wastes or water quality parameters). It is also possible that spatial analysis of historical data will reveal sites where data are lacking and that should be monitored in the future. Coalition Groups shall collect and review historical data for all wastes in the various watersheds in advance of developing monitoring designs. This critical initial step in developing a monitoring plan will focus the study, provide rationale for the site selection process, and reduce costs.

Coalition Groups are encouraged to review the on going monitoring in the watershed and coordinate the monitoring effort to avoid duplication.

4. Minimum Requirements

The following table lists the minimum requirements for the constituents to be monitored by the Coalition Group.

Table 1. Constituents to be monitored

Constituent	Quantitaion Limit	Reporting Unit	Monitoring Phase
Physical Parameters			
Flow	N/A	CFS (Ft^3/Sec)	Phase 1, 2 & 3
pH	N/A	pH	Phase 1, 2 &3
Electrical Conductivity	N/A	µmhos/cm	Phase 1, 2 &3
Dissolved Oxygen	N/A	mg O_2/L	Phase 1, 2 &3
Temperature	N/A	Degrees Celsius	Phase 1, 2 &3
Color	N/A	ADMI	Phase 1, 2 &3
Turbidity	N/A	NTUs	Phase 1, 2 &3
Total Dissolved Solids	N/A	mg/L	Phase 1, 2 &3
Total Organic Carbon	N/A	mg/L	Phase 1, 2 &3
Drinking Water :			
E *Coli*	(b)	ug/L	Phase 1
Total Organic Carbon	(b)	ug/L	Phase 1
Toxicity Test			
Water Column Toxicity			Phase 1
Sediment Toxicity			Phase 1
Pesticides [(a)]			
Carbamates	(b)	ug/L	Phase 2
Organochlorines	(b)	ug/L	Phase 2
Organophosphorus	(b)	ug/L	Phase 2
Pyrethroids	(b)	ug/L	Phase 2
Herbicides	(b)	ug/L	Phase 2
Metals (a)			
Cadmium	(b)	ug/L	Phase 2
Copper	(b)	ug/L	Phase 2
Lead	(b)	ug/L	Phase 2
Nickel	(b)	ug/L	Phase 2

Constituent	Quantitaion Limit	Reporting Unit	Monitoring Phase
Zinc	(b)	ug/L	Phase 2
Selenium	(b)	ug/L	Phase 2
Arsenic	(b)	ug/L	Phase 2
Boron	(b)	ug/L	Phase 2
Nutrients (a)			
Total Kjeldahl Nitrogen	(b)	mg/L	Phase 2
Phosphorus	(b)	ug/L	Phase 2
Potassium	(b)	ug/L	Phase 2

a In addition to TIEs, sites identified as toxic in the initial screen shall be re-sampled to estimate the duration of the toxicant in the waterbody. Additional samples upstream of the original site should also be collected to determine the potential source(s) of the toxicant in the watershed

b Quantitation limits must be lower than LC50 or other applicable federal or state toxic or risk limits.

The MRP Plan must include a sufficient number of monitoring sites and surface water flow monitoring for each location to allow calculation of the load discharged for every parameter monitored.

Method detection limits and practical quantitation limits shall be reported. All peaks detected on chromatograms shall be reported, including those, which cannot be, quantified and/or specifically identified. The Coalition Group shall use US EPA approved methods, provided the method can achieve method detection limits equal to or lower than analytical methods quantitation limits specified in this Order.

At a minimum, the MRP Plan must clearly demonstrate (1) compliance with requirement of all phases of monitoring as described in this MRP (2) sufficient number of monitoring sites based on acreages and watershed characteristics, flow monitoring, and frequency of sample collection to allow for the calculation of load discharged for every waste parameter monitored; and (3) the use of proper sampling techniques and laboratory procedures to ensure a sample is representative of the site and is performed in the laboratory using approved methodologies

Bioassessment monitoring protocols are at the developing phase and there are no Basin Plan requirements or standards addressing the results of bioassement monitoring. Coalition Groups are encouraged to conduct Bioassessments to collect data that may be used as reference sites and provide information for scientific and policy decision making in the future. Bioassessments may serve monitoring needs through three primary functions: (1) screening or initial assessment of conditions; (2) characterization of impairment and diagnosis; and (3) trend monitoring to evaluate improvements through the implementation of management practices. Bioassessment data from all wadeable impaired water

bodies may serve as an excellent benchmark for measuring both current biological conditions and success of management practices.

Watershed Specific Requirements

The watershed specific requirements include watershed constituents of concern based on the characteristics of the watershed and the receiving water quality conditions. Some watersheds may need to conduct more extensive toxicity testing if toxicity has been documented by previous monitoring or increase the number of monitoring sites. Watershed specific requirements will include follow up analyses on specific constituents of concern, e.g., specific metals or pesticides.

5. Flow Monitoring

Representative flow measurements shall be obtained at each sample location during each sampling event. Additionally, the presence or absence of flow at each sample site shall be noted at a sufficient frequency to determine the quantity discharged during the irrigation season. The MRP Plan shall record the time, date, and location of each flow measurement or observation (absences) on field data sheets. Discharge flow monitoring shall be conducted and shall be reported in cubic feet per second (cfs).

6. Monitoring Seasons

Monitoring required in Section 1 “Monitoring Types” shall be conducted during the irrigation season and storm season, which coincides with the orchard dormant spray application. In general, the irrigation season is March through August, but may start as early as February and extends to October. The storm season is December through February, but may include November and March. The MRP Plan shall describe the phased monitoring program for irrigation and storm seasons.

