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Approved:
Beverly H. van Buuren, SWAMP QA Officer

Date:
March 03, 2005

SURFACE WATER AMBIENT MONITORING PROGRAM (SWAMP) QA PROGRAM ON-SITE SYSTEMS ASSESSMENT FOR CONTRACT LABORATORIES

1.0 PURPOSE

This standard operating procedure (SOP) describes the process used by the Surface Water Ambient Monitoring Program (SWAMP) QA Team to perform on-site systems assessments (i.e., audits) of contract laboratories in the SWAMP program. The purpose of an audit is to evaluate laboratory practices, procedures, personnel, and facilities against requirements of the SWAMP Quality Assurance Management Plan (QAMP) (Dec. 2002) and good laboratory practices.

2.0 RESPONSIBILITIES

The Interim QA Officer is responsible for ensuring that this procedure is implemented for Work Plans for each fiscal year, for the State Water Quality Control Board (SWQCB) agencies under the Master Contract.

SWAMP QA Team personnel are responsible for auditing SWAMP contract laboratories.

3.0 PROCEDURE

An audit schedule will be drafted on an annual basis in July. At the discretion of the Interim QA Officer and the SWAMP Coordinator, some laboratories will receive a desktop audit in lieu of an on-site audit. In addition, at the discretion of the Interim QA Officer and the SWAMP Coordinator, all laboratories may not be audited annually.

The following sections discuss the audit process for contract laboratories participating in the SWAMP program.

3.1 INITIAL CONTACT WITH LABORATORY

The Lead Auditor or a designee will call the Contract Laboratory (laboratory) to be audited, six weeks prior to the audit, to speak with the QA Officer and any relevant Project Managers, to give advance notice, and to inform the laboratory of the delivery of a pre-audit packet.

3.2 PRE-AUDIT PACKET

A pre-audit packet will be mailed Certified US Post to the laboratory four weeks before the on-site audit. The laboratory is required to respond to this packet and forward any requested information within two weeks of receipt of the pre-audit packet.

The pre-audit packet should contain the following items:

- A cover letter documenting the specific dates that the on-site audit will be performed and lists the contents of the packet.
- A desk-top audit request list.
- An audit agenda (Attachment 1).
- A copy of the audit checklist (Attachment 2).

3.3 DESK-TOP AUDIT

The desktop audit is an audit of laboratory documents and materials. The documents required for the desktop audit are requested in the pre-audit packet and should be sent by the laboratory two weeks prior to the on-site visit.

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A desk-top audit may include review of:

- The laboratory's Quality Assurance Plan/Program (QAP)
- Personnel/Position Organization Chart
- A sampling of SOP's relevant to the project
- Documentation of annual MDL studies
- 3 project-specific data reports including raw data
- Control charts of project-specific QC samples
- 2 audit reports and responses from most recent project specific or state audits

The desktop audit will be performed at least three days prior to the on-site audit.

3.4 ON-SITE AUDIT

The on-site audit will follow an audit agenda and will include an opening meeting, a review of the laboratory processes, review of documentation, and a closing meeting. The on-site audit involves an assessment of the laboratory's practices, procedures, personnel, and facilities in comparison to the requirements of the SWAMP QAMP and general laboratory practices. The auditor will record all notes from the audit in a bound logbook containing the audit checklist (Attachment 2). The audit is not limited to items on the checklist.

The SWAMP Coordinator, the Regional Board that contracts the laboratory or the Contract Laboratory may submit a written request to the Interim QA Officer regarding the on-site audit. Examples of requests are: the laboratory would like to spend time discussing a specific element of the program, the Regional Board is concerned about a specific report or data batch, etc. The Interim QA Officer will assess each request and its usefulness in the audit process. It is essential that the audits remain fair and objective. It is the responsibility of the Interim QA Officer to ensure the audit procedure is completely objective.

The opening meeting should consist of introductions, a discussion of the agenda and audit checklist, and questions. The audit will involve the audit team following a sample set through the entire laboratory process from receipt to reporting and a review of all accompanying documentation such as training records, equipment records, and QA/QC records. The closing meeting is a presentation of the findings and/or observations from the audit and the desk-top audit. Observations are considered to be a single non-compliant event while a finding is considered to be multiple observations within a system or a failure of a system.

3.5 AUDIT REPORT

The Lead Auditor will summarize the audit team's notes and complete an audit report within ten days of the on-site visit. This report will follow the checklist format. The audit report will incorporate the details of the findings and/or observations, supporting evidence for each, and references to SWAMP QAMP or other requirements as applicable. It is acceptable for the audit report to include recommendations for corrective actions and/or due dates for completion of corrective action.

The report will be sent with a cover letter requesting a laboratory response within 14 days of receipt.

