

**IRRIGATED LANDS CONDITIONAL WAIVER PROGRAM  
QUALITY ASSURANCE PROJECT PLAN GUIDELINES**

***WORKING Draft Document***

***Preliminary Review Only***

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# IRRIGATED LANDS CONDITIONAL WAIVER PROGRAM QUALITY ASSURANCE PROJECT PLAN GUIDELINES

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# IRRIGATED LANDS CONDITIONAL WAIVER PROGRAM QUALITY ASSURANCE PROJECT PLAN GUIDELINES

## I INTRODUCTION

A Quality Assurance Project Plan (QAPP) shall be developed by the Discharger 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 (QA/QC) components that need to be described in the QAPP. The QAPP shall be submitted to the staff of the Central Valley Water Board Irrigated Lands Conditional Waiver Program (ILP) for review and approval by the Central Valley Water Board Quality Assurance Officer.

## II OBJECTIVE

The purpose this document is to identify the quality assurance (QA) and quality control (QC) components that must be described in the QAPP for the Discharger monitoring. A QAPP contains the requirements and criteria for the field and laboratory procedures used during planning and implementation of the monitoring program. The QAPP shall identify the procedures that will be used to assure that the monitoring data represents, as closely as possible the water quality conditions of the water body that is being sampled. This will be achieved by using accepted methodologies, (e.g., USEPA) for sample collection and analysis of water, sediment, and biota. The Discharger's ability to meet this objective will be assessed by evaluating the monitoring detection limits, precision, accuracy, comparability, representativeness, and completeness. A QAPP must contain adequate detail for project and Water Board staff to identify and assess the technical and quality objectives, measurement and data acquisition methods, and limitations of the data generated under the project. This document provides a description of major elements of a QAPP that are also required under the guidelines provided by the USEPA and the State Surface Water Ambient Monitoring Program (SWAMP).

Note: This document provides a compilation of EPA, SWAMP and ILP guidelines. Language has been taken and used directly from the following documents:

USEPA. 2001 (2006) EPA Requirements for Quality Assurance Project Plans (QA/R-5)  
Office of Environmental Information, Washington, D.C. EPA QA/R-5

SWAMP Quality Assurance Management Plan (SWAMP QMP version 1 dated  
12/22//2002 and Draft Version 2 dated 08/09/2006)  
<http://www.swrcb.ca.gov/swamp/qapp.html>

## III COMPONENTS OF A QAPP

The U.S. Environmental Protection Agency details the components, content, and format required for a QAPP. Following the guidelines provided by the USEPA, a QAPP must contain specific information regarding four main components:

### A. Project Management

This component addresses basic project management, including the project history and objectives, roles and responsibilities of the participants, and other aspects. These elements ensure that the project has a defined goal, that the participants understand the goal and the approach to be used, and that the planning outputs have been documented.

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## **B. Data Generation and Acquisition**

This component addresses all aspects of project design and implementation. Implementation of these elements ensure that appropriate methods for sampling, measurement and analysis, data collection or generation, data handling, and quality control (QC) activities are employed and are properly documented.

## **C. Assessment and Oversight**

This component addresses the activities for assessing the effectiveness of the implementation of the project and associated quality assurance (QA) and QC activities. The purpose of the assessment is to provide project oversight that will ensure that the QA Project Plan is implemented as prescribed.

## **D. Data Validation and Usability**

This component addresses the QA activities that occur after the data collection, laboratory analysis and data generation phase of the project is completed. Implementation of these elements ensures that the data conform to the specified criteria, thus achieving the project objectives (USEPA 2001).

These four main components are further subdivided into twenty-four (24) specific elements as required by the USEPA. The State SWAMP QAPP guidelines further define items required under each component to ensure that adequate detail is presented within the project's QAPP. The ILP has additional requirements under each component. In order to provide more information in preparing the QAPP, all required components, elements, and subsections are discussed in the ensuing sections of this document. A QAPP that is submitted for compliance with the ILP must contain all of the components, elements and requirements that are described in this document.

## **IV QAPP ELEMENTS**

This section identifies the elements that further describe the four key QAPP components required by the ILP Program.

### **A. PROJECT MANAGEMENT**

#### **A.1. TITLE AND APPROVAL SHEET** (USEPA Element 1)

The Title and Approval Sheet element provides the basic project information including the project title, QAPP version number and date, identifies key project staff, and official approval signatures. The Title and Approval Sheet must include the following components:

- A.1.1 Project title.
- A.1.2 Revision number.
- A.1.3 Organization name.
- A.1.4 Signature and date block for coalition or irrigation district lead, or individual.
- A.1.5 Signature and date block for project manager/s.
- A.1.6 Signature and date block for project QA officer/s.

#### **A.2 TABLE OF CONTENTS** (USEPA Element 2)

The Table of Contents element provides for organized index of all QAPP components and must include the following components:

- A.2.1 List of QAPP sections.
- A.2.2 List of tables and figures.
- A.2.3 List and description of appendices.

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A.2.4 List and description of attached SOPs.

A.2.5 Include SOPs revision number and date for each referenced SOP.

### A.3 DISTRIBUTION LIST (USEPA Element 3)

The Distribution List element provides for a comprehensive list of individuals and organizations that will require a copy of the approved QAPP and subsequent revisions. This element also provides for a list of those responsible for implementation of the approved QAPP as well as assessment of compliance of the terms within. The Distribution List element must include the following components:

A.3.1 List of contact staff, organization, phone numbers, email addresses.

A.3.2 List of names of individuals and organizations who will receive and retain a copy of the QAPP.

### A.4 PROJECT ORGANIZATION (USEPA Element 4)

The Project Organization element provides for a detailed breakdown of key participating individuals and organizations identifying their individual roles and responsibilities within the project. This element also provides information about the chain of authority and at what level key decisions and project assessment reviews will take place. Outside Data sources should also be included. The Project Organization element must include the following components:

A.4.1 Identification of key individuals involved in any major aspect of the project.