Each phase of monitoring shall include monitoring of two major storm events during one storm season and monthly sampling during one irrigation season followed by collection and evaluation of data. Data must be submitted to Executive Officer for review and approval. The Coalition Group shall design a monitoring phase based on the results of the previous phase. A revised MRP Plan shall be submitted for each phase for approval by the Executive Officer.

7. Monitoring Schedule

The MRP Plan shall be carried out using a systematic schedule. The MRP Plan should indicate the start date, identify time of the year, identify when field studies will take place, define the frequency of sampling, and indicate when the field

studies end. Timing, duration, and frequency of sampling should be based on the complexity, hydrology, and size of the waterbody. Historical data must be reviewed to assist with determining some of these factors. The MRP Plan must include a sufficient number of monitoring sites and surface water flow monitoring for each location to allow calculation of the load discharged for appropriate parameters to achieve the objective identified in Section I. *MONITORING AND REPORTING PROGRAM REQUIREMENTS* above.

At a minimum, each phase of the above referenced monitoring shall be conducted during two major storm events and after storm events, and monthly sampling during the peak irrigation season for one year, unless otherwise approved by the Executive Officer.

8. Monitoring Sites

The MRP plan shall describe the study area, sampling sites, sampling locations, GPS coordinates, land use in the watershed, the chemicals being used, and the existing management practices in the watershed. The numbers and locations of sites must be based on specific watershed characteristics and be supported by a detailed discussion of these characteristics. Monitoring sites shall be selected for various watersheds based on size and flow of waterbodies (mainstem river, tributaries and agricultural drainage), land use (e.g.. agricultural activities and pesticide use). Monitoring sites must be established initially on the water bodies that are carrying agricultural drainage into natural waterbodies. If results indicate that water quality objectives are exceeded at any site, monitoring for the constituents of concern (constituents exceeded water quality objectives) shall continue and the monitoring must be expanded upstream in a systematic search for sources. All major drainages must be part of baseline monitoring. At least 20% of the intermediate drainages must be monitored during the first year and the second 20%, the second year, etc. Smaller drainages will be monitored if the evaluation of data from the larger drainages or receiving water indicates water quality problems. The major, intermediate and small drainages based on hydrology, size and flow of the water bodies are different for each watershed. Therefore, Coalition Groups shall provide scientific rationale for the site selection process based on historical and on-going monitoring and drainage size and land use. The size of major, intermediate and small drainages within the sub watershed shall be discussed in the MRP Plan and how the size of these drainages was used to develop the monitoring sites. Monitoring sites should not include main-stem water bodies already on the Clean Water Act section 303(d) listed water body. These sites should be monitored only to determine the degree of implementation of management practices to reduce discharge of COC listed on 303(d). The initial focus of the MRP Plan shall be on water bodies that carry

agricultural drainage or are dominated by agricultural drainage. A map showing the monitoring sites shall be provided with the MRP Plan.

II. QUALITY ASSURANCE PROJECT PLAN (QAPP)

To create a sound and consistent watershed or regional MRP Plan, it is important to develop monitoring protocols and a monitoring plan for the evaluation of water quality data. A QAPP must be developed by the Coalition Group to include watershed and site-specific information, project organization and responsibilities, and quality assurance components of the monitoring program. StateWide Ambient Monitoring Program (SWAMP) QAPP is a comprehensive quality assurance plan that includes many of the elements required under this MRP. **Attachment A** presents the MRP QAPP Requirements and the outline for development of the monitoring QAPP. The QAPP includes the laboratory and field requirements to be used for data evaluation. Coalition Groups may use the SWAMP QAPP as an available resource and add the site-specific requirements and any other elements that are required under this MRP. A Watershed specific QAPP is required to be submitted with the Watershed Evaluation Report. The Watershed Evaluation Report is a condition of the Conditional Waiver.

III. REPORTING REQUIREMENTS

Pursuant to California Water Code (CWC) Section 13267, the following Reports are required to be submitted to the Regional Board by the time schedule identified below.

A. Watershed Evaluation Report DUE: 1 April 2004

The Coalition Group shall compile a Watershed Evaluation Report containing the following information:

1. Watershed Setting

- Map(s) of watershed area showing irrigated lands (including crop type), drainage and discharge locations. Maps or discussion shall provide details of the watershed showing which fields are served by each drain.
- Information on crops grown in the watershed or subwatershed area, production practices, chemicals used and application methods (including timing of application) within the watershed and other factors that may impact the quality of discharges.
- Inventory of management practices that are in place and which practices are effective pollution control measures.
- Historical water quality monitoring results Documentation of existing receiving water quality data and quality of typical irrigation discharges.

- Known water quality issues, water quality limited waterbodies, and potential water quality problems.
- Known programs addressing the water quality issues associated with discharges from irrigated lands. Discussion of practices in use and available programs to address problems from irrigated agricultural discharges (e.g. tailwater return systems, irrigation efficiency improvements, UC Coop Ext. and NRCS grower outreach, EQIP, etc.).

2. Watershed Priorities

Based on the information available, the Coalition Group shall identify its priorities with respect to work on specific subwatersheds and water quality parameters.