3.6 AUDIT RESPONSE

The laboratory is required to prepare a written audit response due to the Lead Auditor within 14 days of receipt of the audit report. An audit response should include detailed plans for corrective actions and due dates for completion of the corrective actions. Corrective actions must be well documented and should include a plan for follow-up to ensure the effectiveness of that action.

The audit response will be reviewed by the Lead Auditor and the Interim QA Officer within five days of receipt. If the response is satisfactory the Lead Auditor will send a letter of acceptance of the response. If the response is not satisfactory the Lead Auditor or the Interim QA Officer will contact the laboratory to work towards an acceptable response.

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The letter of acceptance will also include a statement to inform the laboratory of the time period before the next audit.

4.0 SUMMARY OF AUDIT REPORTS

All individual audit reports and responses will be compiled and formatted into an annual audit report that includes suggestions for further development of the audit program. This report will be submitted to the Interim QA Officer, the QA Coordinator, and the SWAMP program coordinator for review. The information from this report will also be presented annually at a SWAMP Round Table meeting.

Individual audit reports remain confidential and are only available to the QA Team, the SWAMP Coordinator, the Regional Board that has contracted the laboratory, and the Contract Laboratory.

5.0 REFERENCES

Environmental Protection Agency (EPA), Guidance on Technical Audits and Related Assessments for Environmental Data Operations EPA QA/G-7, EPA/600/R-99/080, January 2000.

International Organization for Standardization (ISO), Guidelines for Auditing Quality Systems, ISO 10011-1-3:1990 (E).

National Environmental Laboratory Accreditation Conference (NELAC), Chapter 5-Quality System Standard, revision 16, October 2002.

Surface Water Ambient Monitoring Program (SWAMP), Quality Assurance Management Plan (QAMP), 1st revision, December 2002.

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ATTACHMENT 1

Example of an Audit Agenda

Title
Laboratory Name
Date of Audit
Required Attendees
Name of Audit Team

Schedule:

9:00-9:30- Opening Meeting: Introductions, Discuss Agenda and Checklist
10:00-12:00 Follow a sample from receipt to final report
12:00-1:00 Lunch Break
1:00-3:00 Continue with following sample
3:00-4:30 Review Laboratory Documentation
4:30-5:00 Closing Meeting: Lead Auditor presents findings/observations.

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ATTACHMENT 2

Audit Checklist for SWAMP Contract Laboratories

Date:

Lead Auditor:

Audit Team:

Laboratory Information

Organization:

Lab Manager:

Address:

Phone:

Email:

Lab QA Officer:

Phone:

Email:

Sub-contract Laboratory Information

Organization:

Lab Manager:

Address:

Phone:

Email:

Lab QA Officer:

Phone:

Email:

Page references in parenthesis refer to the SWAMP QAMP (version 1).

A. General Information	Yes	No	N/A	Comments
Name of person interviewed:				
1. Is a written ethics policy available?				
2. Is a written and approved QAP available?				
3. Is the QAP updated on a regular basis?				
4. Are SOPs listed and accurately referenced in the QAP?				
5. If deviations from the QAP occur, are they documented?				
6. Is a signed SWAMP compliant QAPP available?				
7. Are sub-contractors aware of SWAMP quality assurance requirements and do they follow them?				

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B. Organization and Personnel	Yes	No	N/A	Comments
Name of person interviewed:				
1. Is the organization and management structure of the lab defined and documented including clear descriptions of the lines of responsibility?				
2. Is an updated organization chart delineating lines of responsibility available?				
3. Is a QA Officer or quality manager appointed?				
4. Does the QA Officer have documented training?				
5. Is the QA Officer position independent of any other job titles or positions within the laboratory?				
6. Does the QA Officer abstain from performing any bench top prep or analyses?				
7. Does the QA Officer maintain independence from the lab manager?				
8. Is the independence of the QA Officer/Manager from the tasks they oversee clearly documented?				
9. Is the laboratory adequately staffed?				

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C. GLP/Training	Yes	No	N/A	Comments
Name of person interviewed:				
1. Does the staff have necessary references (SWAMP QMP, laboratory QAP, laboratory policies, SOPs, instrument manuals, etc.) for all analytical procedures?				
2. Are the QAP, policies, and SOPs identified with a title, date of issue, and revision number?				
3. Are all QC protocols the in SWAMP QAMP and laboratory QAP followed?				
4. Have SOPs been written and approved for all elements performed by the laboratory?				