A.4.2 Discussion of each individual's responsibility

A.4.3 Organizational chart detailing lines of authority

A.4.4 Designation of a QA Manager

A.4.5 Identification (if applicable) the individual (s) responsible for maintaining the official, approved QAPP

A.4.6 Identification (if applicable) of any advisors to the project.

### A.5 PROBLEM DEFINITION/BACKGROUND (USEPA Element 5)

The Problem Definition/Background element provides for a statement of the Project objectives and an overview for historical background for the problem the project is addressing. Existing and applicable regulatory information should also be identified within this section. The Problem Definition/Background element must include the following components:

A.5.1 Description of the project objectives.

A.5.2 Description of the approaches to meet the objectives.

A.5.3 Identification of applicable regulatory information, applicable criteria, action limits, TMDLs, and Basin Plan objectives.

A.5.4 Description of the decisions to be made, actions to be taken, or outcomes from the information to be obtained

A.5.5 Description of the project background or historical information for initiating this project

The requirements in Sections A.5.4 and A.5.5 need to be placed in the Project's MRP Plan. However, the QAPP should identify the sections and pages where this information can be found in the specific MRP Plan.

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## A.6 PROJECT DESCRIPTION (USEPA Element 6)

The Project Description element provides for a summary of all work that is to be performed and the schedule for implementation. This element also provides for a detailed description of the geographical area where sampling is to be performed. The Project Description element must include the following components:

- A.6.1 Detailed summary of work to be performed.
- A.6.2 Detailed schedule of major project work benchmarks.
- A.6.3 Detailed geographical information.
- A.6.5 Photo reconnaissance of the monitoring sites.
- A.6.6 Discussion on resource and time constraints.

## A.7 QUALITY OBJECTIVES AND CRITERIA (USEPA Element 7)

The Quality Objectives (QOs) and Criteria element provides for the QC objectives as well as performance criteria to achieve those objectives. Objectives and criteria for meeting the objectives should be defined at the both the sampling design and analytical measurement levels (see Appendices). The following tables and definitions must be included within the QOs and Criteria element of the Project's QAPP.

- A.7.1 Data quality objectives (see Appendices of this document)
- A.7.2 Performance criteria goals
- A.7.3 Monitoring parameters table with practical quantitation limits (PQLs) and analytical methods
  - A.7.3.1 QUANTITATION LIMITS.

Laboratories must establish QLs that are reported with the analytical results; these may also be called reporting limits. These laboratory QLs must be less than or equal to the PQLs that are identified in the ILP Monitoring and Reporting Program requirements. The laboratories must have documentation to support quantitation at the required levels. Any modification in reported QLs must be identified and discussed in the laboratory data report. For example, the reported QL for a measurement will change due to sample dilution. The dilution factor, reason for dilution and other relevant information must be described in the data report.

Laboratories must also report analytical results with measurements equal to or higher than the Method Detection limit (MDL) and lower than the QL. These results must be reported as numerical values and qualified as estimated. Reporting such values as "trace" or "<QL" is not acceptable.

Each laboratory performing analyses for the ILP program must routinely conduct MDL studies to establish the maximum sensitivity (lowest concentration detectable) for each chemical constituent, and to document that the MDLs are less than the PQLs. The MDL studies must be thoroughly documented and conducted in accordance with Revision 1.1, Code of Federal Regulations (CFR), Title 40, Part 136, Appendix B (1984), "Definition and Procedure for the Determination of the Method Detection Limit." New MDL studies should be conducted whenever there is a significant change in methods, reagent type or procedures, or within two years of the date the most recent study was conducted.

An MDL is developed from seven aliquots of a standard containing all analytes of interest spiked at approximately 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 one-third the spiked concentration, the MDL study must be repeated using a lower concentration.

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Project samples may not be analyzed and reported until the MDL study has been completed according to the CFR requirements. 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.

If any analytes have MDLs that are higher than the project QLs, the following steps must be taken:

- (a) Optimize the sensitivity of the analytical system (as allowed under the appropriate method), and perform a new MDL study sufficient to establish analyte identification at concentrations less than the project-specified QLs.
- (b) If MDLs below required PQLs still cannot be achieved for the required constituents using the methods identified the MRP, the ILP staff must be contacted. If an alternate method (accredited, modified or performance based) may be used to meet the desired MDLs, a written request to use that method must be provided to the ILP. The request to use an alternate method must be approved by the Executive Officer and Quality Assurance officer prior to sample analysis.
- (c) If methods or laboratories that meet the QL requirements are not available, or cannot be feasibly accessed, a variance or exception to a specific QL may be requested in writing. Variances will only be approved on a case-by-case basis, and after consideration of the impact of the variance, and the documentation provided.

#### A.7.3.2 QUALITY CONTROL MEASUREMENTS

The collection of samples and evaluation of data shall provide data that are Representative, Comparable, Complete, Precise, and Accurate.

*(a) Representativeness:* Sampling locations should be selected that adequately represent all of the discharges from the farm/ranch, or coalition project area, and the affected water bodies. Samples must also be collected during times and at locations that are representative and that meet the objectives described in the ILP MRP. Objectives include adherence to sampling Standard Operating Procedures (SOPs), holding times, decontamination procedures, etc.

*(b) Comparability:* Data collected under the ILP must be comparable in content and quality to the statewide consistency goals outlined by the SWAMP program. An acceptable, approved MRP Plan and project QAPP, ensures comparability with other State monitoring programs and projects.

*(c) Completeness:* Data completeness is defined as a measure of the amount of valid data obtained from a measurement system as compared to the planned amount, usually expressed as a percentage. Factors that affect data completeness include sample breakage during transport or handling, insufficient sample volume, laboratory error, QC failure and equipment failure. The dischargers should strive to meet a goal of 90% data completeness per sample batch and must be calculated and reported with the completion of each monitoring report(s).

*(d) Precision and Accuracy:* The evaluation of precision and accuracy takes place at the analytical measurement level for values obtained both in the field

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and in the laboratory. These are further defined in the Appendices of this document, and the calculations to determine the precision and accuracy values are described in Section IV.B.5 of this document.