3. Management Practices

The Coalition Group shall be responsible for monitoring the success of identified management practices through the MRP Plan as well as the evaluation of the management practices. The report shall provide an implementation plan for management practices in the watershed. The report shall also identify pilot projects for the implementation of management practices on prioritized sub-watersheds.

3.1 Implementation Plan

The Coalition Group shall develop an implementation plan to identify and track the progress of water quality management practices within the watershed. This plan may address water quality issues related to the discharge of irrigation return flows separately from stormwater discharges and shall include a schedule for implementation of management practices that may include, but is not limited to, grower education, technical and financial assistance.

3.2 Communication Report

When monitoring results indicate that water quality objectives are exceeded in the surface waters of the Coalition Group area, the Coalition Group shall submit a Communication Report describing how it will evaluate the effectiveness of one or more management practice(s) at preventing discharges of COCs to surface waters. The selection of management practice evaluation projects shall include consideration of the contribution of target COCs to known water quality impairments, potential application of the management practices over a broad geographic area and large spectrum of crops, and ease and immediacy of possible implementation. Projects need not involve new practices, but can involve quantification of benefits of

existing practices. Communication Report shall be submitted for each proposed, implemented, or completed project and shall include, at a minimum: description of management practice(s) being evaluated, target chemical(s), reasons for selecting the specific project, methodology for evaluating the effectiveness of the practice (including sampling and QA/QC plans), and involvement by stakeholders and agencies in developing, implementing and evaluating the project. If projects are completed, the Communication Report shall present the conclusion(s) of the evaluation project.

B. Monitoring and Reporting Program Plan Due: 1 April 2004

The MRP Plan must include the components of the monitoring progam as stated in this Order. The MRP Plan shall specify all quality assurance elements including the US EPA test method and detection limits for the required constituents as specified in the QAPP for Monitoring Program Requirements, **Attachment A**. At a minimum, the MRP Plan shall include the following elements:

1. Description of the Watershed including characteristics relevant to the monitoring;
2. Summary of the historical data and on-going monitoring;
3. Description of Monitoring Phases;
4. Monitoring sites;
5. Land Use description;
6. Sampling locations;
7. Detailed maps showing the land use and sampling locations;
8. Monitoring periods including monitoring events and frequencies of monitoring during each event;
9. Monitoring parameters;
10. parameters to be monitored including minimum and site specific requirements as described here;
11. A QAPP consistent with the requirements described in **Attachment A**;
12. Documentation of monitoring protocols including sample collection methods and laboratory quality assurance manual;
13. Laboratory Quality Assurance manual must describe analytical methods; internal quality control (QC) samples, frequency of QC sample analyses and acceptance criteria; calibration procedures and acceptance criteria; instrumentation and, other technical capabilities of the laboratory; and
14. Watershed contact information.

C. Annual Monitoring Report Due: Annual, 1 March

The Annual Monitoring Report (AMR) shall be prepared after field monitoring events have been completed and includes a review of the monitoring program including the results of the data collected and data evaluation. The AMR shall include the following components:

1. Title page;
2. Table of contents;
3. Description of the watershed
4. Monitoring objectives;
5. Sampling site descriptions;
6. Location map of sampling sites and land use;
7. Tabulated results of analyses;
8. Sampling and analytical methods used
9. Copy of chain of custodies;
10. Associated laboratory and field quality control samples results;
11. Summary of precision and accuracy;
12. Pesticide Use Information;
13. Data interpretation including assessment of data quality objectives;
14. Summary of management practices used;
15. Actions taken to address water quality impacts identified, including but not limited to, revised or additional management practices to be implemented;
16. Communication Report; and
17. Conclusions and recommendations.

Copies of all field documentation and laboratory original data must be included in the annual monitoring report as attachments. The AMR should also provide a perspective of the field conditions including a description of the weather, rainfall, temperature, stream flow, color of the water, odor, and other relevant information that can help in data interpretation.

In reporting monitoring data, the Coalition Groups shall arrange the data in tabular form so that the required information is readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with the Waiver.

A transmittal letter shall accompany each report. This letter shall include a discussion of any violations of the Waiver found during the reporting period, and actions taken or planned for correcting noted violations, such as operational, field or facility modifications. If the Coalition Group has previously submitted a Communication Report describing actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall be signed and contain a penalty of perjury statement by the Coalition Group, or the Coalition Group's authorized agent. This statement shall state:

> *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for violations."*

The Regional Board may request Coalition Groups and/or individual Dischargers to take additional actions if monitoring data indicates the water quality objectives are exceeded in surface waters.

Based on results of the monitoring program after a minimum of one year, the Coalition Group may submit a revised MRP Plan requesting a reduction in the constituents monitored and/or sample frequency. If such reductions are warranted, the MRP may be revised by the Executive Officer.

The Coalition Group, on behalf of the individual member dischargers, shall implement the above monitoring program as of the date of this Order.

Ordered by: _____/S/_____
THOMAS R. PINKOS, Executive Officer

_____3/18/04_____
(Date)

Attachment A – Quality Assurance Project Plan

Revised: 7/24/03
Revised 3/17/04 pursuant to SWRCB Order WQO 2004-0003

CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM IRRIGATED LANDS CONDITIONAL WAIVER

COALITION GROUP MONITORING AND REPORTING PROGRAM ORDER NO. R5-2003-0826

QUALITY ASSURANCE PROJECT PLAN

1.0 INTRODUCTION

A Quality Assurance Project Plan (QAPP) shall be developed by the Coalition Group and shall include site-specific information and field and laboratory quality assurance requirements. This document identifies the major elements of the quality assurance and quality control components that need to be described in the QAPP. The QAPP shall be submitted to the Regional Board for review and approval.