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C. GLP/Training (continued)	Yes	No	N/A	Comments
5. Is there a program for annual review and updating of SOPs?				
6. Are changes to SOPs documented with revision numbers and the dates that the changes become effective?				
7. Do SOPs include a corrective action section for departure from policy or out of control QC?				
8. If Performance-Based Measurement Systems are used are they fully documented and validated?				
9. Is there a documented training program including training evaluation and documentation?				
10. Are SOPs and method procedures read and followed by laboratory staff and is this process documented?				
11. Have personnel been adequately trained to perform each analysis and is that training documented? (pg 46)				
12. Is training of staff on a new procedure supervised until demonstration of initial capability is completed?				
13. Are staff training files reviewed and updated annually?				
14. Is demonstration of capability documented for all analyses in an appropriate matrix for each analyst (e.g. blind PE samples)?				
15. Is demonstration of capability performed each time there is a change in the method or instrumentation?				
16. Does the laboratory maintain control charts for appropriate quality control and monitoring samples?				
17. Does the lab participate in Performance Evaluation Studies, intercomparisons, or round robin studies and is that data readily available for review?				
18. Are internal audits conducted on equipment, personnel, procedures, and data review? (pg 99,129)				
19. Are deficiencies found during internal audits documented and remedied prior to continued operations? (pg 99,129)				

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C. GLP/Training (continued)	Yes	No	N/A	Comments
20. Does the laboratory have a corrective action policy that includes established procedures for documentation and follow-up on corrective actions?				
21. Does the lab have policies and procedures in place to insure the protection of its electronic data storage and of client's confidential information?				
22. Does the lab have policies and procedures in place to insure the protection of its hard copy data storage and of client's confidential information?				
23. Are all logbooks bound and include titles, page numbers, and revision numbers?				
24. Are logbooks regularly reviewed by the QA officer for compliance with policies?				
25. Is there a record management system for control of logbooks and lab notebooks?				

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D. Facilities	Yes	No	N/A	Comments
Name of Person Interviewed:				
1. Is the laboratory located in a secure facility?				
2. If the building is not secure, are samples and client information stored in a secure manner?				
3. Is the lab maintained in a clean and orderly manner with adequate space to store, prepare, and process samples?				
4. Is the laboratory temperature and humidity controlled?				
5. Is the air in the laboratory monitored for possible contamination and/or interferences on a regular basis?				

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D. Facilities (continued)	Yes	No	N/A	Comments
6. Does the laboratory have an appropriate water source and purification system?				
7. Are ultra-clean facilities available when appropriate (i.e. metal surfaces free of rust, biological sterility, dust)?				
8. Is equipment such as ovens, fridges, freezers, hot plates, water baths etc. checked on a regular basis with NIST traceable references and is that process documented in an assigned logbook?				
9. Are balances calibrated using weights traceable to NIST weights each working day and are this documented in a logbook?				
10. Are balances located on vibration-free bench tops?				
11. Are all pipettes individually identified and calibrated on a regular basis (at least quarterly) and is this process documented?				
12. If equipment is calibrated by an outside source are calibration certificates available?				

Notes:

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E. Sample Handling, Custody, and Preparation	Yes	No	N/A	Comments
Name of Person Interviewed:				
1. Does the lab have documented procedures for sample transportation, receipt, handling, storage, and disposal as well as a method for documenting all of those procedures?				
2. Was chain of custody started in the field? (pg 98). If so, has that chain of custody been maintained and returned to client with the report?				

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E. Sample Handling, Custody, and Preparation (continued)	Yes	No	N/A	Comments
Name of Person Interviewed:				
3. Does the sample custodian record the time/date of receipt, shipper and tracking information, sample or temperature blank temperature, client information, name and signature of sample custodian, and any notes of discrepancies about the samples upon receipt?				
4. Is all of the sample receipt information logged into a sample book?				
5. Does the sample custodian check for correct documentation, container type, and holding times?				
6. Is there a sample identification system that provides unique sample ID's to each sample?				
7. Are sample IDs retained through out the life of the sample in the lab?				
8. Does the sample system design ensure that samples cannot be confused?				
9. Are all procedures to which a sample is subjected to, documented including the date, time, and initials of the person performing the procedure?				
10. Does the sample system include a documentation procedure and labeling protocol for sample splits?				
11. After receipt are samples preserved and stored according to the SWAMP QMP and/or method?				
12. Is all preservation recorded in a logbook including date of preserved, preservation method, and initials?				
13. Is preservation and sample prep (digestion/extraction) performed within holding time requirements listed in the SWAMP QAMP in addition to the method?				
14. Are all samples prepared according to SWAMP and method specific requirements?				
15. Were all samples digested/extracted within the holding times listed in the SWAMP QAMP in addition to the method?				