#### A.8 SPECIAL TRAINING NEEDS/CERTIFICATION (USEPA Element 8)

The Special Training Needs/Certification element provides for information regarding any training that will be required for field, laboratory, and other project staff and states the individuals or organizations who are responsible for ensuring that the training is adequate and is completed.

The Special Training Needs/Certification element must include the following components:

- A.8.1 Identification of project personnel with specialized training or certification
- A.8.2 Identification of project field personnel training
- A.8.3 Identification of QA manager and Training Officer
- A.8.4 Discussion of renewal or how new training/certifications will be provided
- A.8.5 Discussion of how training is provided
- A.8.6 Identification of how training is documented
- A.8.7 Identification of the location for staff training records

All staff performing field, laboratory, data entry, and data quality assurance 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 standard operating procedures (SOPs) included in the project QAPP. It is the responsibility of the discharger and project management to ensure that training is mandatory for all personnel, and that such training is documented through training certifications or records. The QA officer for the project is responsible for training but others may conduct training. These records must be maintained and updated for all participating field and laboratory staff.

#### A.9 DOCUMENTS AND RECORDS (USEPA Element 9)

The Documents and Records element describes the required documents and records necessary for project quality assurance, including the Project QAPP. The Documents and Records element must include the following components:

- A.9.1 Identification of reporting format as required by the MRP.
- A.9.2 List of all other project documents.
- A.9.3 Discussion of where project information will be kept and length of retention.
- A.9.4 Discussion of paper and electronic backup methods.
- A.9.5 Discussion of how documents will be updated and the responsible party for the update and distribution.
- A.9.6 Discussion of how those on the distribution list will receive the most current version of the approved QAPP.

Copies of field logs, chain-of-custody forms (Section B.3), sample integrity forms for the contract and subcontract laboratories, original preliminary and final lab reports, and electronic media reports must be kept for review by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) ILP staff. The project field crew must retain original field logs with copies submitted to ILP staff. The project contract laboratory shall retain original chain-of-custody forms and copies of the preliminary and final data reports for a period of no less than five years.

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 chain-of-custody (COC) forms for all samples submitted for analysis. At minimum, the following sample-specific information must be provided for each sampling event.:

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- (a) Site Name
- (b) Site Code
- (c) GPS coordinates taken with each sampling event
- (d) Sample type, e.g. grab or composite type (Cross-sectional, flow-proportional, etc.)
- (e) QC sample type and frequency
- (f) Date and time(s) of sample collection (first sample taken)
- (g) Results of field measurements
- (h) Sample preservation
- (i) Requested analyses (specific parameters or method references)
- (j) 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
- (k) Results of measurements for tests run prior to toxicity analyses, such as dissolved oxygen, temperature, electrical conductivity, hardness, and ammonia
- (l) A description of any unusual occurrences, noted by the field personnel, associated with the sampling event - particularly those that may affect sample or data quality.
- (m) Any anomalies regarding sample condition noted by the laboratory.
- (n) Report of any adjustments made to samples prior to running analyses, such as adjustments to dissolved oxygen, alkalinity, de-chlorination, or other.
- (o) Records of exceedance reports or exception reports when results exceed standards or do not meet QC criteria.

For data connectivity purposes all samples taken at a site for one sample event should be assigned one designated sampling time. This time designation is the time assigned to the first sample collected, and must be consistent with the time assigned in the chain of custody, field data sheet, and laboratory report forms. An example of a field data sheet form including all the items described above is included in (Appendix B, Example Form I) at the end of this document.

In the case of field parameters that are continuously monitored through a data logger (e.g. EC, flow, DO, water temperature) field logs are still required as described in items (a) through (n) of this section. The field data should be submitted in the format example provided in Appendix B, Form I.

#### **IV.B. DATA GENERATION AND ACQUISITION**

This section describes the elements that are necessary to complete the Data Generation and Acquisition component of the QAPP requirements.

##### **B.1 SAMPLING PROCESS DESIGN (USEPA Element 10)**

The Sampling Process Design element provides for discussion on the Project's data collection design in relation to the Project's objectives. This section should include a description of the monitoring approach as well as follow up methods when water quality problems are detected.

The Sampling Process Design element must include the following components:

- B.1.1 Discussion of the experimental and data collection design.
- B.1.2 Discussion of the rationale for the design
- B.1.3 Indicate the expected monitoring schedule for each monitoring location.
- B.1.4 Discussion of exceedance follow-up plan for each site
- B.1.5 Indicate the type and total number of samples, matrices, and runs/trials expected or needed for the project
- B.1.6 Indicate where samples should be taken, and how sites should be identified. A map may be included
- B.1.7 Describe the course of action should sampling sites become inaccessible
- B.1.8 Differentiate project data that is critical and data that is for informational purposes only

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- B.1.9 Identify sources of natural variability and how their influence on project data can be minimized
- B.1.10 Identify potential sources of bias or misrepresentation, and describe how their contribution can be minimized

The requirements in Sections B.1.5 through B.1.10 need to be described in the Project MRP Plan. The QAPP must identify the sections and pages where this information can be found in the specific MRP Plan.

## B.2 SAMPLE COLLECTION METHODS (USEPA Element 11)

The Sample Collection Methods element provides for information regarding how samples will be collected consistently between all locations and by all sampling staff. The methods for sample collection preparation, physical collection, handling, and transportation must include measures to avoid contamination, ensure accurate tracking, and preserve sample integrity for analysis.

This element also includes a list of applicable field and laboratory Standard Operation Procedures (SOPs) identified by number, date, and regulatory citation. The identified SOPs must be attached to the QAPP as appendixes. Sample Collection Methods element must also include the following components:

- B.2.1 Criteria for acceptable versus unacceptable water and sediment samples.
- B.2.2 Identify pre-sample (Appendix C) collection preparation methods.
- B.2.3 Identify sample collection method SOPs.
- B.2.4 Identify sample container sizes, preservation, and transportation.
- B.2.5 Discuss sampling equipment cleansing and decontamination.
- B.2.6 Discuss corrective action measures for problematic situations.
- B.2.7 Discuss, if applicable to the project, how samples are homogenized, composited, split, and/or filtered.