2.0 OBJECTIVE

The objective of this document is to identify the quality assurance components that should be included in the QAPP for the watershed monitoring. A QAPP contains the requirements and criteria for the field and laboratory procedures used during planning and implementation of the monitoring program. These requirements and criteria shall be presented as a set of procedures to assure that the data collected during a monitoring program represents, as closely as possible, *in situ* conditions of the watersheds. This objective will be achieved by using accepted methodology (e.g., U.S. EPA) to collect and analyze water, sediment, and biota samples. The program's ability to meet this objective will be assessed by evaluating the laboratory results in terms of detection limits, precision, accuracy, comparability, representativeness, and completeness. This document provides a description of major elements of the field and laboratory quality assurance components.

3.0 WHAT SHOULD BE INCLUDED IN THE QAPP

A monitoring QAPP should include Project Management information e.g., project organization and responsibilities, project schedule, and the quality assurance components of the field and laboratory activities. The elements described in this document will provide the framework for developing a QAPP. These elements describe the field and laboratory elements of a QAPP and the requirements that are set forth by the Regional Board. QAPP for the watershed monitoring must include all the required components as listed in Table No. 1.

Table No.1. Components of Monitoring Quality Assurance Project Plan

SECTION NUMBER	SECTION NAME	SECTION DESCRIPTION
1.0	PROJECT MANAGEMENT	This section explains the overall project management.
1.1	TITLE PAGE AND APPROVAL	Description of Project Title, organizations, and responsible staff.
1.2	TABLE OF CONTENTS	Table of Contents list the sections and sub-sections included in the QAPP.
1.3	CONTRACT INFORMATION	List the contact staff, organization, and phone numbers.
1.4	PROJECT ORGANIZATION AND RESPONSIBILITY	Identify the project organization and the responsible entities who will ensure the QAPP procedures will be followed.
1.5	PROJECT OBJECTIVES AND APPROACH	Describe the objective based on the goal defined in the Conditional Waiver. Describe the approaches to meet the objectives.
1.5.1	*Measurement*	Describe the constituents that will be monitored.
1.5.2	*Project Schedule*	Identify when field studies will take place, the frequency of sampling, and when the field studies end.
1.6	QUALITY OBJECTIVES AND CRITERIA FOR DATA MEASUREMENT	Describe the quality objectives and criteria for data measurement. Refer to Quality Control Requirements listed in this document.
1.7	TRAINING AND CERTIFICATION	Describe the procedures for training field and laboratory staff.
1.8	DOCUMENTATION AND RECORDS	Describe the documentation procedure and record keeping for the monitoring program.
1.8.1	*Data to be Included in Reports*	List the laboratory and field data that will be included in the report.
1.8.2	*Reporting Format*	Explain what type of data will be included in the final report. Describe how the data that didn't meet the quality objectives will be qualified (e.g., estimated, usable, unusable).
2.0	DATA ACQUISITION	This section describes the sampling design and sample collection criteria
2.1	SAMPLING DESIGN	Describe the sampling design.
2.2	RATIONALE FOR THE DESIGN	Describe the purpose of the study. State if the design is based on a statistical or judgmental data collection method.
2.2.1	*Procedure for locating and Selecting Environmental Samples*	Describe procedures for locating and selecting the monitoring site/location(s).
2.2.2	*Classification of Measurements as Critical*	All measurements shall be classified as critical. Describe the process that will ensure that data will undergo closer scrutiny during data review.
2.2.3	*Validation of any Nonstandard methods*	List the non-standard methods that will be used and describe the procedures to validate the method.
3.0	FIELD PROCEDURES	Describe the field procedures for the elements listed below. Refer to the Field Procedures (Section 3.0) to meet the requirements for this monitoring program.
3.1	SAMPLE COLLECTION METHODS	See Section 3.0 for criteria. Describe the project specific methods.
3.1.1	*Sample Storage, Preservation and Holding Times*	See Section 3.0 for criteria. Describe the project specific procedures.
3.1.2	*Sample Identification Scheme*	See Section 3.0 for criteria. Describe the project specific procedures.
3.1.3	*Field Measurements*	See Section 3.0 for criteria. Describe the project specific methods of field measurement.
3.1.4	*QC Sample Collection*	See Section 3.0 for criteria. Describe the project specific quality control samples.
3.1.5	*Field Instrument Calibration*	See Section 3.0 for criteria. Describe the project specific methods of calibration.
3.1.6	*Decontamination Procedures*	See Section 3.0 for criteria. Describe the project specific documentation procedure.
3.1.7	*Field Documentation*	See Section 3.0 for criteria. Describe the project specific field documentation procedure.
3.2	SAMPLE CUSTODY AND DOCUMENTATION	This section describes the sample custody and documentation procedures.
3.2.1	*Documentation Procedures*	Describe the field documentation procedures.
3.2.2	*Chain-of-Custody Procedures and Form*	See Section 3.0 for criteria. Describe the Chain of Custody procedures.
3.2.3	*Sample Shipments and Handling*	See Section 3.0 for criteria. Describe the sample shipment procedure. How the samples will be delivered from the field to the laboratory.
3.2.4	*Laboratory Custody Procedures*	See Section 3.0 for criteria. Describe the project laboratory custody procedures.
4.0	ANALYTICAL METHOD REQUIREMENTS	This section describes the analytical method requirements.
4.1	CHEMISTRY ANALYSIS	Describe the chemistry analyses procedure, reference the published method, and identify the quantitation procedures.
4.2	TOXICITY TESTING	Describe the toxicity testing method and procedure, species, and reference the published methods being followed.
4.3	DETECTION AND QUANTITATION LIMITS	Describe the detection and quantitation limits for all constituents. See

SECTION NUMBER	SECTION NAME	SECTION DESCRIPTION
		Section 4.0 for requirements.
4.4	LABORATORY STANDARD AND REGENTS	Describe the reagents used in the laboratory and how they are checked for the quality.
4.5	SAMPLE PREPARATION PROCEDURES	Describe the sample preparation procedure and the reference method for each analytical method used and every constituent being monitored
5.0	QUALITY CONTROL REQUIREMENTS	This section describes the laboratory and field quality control. Laboratory and field sampling SOP should be provided to include the detail information.
5.1	DATA QUALITY OBJECTIVES AND QUALITY ASSURANCE OBJECTIVES	Describe the precision, accuracy, comparability, and completeness criteria for this project. See Section 5.0 for required information.
5.2	DEVELOPMENT OF PRECISION AND ACCURACY	Provide information on how the precision and accuracy will be developed for this project. See Section 5.0 for required information.
5.3	INTERNAL QUALITY CONTROL SAMPLES	Describe and list the internal QC samples, the frequency and acceptance criteria.
5.4	FIELD QUALITY CONTROL SAMPLES	Describe and list the type of field QC samples, the frequency of collection, and the acceptance criteria.
5.5	LABORATORY QUALITY CONTROL SAMPLES	Describe the laboratory QC samples and the frequency of analyses.
6.0	INSTRUMENTATION AND EQUIPMENT PREVENTATIVE MAINTENANCE	This section describes the instrumentation and preventive maintenance.
6.1	SAMPLE EQUIPMENT CLEANING PROCEDURES	Describe the sampling equipment cleaning procedures.
6.2	ANALYTICAL INSTRUMENT AND EQUIPMENT TESTING PROCEDURES AND CORRECTIVE ACTIONS	List the analytical instrument, manufacturer, maintenance procedure, and corrective actions when instruments are not operating within the required operating limits.
6.3	INSTRUMENT CALIBRATION AND FREQUENCY	This section describes the instrument calibration procedures and frequency of calibration
6.3.1	*Analytical Procedures and Calibration*	Describe the calibration procedure and frequency for each analytical method used in this monitoring program. Refer to Section 6.0 to follow the required procedure.
7.0	DATA MANAGEMENT	Describe the data management procedure. Where the original data will be kept, who will receive the copy of the data, and who is responsible for maintaining the database.
7.1	DATA ASSESSMENT PROCEDURES	How the data will be assessed and what tools will be used to assess the data.
7.1.1	*Training and Certification*	Describe the training requirements for the field and laboratory staff.
7.1.2	*Data to be included in the Report*	Specify the data that will be included in the monitoring report. See Section 7.0 for requirements
8.0	DATA VALIDATION AND USABILITY	This section describes the data validation and usability.
8.1	LABORATORY DATA REVIEW. VERIFICATION AND REPORTING	Describe the laboratory procedure for data review and validation prior to release of the data.
8.2	DATA SYSTEM AUDITs	Describe any audit that the system may undergo during the monitoring.
8.2.1	*Technical System Audit*	Describe the frequency and procedure for the technical system audit.
8.2.2	*Performance Evaluations Audit*	Describe the procedure for performing a PE sample.
8.2.3	*Field Technical Audits*	Identify the entity who will be conducting the field technical audit and describe the procedure for conducting the audit.
9.0	REFERENCES	List all the references used to prepare the QAPP.
	ATTACHMENTS	List and enclose the attachments required. (e.g., Laboratory Quality Assurance Manual and SOPs).

In order to provide some technical information in preparing the QAPP, Sections 3.0 through 8.2.3 of the QAPP listed in Table No.1 are discussed in more detail below.

These sections focus primarily on the quality assurance and quality control components of the field and laboratory procedures. The section numbers provided below correspond to the Table No. 1 section numbers and section titles for ease of use.

SECTION 3.0 FIELD PROCEDURES

Surface water and sediment samples will be collected for chemical analyses and biological toxicity testing. While the primary focus will be the collection of samples for pesticide analyses, other constituents will be required as listed in the *Watershed Monitoring and Reporting Program.*

Section 3.1 Sample Collection Methods

Proper sampling techniques must be used to ensure that a sample is representative of the flow in the cross section. Samples should be collected using a standard multi-vertical depth integrating method to obtain the most representative isokinetic sample possible. By using this method the water entering the sampler is hydrodynamically equivalent to the portion of the stream being sampled. Abbreviated sampling methods (i.e., weighted-bottle or dip sample) can also be used for collecting a representative sample of the stream chemistry.

Section 3.1.1 Sample Storage, Preservation and Holding Times

Sample containers must be pre-cleaned and certified to be free of contamination according to the United States Environmental Protection Agency (U.S. EPA) specification for the appropriate methods.

Section 3.1.2 Sample Identification Scheme

All samples must be identified with a unique number to ensure that results are properly reported and interpreted. Samples must be identified such that the site, sampling location, matrix, sampling equipment and sample type (i.e., normal field sample or QC sample) can be distinguished by a data reviewer or user.