### B.2.5.1 FIELD PROCEDURES

Field procedures must include:

- (a) Photo reconnaissance of the monitoring sites must be submitted to Central Valley Water Board once a year along with the GPS coordinates. Any changes, in monitoring locations, during monitoring events must be photo-documented and GPS coordinates should be included as well.
- (b) Field personnel must be instructed in the proper collection of samples prior to the sampling event and in how to recognize and avoid potential sources of contamination.
- (c) Field personnel must be able to distinguish acceptable versus unacceptable water and sediment samples in accordance with pre-established criteria.
- (d) Sample containers must be pre-cleaned and certified to be free of contamination according to the USEPA specification for the appropriate methods.
- (e) All field and sampling equipment that will come in contact with field samples must be decontaminated after each use in a designated area to minimize cross-contamination. These details (proper procedures for how and when to clean the equipment) must be specified in the sampling SOP.
- (f) 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.
- (g) A field activity coordinator must be responsible for ensuring that the field sampling team adheres to proper custody and documentation procedures. A master sample

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logbook or field datasheets shall be maintained for all samples collected during each sampling event.

- (h) 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, location of the tributaries, and the actual GPS coordinates where the sample was taken must be recorded on the field sheets, along with field measurements.
- (i) All sampling events must include flow information. When possible the USGS method should be used at all wadeable and nonwadeable stream sites for accurately determining flow during each specific monitoring event. If the USGS method cannot be used then flow measurements should be taken near the stream bank of the site or the float method can be used. The approximate location and number of stream flow measurements should be documented on the data sheets. Photo documentation should also be used at these sites. Data files for flow data should contain a comment column that will allow a flag for flow measurements that have a high degree of uncertainty. Flow data with a high degree of uncertainty should not be used for pesticide (or other constituent) instantaneous loading calculations. **(Toxicity Triggers Focus Group Recommendation 6.0) (USGS survey report 99-255)**

### B.3 SAMPLE HANDLING AND CUSTODY (USEPA Element 12)

The Sample Handling and Custody element provides for a discussion of the sample integrity maintenance requirements as well as tracking and chain-of-custody procedures. The components of this element must describe the efforts that will be taken to ensure the physical and chemical integrity of a sample from collection to disposal.

Sample Handling Custody element must include the following components:

- B.3.1 Identify sample holding times, integrity, and storage measures (both before and after extraction) See Appendices for sample handling details
- B.3.2 Corrective action for samples that do not meet preservation and/or holding times.
- B.3.3 Identify the physical transport of samples from the field.
- B.3.4 Discuss sample handling and custody documentation.
- B.3.5 Identify sample Chain-of-Custody procedures.
- B.3.6 Discuss individuals responsible for verifying procedures.

#### B.3.6. FIELD CUSTODY PROCEDURES

Project field custody procedures must include the following conditions:

- (a) 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.
- (b) A chain-of-custody form must be completed after sample collection and prior to sample shipment or release. The chain-of-custody 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.
- (c) All sample shipments are accompanied with the chain-of-custody form, which identifies the contents. The original chain-of-custody form accompanies the shipment and a copy is retained in the project file.
- (d) All shipping containers must be secured with chain-of-custody seals for transportation to the laboratory. The samples must be transported in ice to maintain sample temperature between 2-4 degrees C. The samples must be sealed in zip lock bags

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and shipped to the contract laboratories according to Department of Transportation standard.

- (e) Samples that do not meet preservation and/or holding times need to be re-sampled.

#### B.3.7. CHAIN OF CUSTODY FORMS

Chain of custody forms should include the following items:

- (a) Sampler name.
- (b) Address (parcel).
- (c) Ice chest temperature at log-in.
- (d) To whom the laboratory results need to be sent.
- (e) Laboratory number.
- (f) Field number.
- (g) Lab storage.
- (h) Sample identification
- (i) Analysis required.
- (j) Number of containers (i.e. plastic, glass, vial, whirlpak)
- (k) Sample collection date and time.
- (l) Comments/special instructions.
- (m) Samples relinquished by (signature, print name, date).
- (n) Samples received by (signature, print name, date).

An example of a Chain of Custody form including all the items described above is attached in the Appendices of this document.

#### B.3.8. SAMPLE CONTROL ACTIVITIES

Sample control activities must be conducted at the laboratory as well as in the field. Project laboratory custody procedures must include the following conditions:

- (a) Initial sample login and verification of samples received with the chain-of-custody form.
- (b) Document any discrepancies noted during login on the chain-of-custody.
- (c) Initiate internal laboratory custody procedure.
- (d) Verify sample preservation (e.g., temperature).
- (e) Notify the project coordinator if any problems or discrepancies are identified.
- (f) Proper sample storage, including daily refrigerator temperature monitoring and sample security.

### B.4 ANALYTICAL METHODS AND FIELD MEASUREMENTS (USEPA Element 13)

The Analytical Methods and Field Measurements element provides for information regarding the specific methods and procedures used to extract, analyze, and/or take measurements of the samples as well as the performance criteria. Analytical Methods and Field Measurements element must include the following components:

- B.4.1 Identify methods and SOPs that will meet ILP requirements.
- B.4.2 Identify instrumentation and kits associated with field measurements and laboratory measurements.
- B.4.3 Describe sample disposal procedures (or referred to Section B.4.1).
- B.4.4 Identify method and instrument performance criteria, detection and QLs.
- B.4.5 Identify corrective action measures and documentation for test/measurement failure.
- B.4.6 Describe how instruments should store and maintain raw data. Methods or SOPs may be referenced and attached to the QAPP.
- B.4.7 Specify laboratory turnaround times needed.