Section 3.1.3 Field Measurements

For all water bodies sampled, water quality parameters including pH, specific conductance, dissolved oxygen, and temperature must be measured prior to collecting samples for laboratory analyses.

Section 3.1.4 QC Sample Collection

Equipment blanks, field duplicates, and matrix spikes must be collected at a frequency of about 1 per 20 normal samples. Matrix spikes will be collected as, normal samples and will be spiked at the laboratory prior to sample preparation.

Section 3.1.5 Field Instrument Calibration

Routine field instrument calibration must be performed at least once per day prior to instrument use to ensure instruments are operating properly and producing accurate and reliable data. Calibration should be performed at a frequency recommended by the manufacturer.

Section 3.1.6 Decontamination Procedures

All field and sampling equipment that will contact samples must be decontaminated after each use in a designated area.

Section 3.1.7 Field Documentation

All field activities must be adequately and consistently documented to ensure defensibility of any data used for decision-making and to support data interpretation. Pertinent field information, including (as applicable), the width, depth, flow rate of the stream, the surface water condition, and location of the tributaries must be recorded on the field sheets.

Section 3.2 Sample Custody and Documentation

Sample custody must be traceable from the time of sample collection until results are reported. Sample custody procedures provide a mechanism for documenting information related to sample collection and handling.

Section 3.2.1 Documentation Procedures

A field activity coordinator must be responsible for ensuring that the field sampling team adheres to proper custody and documentation procedures. A master sample logbook or field datasheets shall be maintained for all samples collected during each sampling event.

Section 3.2.2 Chain-of-Custody Form

A chain-of-custody (COC) form must be completed after sample collection and prior to sample shipment or release. The COC form, sample labels, and field documentation must be crossed checked to verify sample identification, type of analyses, number of containers, sample volume, preservatives and type of containers.

Section 3.2.3 Sample Shipments and Handling

All sample shipments are accompanied with the COC form, which identifies the contents. The original COC form accompanies the shipment and a copy is retained in the project file.

All shipping containers must be secured with COC seals for transportation to the laboratory. The samples must be placed with ice to maintain the temperature between 2-4 degrees C. The ice packed with samples must be sealed in zip lock bags and contact each sample and be approximately 2 inches deep at the top and bottom of the cooler. Samples must be shipped to the contract laboratories according to Department of Transportation standard.

Section 3.2.4 Laboratory Custody Procedures

The following sample control activities must be conducted at the laboratory:
-Initial sample login and verification of samples received with the COC form;
-Document any discrepancies noted during login on the COC;
-Initiate internal laboratory custody procedure;
-Verify sample preservation (e.g., temperature);
-Notify the project coordinator if any problems or discrepancies are identified; and
-Proper samples storage, including daily refrigerator temperature monitoring and sample security.

SECTION 4.0 ANALYTICAL REQUIREMENTS

Section 4.1 Chemistry Analyses

Pesticide analyses must be conducted on unfiltered (whole) fractions of the samples. Prior to the analysis of any environmental samples, the laboratory must have demonstrated the ability to meet the minimum performance requirements for each analytical method. Initial demonstration of laboratory capabilities includes the ability to meet the project specified quantitation limits (QL), the ability to generate acceptable precision and recoveries, and other analytical and quality control parameters as stated in this Guide. Analytical methods used for chemistry analyses must follow a published method and document the procedure for sample analyses in a laboratory standard operation procedure (SOP) for review and approval.

Section 4.2 Toxicity Testing

The ambient water toxicity test results must provide a reliable qualitative prediction of impacts to in stream biota. At a minimum the toxicity testing will need to include the 4-day static renewal procedures described in Method for Measuring Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (US EPA, 2002).

Section 4.3 Detection and Quantitaion Limits

Method Detection Limit Studies

Each laboratory performing analyses under this program must routinely conduct method detection limit (MDL) studies to document that the MDLs are less than the project-specified QLs. If any analytes have MDLs that do not meet the project QLs, the following steps must be taken:

1. Perform a new MDL study using concentrations sufficient to prove analyte quantitation at concentrations less than the project-specified QLs per the procedure for the Determination of the Method Detection Limit presented in Revision 1.1," 40 Code of Federal Regulations (CFR) 136, 1984.

2. No samples may be analyzed until the issue has been resolved. MDL study results must be available for review during audits, data review, or as requested. Current MDL study results must be reported at the beginning of every project for review and inclusion in project files.

An MDL is developed from seven aliquots of a standard containing all analytes of interest spiked at five times the expected MDL, which are taken through the analytical method sample processing steps. The data are then evaluated and used to calculate the MDL. If the calculated MDL is less than three times below the spiked concentration, another MDL study must be performed using a lower concentration

Project Quantitation Limits

Laboratories generally establish QLs that are reported with the analytical results; these may be called reporting limits, detection limits, reporting detection limits, or other terms. These laboratory limits must be less than or equal to the project QLs. Project QLs must be lower than the proposed or existing numeric water quality objectives by the Regional Board. The laboratories must have documentation to support quantitation at the required levels.

Laboratories must report analytical results between the MDL and QL. These results must be reported as numerical values and qualified as estimates. Reporting as “trace” or “<QL” is not acceptable. Sample results less than MDLs will be reported only for GC/MS analyses if the mass spectral fingerprint can prove positive identification; these results must be qualified as estimated values by the laboratory.

Section 4.4 Laboratory Standards and Reagents

All stock standards and reagents used for extraction and standard solutions must be tracked through the laboratory. The preparation and use of all working standards must be recorded in bound laboratory notebooks that document standard tractability to U.S. EPA, A2LA or National Institute for Standards and Technology (NIST) criteria. Records must have sufficient detail to allow determination of the identity, concentration, and viability of the standards including any dilutions performed to obtain the working standard. Date of preparation, analyte or mixture, concentration, name of preparer, lot or cylinder number, and expiration date, if applicable, must be recorded on each working standard.

Section 4.5 Sample Preparation Methods

Surface water and sediments samples will be prepared in solvent or via other extraction techniques prior to sample analyses. All procedures must follow a published method. The sample preparation procedure must be documented and included in the monitoring plan for review and approval.

SECTION 5.0 QUALITY CONTROL REQUIREMENTS

The types of quality control assessments required in the monitoring program are discussed below. Detailed procedures for preparation and analysis of quality control samples must be provided in the

analytical method documents or Standard Operating Procedures (SOP) by the analytical laboratories for approval.

Section 5.1 Quality Assurance Objectives (QAOs)

Quality assurance objectives are the detailed QC specifications for precision, accuracy, representativeness, comparability, and completeness (PARC). The QAOs are then used as comparison criteria during data quality review by the group that is responsible for collecting data to determine if the minimum requirements have been met and the data may be used as planned.

Section 5.2 Development of Precision and Accuracy Objectives

Laboratory control spikes (LCSs) are used to determine the precision and accuracy objectives. The laboratory fortifies the LCSs with target compounds to monitor the laboratory precision and accuracy. Field duplicates measure sampling precision and variability for comparison of project data. Acceptable relative percent difference (RPD) is less than 25 for field duplicate analyses. If field duplicate sample results vary beyond these objectives, the results are qualified.

Section 5.3 Internal Quality Control (QC)

Internal quality control (QC) is achieved by collecting and/or analyzing a series of duplicate, blank, spike, and spike duplicate samples to ensure that analytical results are within the specified QC objectives. The QC sample results are used to quantify precision and accuracy and identify any problem or limitation in the associated sample results. The internal QC components of a sampling and analyses program will ensure that the data of known quality are produced and documented. The internal QC samples, frequency, acceptance criteria, and corrective action must meet the minimum requirements presented in the following sections.

Section 5.4 Field Quality Control

Field QC samples are used to assess the influence of sampling procedures and equipment used in sampling. They are also used to characterize matrix heterogeneity.

For basic water quality analyses, quality control samples to be prepared in the field will consist of equipment blanks, field duplicates, and matrix spikes (when applicable). The number of field duplicates and field blanks are set to achieve an overall rate of at least 5% of all analyses for a particular parameter. The external QA samples are rotated among sites and events to achieve the overall rate of 5% field duplicate samples and 5% equipment blanks (as appropriate for specific analyses).

Equipment Blanks

Equipment blanks will be collected and analyzed for all analytes of interest along with the associated environmental samples. Equipment blanks will consist of laboratory-prepared blank water (certified contaminate free) processed through the sampling equipment using the same procedures used for environmental samples.

Field Duplicates

Field duplicates will be collected at the rate of one per sampling event, and analyzed along with the associated environmental samples. Field duplicates will be collected at the same time as environmental samples or of two grab samples collected in rapid succession. If the relative percent difference (RPD) of field duplicate results is greater than 25% and the absolute difference is greater than the RL, both samples should be reanalyzed.

Matrix Spikes and Matrix Spike Duplicates

Matrix spikes and matrix spike duplicates will be analyzed at the rate of one pair per sample batch. Matrix spike samples are collected at the same time as the environmental samples and are spiked at the laboratory. Laboratory acceptance criteria should be submitted to the Regional Board staff for review and approval as part of the development and approval of the Scope of Work for monitoring.

Section 5.5 Laboratory Quality Control

For basic water quality analyses, quality control samples prepared in the contract laboratory will typically consist of method blanks, laboratory control samples, laboratory duplicates, and surrogate added to each sample (organic analysis).

Method Blanks

Method blanks will be prepared and analyzed by the contract laboratory with each batch of samples. If any analyte is detected in the blank, the blank and the associated samples must be re-extracted and re-analyzed.

Laboratory Control Samples and Surrogate

Laboratory control samples (LCS) will be analyzed at the rate of one per sample batch. Surrogate may be added to samples for organic analyses. Laboratory acceptance criteria must be submitted to Regional Board staff for review and approval as part of the development and approval of the monitoring plan.

SECTION 6.0 INSTRUMENTATION AND EQUIPMENT PREVENTIVE MAINTENANCE

Section 6.1 Sample Equipment Cleaning Procedures

Equipment used for sample collection must be cleaned according to the specific procedures documented in each sampling SOP. Sampling SOP will be prepared by the group responsible for

sampling and will be submitted to Regional Board for review and approval as part of the monitoring plan.

Section 6.2 Analytical Instrument and Equipment Testing Procedures and Corrective Actions

Testing, inspection, maintenance of analytical equipment used by the contract laboratory, and corrective actions shall be documented in the quality assurance manuals for each analyzing laboratory. Laboratory Quality Assurance Manual must be submitted to Regional Board for review and approval prior to start of sampling and analyses.