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**B.4.8 Provide method validation and information for all non-standard SOPs and performance based methods (PBMs). –Refers to Lab RT Recommendation #1**

**B.4.9 Indicate where PBMs development records are stored and how they can be accessed. Refers to Lab RT Recommendation #1**

With the inclusion of the above components laboratory analyses discussed in the Project QAPP also must also identify the following:

*(a) Laboratory Corrective Actions*

Corrective action measures should also be discussed in the event of instrument failure or performance criteria exceedances. Specific activities that will take place when a failure occurs must be discussed for chemical measurements, toxicity, and microbiological analyses. Project leads must ensure that the laboratory follow the corrective action procedures stated in their QAPP. At a minimum, the approach for corrective action should state the following in the Project QAPP:

“When an out of control situation occurs, analyses or work must be stopped until the problem has been identified and resolved. The analyst responsible must document the problem and its solution and all analyses since the last in control point must be repeated or discarded. The nature and disposition of the problem must be documented in the data report that is sent to the Central Valley Water Board.”

*(b) Laboratory Calibration Curves*

Laboratory adjustments to calibration curves and also to recovery acceptance limits are method dependent. However, when these adjustments are changed during Project implementation, these changes need to be communicated to the ILP Staff in order to ensure that new limits will meet the Program requirements.

For this program, only calibration with a linear regression is acceptable for organic analyses. Non-linear calibration is not allowed due to the fact that using a non-linear 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). In order to conduct the linear regression, laboratories shall prepare an initial 5-point calibration curve, where the low level standard concentration is less than or equal to the analyte quantitation limits.

*(c) Pesticide 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 QC parameters as stated in this document.

*(d) Algae Toxicity Testing*

Algae toxicity testing shall not be preceded with treatment of the chelating agent, EDTA. The purpose of omitting this reagent is to ensure that metals used to control algae in the field are not removed from sample aliquots prior to analysis.

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**(d) Alternative Analytical methods (Lab Round Table Recommendation 1.0)**

Analytical methods should be identified by number, date, and regulatory citation. Analytical methods used for chemistry analyses must follow a procedure approved by USEPA or provided in Standard Methods for the Examination of Water and Waste Water 19<sup>th</sup> Edition. When there is a program need to analyze for contaminants that do not have USEPA or Standard Methods procedures, then United States Geological Survey (USGS), American Society of Testing Materials (ASTM), and Association of Official Analytical Chemist (AOAC) methods may be used by accredited laboratories.

In the event that the requirements of the ILP MPR provided in the referenced documents, then laboratories may still achieve compliance by submitting a performance-based evaluation of their procedure for Central Valley Water Board Executive Officer's approval. This will require a peer-reviewed published method or performance-based validation method based upon the protocol described by USEPA "Guide to Methods Flexibility and Approval of EPA Water Methods" (USEPA, 1996).

Laboratory development of a performance based method (PBM) validation package and Standard Operating Procedures (SOP) are required when analytes or quantification levels are outside the analyte list or differ by ten times the measurement levels stated in the published method. The validation package shall include all data for the "Initial Demonstration of Laboratory Capability", which includes:

1. MDL Studies (the analyst shall determine the MDL for each analyte according to the procedure in 40 Code of Federal Regulation (CFR) 136, Appendix B using the apparatus, reagents, and standards that will be used in the practice of this method).
2. Initial precision and recovery (IPR)
3. QC samples, where applicable
4. Linear calibration ranges

**(e) References for Analytical methods**

The analysis of any material required by this program shall be performed by a laboratory that has accreditation or certification pursuant to Article 3 (commencing with Section 100825) of Chapter 4 of Part 1 of Division 101 of the Health and Safety Code. General guidance of any of the following methods, although specific method modifications may be approved by the Executive Officer of the Central Valley Water Board if sufficient justification is provided. A list of references for analytical methods is provided in Section V of this document.

**B.5 QUALITY CONTROL (USEPA Element 14)**

The QC element provides information regarding the QC activities that will take place for the project. Definitions for all quality control samples described here are included in the Appendices to this document. A summary table must be provided that includes required and optional QC and the frequency. The QC summary table should address all sampling, measurement, and analysis techniques. The following must be included within the QC element of the Project QAPP:

**(a) For Chemical analyses.**

At a minimum, one "QC Set" must be included per analytical method batch per Sampling Event. The minimum required samples for chemical analyses must include:

1. Field Blank
2. Field Duplicate
3. Matrix Spike (MS) and Matrix Spike Duplicate (MSD)

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4. Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (LCSD)
5. Laboratory Blank
6. Laboratory duplicate (MS/MSD or LS/LSD pair may serve this function)

(b) For *Microbiological and Toxicity analyses*

The minimum required QC samples for microbiological tests must include:

1. Field Blank
2. Field Duplicate
3. Negative Control
4. Positive Control

The minimum required QC samples for toxicity tests must include:

1. Field Blank
2. Field Duplicate
3. Negative Control
4. Reference Toxicant

Optional QC samples that might be utilized by project management include travel blanks, equipment blanks, laboratory duplicates, equipment blank/rinsate samples, and field split samples. Definitions for all quality control samples described here are included in the Appendices to this document.

#### B.5.1.1 METHOD BLANK SPECIFICATIONS

Methods blanks, and all laboratories positive and negative controls for other media and analytes, should be conducted, when necessary (depending on the method), upon initiation of sampling.

##### **(Lab Round Table Recommendation # 3.0)**

Although laboratory blanks are important for all analyses, method blanks for low-level analyses can be conflictive. Improvements in analytical sensitivity have lowered detection limits down to the point where some amount of analyte may be detected in even the cleanest laboratory blanks. In these circumstances, the magnitude of a contaminant found in blanks should be compared to the concentrations found in the samples. **Subtracting method blank results from sample results is not permitted**, however any blank contamination should be discussed with project management, and must be reported in the monitoring reports that are submitted to the ILP staff.

When laboratories obtain detectable concentrations of a specific analyte in the method blanks as part of their laboratory quality control, they need to re-extract and re-analyze in the following circumstances:

**METALS:** If any analyte concentration in the method blank is above the PQL, the lowest concentration of that analyte in the associated samples must be 10 times the method blank concentration. Otherwise, all samples associated with that method blank with the analyte's concentration less than 10 times the method blank concentration and above the PQL must be re-digested and re-analyzed for that analyte. The sample concentration is not to be corrected for the method blank value;

**ORGANICS:** If any analyte concentration in the method blank is above the PQL, all samples associated with that method blank must be re-extracted and re-analyzed for that analyte. The exception to the above requirement is for common laboratory

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contaminants such as volatile solvents and phthalates where all samples associated with that method blank, with an analyte concentration less than 10 times the method blank concentration and above the PQL must be re-digested and re-analyzed for that analyte.