Section 6.3 Instrument Calibrations and Frequency

Section 6.3.1 Analytical Procedures and Calibration

This section briefly describes analytical methods and calibration procedures for samples that will be collected under this monitoring program.

Analytical methods that will be used in this program will need to follow the general guidance of any of the following methods:

- *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA-600/4-85 054)
- *U.S. EPA Methods for Chemical Analysis of Water and Wastes* (EPA-600/4-79-020, third edition, 1983)
- *Methods for Determination of Organic Compounds in Drinking Water* (EPA-600/4-88/039)
- *Standard Methods for the Examination of Water and Wastewater*
- *USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012*
- *USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.*
- *USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024.*

For this program, only linear calibration with either an average response factor or a linear regression is acceptable for organic analyses. Non-linear calibration is not allowed since using this calibration option

creates a potential for poor quantitation or biased concentrations of compounds at low or high concentrations (near the high and low ends of the calibration range.

Laboratories shall prepare an initial 5-point calibration curve, where the low level standard concentrations is less than or equal to the analyte quantitation limits

SECTION 7.0 DATA MANAGEMENT

Copies of field logs, a copy of COC forms, original preliminary and final lab reports, and electronic media reports must be kept for review by the Regional Board Staff. The field crew must retain original field logs. The contract laboratory shall retain original COC forms. The contract laboratory will retain copies of the preliminary and final data reports.

Concentrations of chemicals and toxicity endpoints, and all numerical biological parameters shall be calculated as described in the referenced method document for each analyte or parameter, or laboratory operating procedures. The data generated shall be converted to a standard database format maintained by the responsible party and available for the Regional Board staff review. After data entry or data transfer procedures are completed for each sample event, data should be inspected for data transcription errors, and corrected as appropriate. After the final QA checks for errors are completed, the data should be added to the final database.

Section 7.1 Data Assessment Procedures

Data must be consistently assessed and documented to determine whether project quality assurance objectives (QAOs) have been met, quantitatively assess data quality and identify potential limitations on data use. Assessment and compliance with quality control procedures will be undertaken during data collection phase of the project.

Section 7.1.1 Training and Certification

All staff performing field or laboratory procedures shall receive training to ensure that the work is conducted correctly and safely. At a minimum, all staff shall be familiar with the field guidelines and procedures and the laboratory SOP included in the project QAPP. All work shall be performed under the supervision of experienced staff, field managers, laboratory managers or other qualified individuals. A copy of the staffs' training records must be maintained in each specific project file.

Section 7.1.2 Data to be Included in Data Reports

For each sampling event, the field team or monitoring agency shall provide the Project Lead Staff with copies of the field data sheets (relevant pages of field logs) and copies of the COC forms for all samples submitted for analysis. At minimum, the following sample-specific information must be provided for each sampling program to the Regional Board staff:

- Sample Identification
- Monitoring location
- Sample type, e.g. grab or composite type (Cross-sectional, flow-proportional, etc.)
- QC sample type and frequency
- Date and time(s) of sample collection
- Requested analyses (specific parameters or method references)
- Results of samples collected and all laboratory QC samples (calibrations, blanks, surrogates, laboratory spikes, matrix spikes, reference materials, etc.) and the identification of each analytical sample batch.

Section 7.1.3 Reporting Format

All results meeting data quality objectives and results having satisfactory explanations for deviations from objectives shall be reported on the Laboratory Final Report. The final results shall include the results of all field and laboratory quality control samples.

SECTION 8.0 DATA VALIDATION AND USABILITY

Section 8.1 Laboratory Data Review, Verification, and Reporting

The laboratory quality assurance manual must be used to accept, reject or qualify the data generated by the laboratory. The laboratory management will be responsible for validating the data generated by the laboratory.

The laboratory personnel must verify that the measurement process was “in control” (i.e., all specified data quality objectives were met or acceptable deviations explained) for each batch of samples before proceeding with analysis of a subsequent batch. In addition, each laboratory will establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data.

Only data, which have met data quality objectives, or data, which have acceptable deviations explained will be submitted by the laboratory. When QA requirements have not been met, the samples will be reanalyzed when possible and only the results of the reanalysis will be submitted, provided they are acceptable.

Section 8.2 Data System Audits

The Regional Board staff may audit laboratories during conducting sample analyses for this program.

Section 8.2.1 Technical System Audit:

A technical system audit is a quantitative review of a sampling or analytical system. Qualified technical staff members perform audits. The laboratory system audit results are used to review operations and ensure that the technical and documentation procedures provide valid and defensible data.

Section 8.2.2 Performance Evaluation Audits

Performance evaluation audits quantitatively assess the data produced by a measurement system. Performing an evaluation audit involves submitting certified samples for each analytical method. The matrix standards are selected to reflect the concentration range expected for the sampling program Any problem associated with PE samples must be evaluated to determine the influence on field samples analyzed during the same time period. The laboratory must provide a written response to any PE sample result deficiencies.

Section 8.2.3 Field Technical Audits

The contractor should routinely observe field operations to ensure consistency and compliance with sampling specifications presented in this document and Quality Assurance Project Plans that will be developed later. An audit checklist should document field observations and activities.

9.0 REFERENCES

U.S. EPA 2001. Laboratory Documentation Requirements for Data Evaluation (R9QA/004.1)

U.S. EPA. 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020, third edition

U.S. EPA.1988. Methods for Determination of Organic Compounds in Drinking Water (EPA-600/4-88/039)

USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012

USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-01
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USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024.