#### B.5.1.2 MATRIX SPIKE AND SPIKE DUPLICATE SPECIFICATIONS

An MS and MSD set must be prepared in the laboratory using sample water collected specifically by the project and be analyzed within the same analytical batch as the original samples. Certified Reference Materials shall be used to prepare MS. After measurement of the MS/ MSD, the Accuracy and Precision must be calculated and noted on the monitoring report and electronic record.

(a)Accuracy of MS Recovery is measured as the percent recovery and provides the accuracy of an analytical test measured against an analyte of known concentration that has been added to an actual field sample. Percent recovery for MS/MSD is calculated as follows:

$$\% \text{ Recovery} = \left( \frac{V_{MS} - V_{Ambient}}{V_{Spike}} \right) \times 100$$

Where:

$V_{MS}$  = is the measured concentration of the spiked sample.

$V_{Ambient}$  = is the measured concentration of the original (unspiked) sample.

$V_{Spike}$  = is the concentration of the spike added.

If the percent recovery for any analyte in the MS or MSD is less than the recommended warning limit, the chromatograms and raw data quantitation reports must be reviewed. Corrective action that is taken and verification of acceptable instrument response must be included in the cover letter discussion as well.

(b)Precision of the MS/MSD pair is measured as the RPD between two spiked samples and is calculated as follows:

$$RPD = \left| \frac{V_{MS} - V_{MSD}}{Mean} \right| \times 100 \%$$

Where:

$RPD$  = is the relative percent difference

$V_{Ms}$  = is the measured concentration for the matrix spike.

$V_{MSD}$  = is the measured concentration of the matrix spike duplicate.

$Mean$  = is the mean of the two concentrations, calculated as follows:

$$Mean = \left[ \frac{(V_{MS} + V_{MSD})}{2} \right]$$

The Data Quality Objective (DQO) for Precision in MS/MSDs is 25% or less. If results for any analytes do not meet this DQO, calculations and instruments must be checked, and the analyst may be required to repeat the analysis to confirm the results. If the results repeatedly fail to meet the objectives indicating inconsistent homogeneity, unusually high concentrations of analytes or poor laboratory precision, then the laboratory is obligated to halt the analysis of

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samples and identify the source of the imprecision and make corrections where appropriate before proceeding.

If an explanation for a low or high percent recovery value is not discovered, the instrument response may be checked using a calibration standard. Low or high matrix spike recoveries may be a result of matrix interferences and further instrument response checks may not be warranted. An explanation for low or high percent recovery values for MS/MSD results must be discussed in a cover letter accompanying the data package to project management and included in the monitoring report to the Central Valley Water Board.

Failure to meet the designated QOs for MS and MSD is indicative of poor laboratory performance. In this case, the laboratory is obligated to halt the analysis of the samples and to identify the source of the problem and make corrections before proceeding.

**B.5.1.3 LABORATORY CONTROL SPIKE AND SPIKE DUPLICATE SPECIFICATIONS**  
Laboratory Control Spike (LCS) & Laboratory Control Spike Duplicate (LCSD) provides information on the analytical accuracy, precision, and instrument bias. After measurements of the LCS and LCSD, the Percent Recovery (Accuracy) and Relative Percent Difference (Precision) must be calculated and noted on the report and electronic record.

(a)Accuracy as LCS Recovery is the measured as the test measured against the analyte of known concentration that had been added to laboratory purified water. Recovery for Laboratory Control Spikes is calculated as follows:

$$\% \text{ Recovery} = \left( \frac{V_{LCS}}{V_{Spike}} \right) \times 100$$

Where:

$V_{LCS}$  = is the measured concentration of the spike control sample.

$V_{LCSD}$  = is the concentration resulting from the spike amount added.

If the percent recovery for any analyte in the LCS, LCSD is outside the recommended control limit, the chromatograms and raw data quantitation reports must be reviewed. Corrective action that is taken and verification of acceptable instrument response must be included in the cover letter discussion as well.

(b)Precision of the LCS/LCSD pair is measured as the RPD between two laboratory control samples, and is calculated as follows:

$$RPD = \left| \frac{V_{LCS} - V_{LCSD}}{Mean} \right| \times 100 \%$$

Mean is the mean of the results from the two LCS samples, calculated as follows:

$$Mean = \left[ \frac{(V_{LCS} + V_{LCSD})}{2} \right]$$

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The Data Quality Objective (DQO) for Precision in LCS/LCSDs is 25% or less. If results for any analytes do not meet this DQO, calculations and instruments must be checked, and the analyst may be required to repeat the analysis to confirm the results. If the results repeatedly fail to meet the objectives indicating inconsistent homogeneity, unusually high concentrations of analytes or poor laboratory precision, then the laboratory is obligated to halt the analysis of samples and identify the source of the imprecision and make corrections where appropriate before proceeding.

If an explanation for a low or high percent recovery value is not discovered, the instrument response may be checked using a calibration standard. Low or high matrix spike recoveries may be a result of matrix interferences and further instrument response checks may not be warranted. An explanation for low or high percent recovery values for LS/LSD results must be discussed in a cover letter accompanying the data package to project management and included in the monitoring report to the Central Valley Water Board.

Failure to meet the designated QOs for LS/LSD is indicative of poor laboratory performance. In this case, the laboratory is obligated to halt the analysis of the samples and to identify the source of the problem and make corrections before proceeding.

#### B.5.1.4 TEST ACCEPTABILITY CRITERIA FOR TOXICITY TESTS (TIC)

##### Recommendation #8)

Decision Step 1: If the Control treatment meets all US EPA TAC, then proceed to statistical analyses for determination of the presence of statically significant reductions in organism survival or algal growth. For samples that exhibit toxicity, the follow-up requirements in the ILP MRP must be followed, **with respect to follow-up sampling and TIE.**

Proposed Decision Step 2a: If **the control treatment exhibits <90% survival and** an acute test of a water sample exhibits 90-100% survival, and the program completeness standard for the test is met (e.g.,  $\geq 90\%$  of testing performed successfully to meet SWAMP compatibility), no further testing is required. **The** test result should be “flagged” to denote **<90% survival in the Control treatment.** If an acute test of a water sample exhibits 90-100% survival, and the program completeness standard for the test is not met, then a re-test must be initiated within 24 hours of the observation of a Control treatment with **<90% survival.** In this case, both the original test results and the re-test results must be reported by the Coalition; the re-test results should be flagged to note that the re-test was initiated outside of the holding time limit. New samples must be collected if the re-test does not meet US EPA TAC.

Proposed Decision Step 2b: If **a control test does not meet the US EPA TAC and** an algal test of a water sample exhibits an algal cell density that is greater than the algal cell density at the Control treatment, ~~and the Control test does not meet the US EPA TAC,~~ it is proposed that instead of the one-tailed statistical tests (which ask only if the test response for a sample is “less” than the Control), a 2-tailed statistical test **will** be performed. If the results of that test indicate that the algal growth in the water sample is significantly greater than the Control treatment, and the program completeness standard for the test is met, then the sample should be determined to be not toxic; test result should be “flagged” to denote **<200,000 cells/ml or CV>20% survival in the Control treatment.** If the program completeness standard for the test is not met, then a re-test must be initiated within 24 hours of the termination of the initial algal test. In this case, both the original test results and the re-test results must be reported by the Coalition; the

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re-test results should be flagged to note that the re-test was initiated outside of the holding time limit. New samples must be collected if the re-test does not meet US EPA TAC.

Proposed Decision Step 3: If a Control treatment does not meet US EPA TAC, and the associated ambient water sample(s) have <90% survival (for an acute toxicity test) or the algal growth is less than the Control, ~~and the sample is not toxic, then Best Professional Judgment must be used to evaluate the data.~~ it is expected that the Regional Board will be notified within 1 business day of the observation of the results in question so that an agreement can be reached regarding how to proceed. **At a minimum, re-testing will be required within 24 hours of the observed test failure. If re-testing does not begin within 24 hours, then re-sampling must be conducted within 48 hours of the observed test failure.** ~~Some actions may include no further testing, retesting, or re-sampling.~~

The reporting of data that do not meet US EPA TAC must also include an assessment from the laboratory as to what may have caused the test control performance issue, what the laboratory is doing to prevent this from happening again in the future, a comparison of the data against the EPA test performance measures, and a comparison of the data against the ILP required completeness criteria in the Coalition's QAPP."

#### **B.5.1.5 FIELD DUPLICATE SPECIFICATIONS** (Lab Round Table Recommendation 2.2)

A field duplicate or field split sample will be collected at the rate of 5% for each analysis (or one set per sampling event, whichever is more frequent). The evaluation of field precision must be addressed in the project QAPP. QAPP acceptance criteria for laboratory precision shall be based only on laboratory-based duplicate samples such as duplicate matrix spikes, blank spikes, laboratory control materials, or certified reference materials. For bacterial analyses, no assessment of field precision is required but laboratories are required to meet methodological precision requirements. Field duplicates with failed results (RPD >25%) do not require re-sampling. However, this data should be flagged and field teams should be notified so that the source of error can be identified and corrective actions taken before the next sampling event.

#### **B.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE** (USEPA Element 15)

The Instrument/Equipment Testing, Inspection and Maintenance element provides for information regarding how personnel can assure that equipment will function properly when needed as well as the methods for recording equipment failure to track problematic units. The Instrument/Equipment Testing, Inspection and Maintenance element must include the following components:

- B.6.1 Identify field and laboratory equipment that require periodic maintenance and the schedule.
- B.6.2 Identify equipment testing criteria and procedures.
- B.6.3 Identify the individual(s) responsible for instrument/equipment testing, inspection, and maintenance.
- B.6.4 Note the availability and location of spare parts.
- B.6.5 Identify pre-use equipment inspection procedures.
- B.6.6 Identify corrective action measures and documentation for equipment failure.

#### **B.7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY** (USEPA Element 16)

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The Instrument/Equipment Calibration and Frequency element provides for information regarding how continual quality performance of equipment and instruments will be ensured. The Instrument/Equipment Calibration and Frequency element must include the following components:

- B.7.1 Identify field and laboratory equipment that require calibration.
- B.7.2 Identify the calibration procedure and schedule.
- B.7.3 Identify calibration documentation methods.
- B.7.3 Identify corrective action measures and documentation for equipment deficiencies.

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, if more frequent than once per day and in case of instrument failure. The calibration should be recorded within a field calibration log or directly on the corresponding field sheet.

#### B.8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES (USEPA Element 17)

The Inspection/Acceptance of Supplies and Consumables element provides for information regarding how supplies and consumables (e.g., standard materials and solutions, sample bottles, calibration gases, reagents, hoses, DI water, potable water, electronic data storage media) shall be inspected and accepted for use in the project if applicable. 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 standards traceable 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. The Inspection/Acceptance of Supplies and Consumables element must include the following components:

- B.8.1 Identify critical supplies and consumables for the field and laboratory.
- B.8.2 Identify the source, acceptance criteria, and procedures for the tracking, storing, and retrieving of the above materials.
- B.8.3 Identify the individual responsible for these tasks.

#### B.9 NON-DIRECT MEASUREMENTS (USEPA Element 18)

The Non-Direct Measurements element provides for an identification and discussion of the types of data needed for project implementation or decision making that are obtained from non-measurement sources such as computer data bases, programs, literature files, and historical data bases. The Non-Direct Measurements element must include the following components:

- B.9.1 Identify non-direct sources of data that will be used within the project.
- B.9.2 Discuss the intended use of this information.
- B.9.3 Identify the acceptance criteria for the data used.

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B.9.4 Identify any required resources and support facilities (e.g. Data Logger, Controllers).

B.9.5 Describe the process by which the project determines limits to validity and operating conditions.

#### B.10 DATA MANAGEMENT (USEPA Element 19)

The Data Management element provides for a detailed discussing of data management process, tracing the path of the data from their generation to their final use and storage.

Data generated shall be converted to a SWAMP comparable format and maintained by the responsible party and available for electronic data submission to the Central Valley Water Board staff. With the inclusion of the above requirement the Data Management element must include the following components:

B.10.1 Identify the data management scheme from field to final use and storage for all data types.

B.10.2 Identify standard record keeping and tracking practices and the corresponding SOPs where applicable.

B.10.3 Discuss how field data and laboratory data will be entered or uploaded into the required data submission format

B.10.4 Discuss the control mechanism for detecting and correcting errors and for preventing loss of data during data reduction, data reporting, and data entry to forms, reports, and/or database.

B.10.5 Identify the individual/s responsible for data management.

B.10.6 Verify that continuous monitoring data will be stored in its original Sonde file.

B.10.7 Include any checklists or forms used in data management.

Procedures for data reduction with respect to significant figures must incorporate the following conventions:

A digit is significant if it is required to express the numerical value of a measurement. The number of significant digits in a measurement must be restricted by the least accurate of its input measurements. These input measurements include all of those associated with sample processing, including aliquots measured during sampling, preparation and laboratory analysis.

Results of mathematical calculations shall have the same number of significant figures as the calculation's least precise input value. Results of addition and subtraction of measurements shall reflect the decimal position of the calculation's least precise input value. The number of significant figures can vary during these calculations. The final digit in an expressed measurement inherently possesses an uncertainty. This is especially relevant in the discussion of MDLs and reporting limits (RLs). In these instances, the number of reported significant digits must realistically reflect the laboratory's analytical precision.

When the result of a calculation contains too many significant digits, it must be rounded. If a result's trailing digit is less than five, the last significant digit is not changed. If this trailing digit is equal to or greater than five, the last significant digit is rounded up.

#### **IV.C. ASSESSMENT AND OVERSIGHT**

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### C.1 ASSESSMENT AND RESPONSE ACTIONS (USEPA Element 20)

The Assessments and Response Actions element provides information regarding how a project's activities will be assessed during the project to ensure that the QAPP is being implemented as approved. The Assessments and Response Actions element must include the following:

- C.1.1 The number, frequency, and type of project assessment activities that will be conducted.
- C.1.2 The individual/s responsible for conducting assessments and indicate their authority to stop work as necessary
- C.1.3 How and to whom assessment information should be reported
- C.1.4 Corrective action measures and documentation for assessment conclusions.

For existing data use projects, data may be assessed to determine suitability for their intended use and to identify whether project specifications were met. Field operation audits, laboratory performance evaluations, and technical system audits should also be included in a project's assessment element. The Central Valley Water Board staff may also audit laboratories during conducting sample analyses for this program.

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

Performance evaluation (PE) 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.

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.

### C.2 REPORTS TO MANAGEMENT (USEPA Element 21)

The Reports to Management element provides for information regarding how management will be kept informed of project oversight, assessment, activities, scheduling, and findings. The Reports to Management element must include the following components:

- C.2.1 Identify which project QA status reports will be needed and frequency.
- C.2.2 Identify individual/s responsible for composing the reports and the individual/s who will receive and respond to the reports.

The element will identify those responsible for writing reports, when, and how often these reports will be written, and identify who will be notified of audit findings. The element will also include the actions project management will take in response to the reports.

## **IV.D. DATA VALIDATION AND USABILITY**

### D.1 DATA REVIEW, VERIFICATION AND VALIDATION (USEPA Element 22)

The Data Review, Verification and Validation element provides the criteria used to review and validate data. These steps help ensure that the data satisfies the quality criteria detailed and

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required by the ILP. The Data Review, Verification and Validation element must include the following:

D.1.1 CRITERIA USED TO VALIDATE THE PROJECT DATA (refer to element A.7.) Data must be consistently assessed and documented to determine whether project QOs have been met, quantitatively assess data quality, and identify potential limitations on data use. Assessment and compliance with QC procedures should be under taken throughout the project to ensure the accuracy of sample collection, laboratory analysis, exceedance communications, and the submitted monitoring reports. Data communicated to Central Valley Water Board staff will be considered draft until the receipt of the monitoring report, which will include copies of signed laboratory data sheets.

The Project QAPP must be used to accept, reject or qualify the data generated by the laboratory. The Project Manager shall convey the QA/QC acceptance criteria to the laboratory management. 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 QO's, or which have deviations that are thoroughly evaluated and described, will be submitted by the laboratory as final results. 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. The Project Manager will be responsible for determining if the validated laboratory data meets the project acceptance criteria.

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. Quality assurance checks shall be performed at a project level prior to submission within monitoring reports and electronic data submittals.

## D.2 VERIFICATION AND VALIDATION METHODS (USEPA Element 23)

The Verification and Validation Methods element provides for the identification of methods or processes for verifying and then validating project information. The Verification and Validation Methods element must include the following components:

D.2.1 Identify the methods and processes used to verify and validate project data.

D.2.2 Identify the individual(s) responsible for verification and validation of each type of data (e.g., Field Logs, Chain-of-Custodies, Calibration Information, Completeness).

D.2.3 Identify documentation and or corrective action for discrepancies.

D.2.4 Attach any checklists, forms, and calculations that will be used.

The methods to be used or processes to be followed can be identified as SOPs, if available, or described in the text.

## D.3 RECONCILIATION WITH USER REQUIREMENTS (USEPA Element 24)

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The Reconciliation with User Requirements element provides for a discussion on how validated data will be evaluated to see if it answers the original questions asked within the monitoring objectives. The Reconciliation with User Requirements element must include the following components:

- D.3.1 Discuss the procedures to evaluate the uncertainty of the validated data.
- D.3.2 Discuss how limitations on data use should be reported to data users.

This element outlines the proposed methods to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection. The element will also describe how reconciliation with user requirements will be documented, issues will be resolved, and how limitations on the use of the data will be reported to decision makers.

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