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E. Sample Handling, Custody, and Preparation (continued)	Yes	No	N/A	Comments
16. Is sample prep documented in a logbook including sample ID, volume or weight, final dilution, reagents, and calculations?				
17. Is the history of the sample readily understood through this documentation?				
18. Is sample storage information properly documented?				
19. Are copies of completed chain of custodies archived?				
20. Are disposal records maintained and available?				
21. Are MDL studies performed annually for each sample preparation/analytical method?				
22. Is all labware to come in contact with the sample cleaned according to method protocols and/or tested to be low for the analyte(s) of interest and interferences? Is this testing documented?				
23. Is there a logbook documenting receipt of reagents including chemical name, vendor name, lot number, and date of receipt?				
24. Are all reagents to be used for sample preparation tested to be low for the analyte(s) of interest and interferences and is this testing documented?				
25. Is there a logbook for prepared reagents containing information such as date prepared, expiration date of the reagent, lot numbers, and initials of person preparing the reagent?				
26. Are all reagent and standard containers labeled with name, vendor name, date received or prepared, expiration date, and initials?				
27. Are certified reference materials entered into a logbook, labeled with receipt and open dates, and stored properly?				

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F. Instrument Performance	Yes	No	N/A	Comments
Name of Person Interviewed:				
1. Is instrumentation maintained according to SOP specifications and equipment manufacturer recommendations?				
2. Is all maintenance recorded into a separate equipment maintenance logbook for each instrument including repair?				
3. Is there a preventative maintenance plan for each instrument?				
4. Are instruments under a service contract?				
5. Is there back-up power for instruments or back-up instruments available?				
6. Is there a list of all equipment including brand name, model number, and serial number included in the QAP?				

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G. Analytical	Yes	No	N/A	Comments
Name of Person Interviewed:				
1. Are all datasets uniquely identified and page numbered?				
2. Do analytical records include lab sample ID, date and time of analysis, instrument identification, and calculations?				
3. Is there an instrument logbook that records daily instrument settings, tuning, and calibration? (pg 113)				
4. Are all standards and CRM's traceable to NIST standards?				
5. Are all prepared standards tested prior to use and is this data available?				

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G. Analytical (cont.)	Yes	No	N/A	Comments
Name of Person Interviewed:				
6. Is there a standard/surrogate logbook in use that includes stock standard id, dilution created, name/initials of preparer, date prepared, and date expired?				
7. Were all samples analyzed within the holding times listed in the SWAMP QAMP in addition to the method?				
8. If samples are prepped/analyzed after the holding time has passed, is the data flagged accordingly?				
9. Is calibration prepared with at least three standards including one at the reporting limit?				
10. Is the linearity and slope of the calibration within acceptable range?				
11. Are all calibrations confirmed with a second source standard such as a certified reference material?				
12. If calibration is not within specifications were corrective actions documented?				
13. Are the calibrations for each instrument in a logbook containing calibration data, maintenance, and troubleshooting?				
14. Are background concentration established by running blanks?				
15. Are blanks run at the appropriate frequency?				
16. Are check standards (e.g. mid-point calibrator) measured at the correct frequency and at the beginning and end of the analytical run?				
17. Are check standard recoveries in an acceptable range?				
18. Does the laboratory make a diligent effort to matrix/concentration match certified reference materials to field samples?				
19. Are certified reference materials processed with the sample batch through all steps of the analysis including the sample prep?				

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G. Analytical (cont.)	Yes	No	N/A	Comments
20. Are samples diluted prior to analysis, if so is the dilution documented and carried through calculations?				
21. Are samples above the range of the calibration re-run at an appropriate dilution?				
22. Is carry-over monitored through out the analytical run?				
23. Are precision measurements (e.g. matrix duplicates, matrix spike duplicates) performed at the proper frequency and are they within acceptable range?				
24. Are accuracy measurements (e.g. CRMs, matrix spike/matrix spike duplicate) recoveries at the proper frequency and are they within an acceptable range?				
25. Is the spiking level for the matrix spikes at an appropriate level?				
26. Are samples corrected for blanks, interference (e.g. ICP-MS), surrogate recoveries, or instrument drift as appropriate?				
27. If applicable, are recoveries of internal standards within an acceptable range?				
28. If applicable, are surrogate recoveries within an acceptable range?				
29. Are clean-up solvents run at the appropriate intervals?				
30. For biological samples is there a record of raw data, collection method, and calculations?				
31. Are MDL studies performed annually and each time the instrument or method is modified for each analysis and are these studies documented?				
32. Are tests for contamination, instrument detection limits, and range performed with the initial instrument calibration and documented?				

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H. Data Handling and Reduction	Yes	No	N/A	Comments
Name of Person Interviewed:				
1. Are all records traceable and retrievable?				
2. Are raw data such as chromatograms and peaks available?				
3. Is there an established SOP to ensure that calculations and data transfers are performed correctly?				
4. Is there a procedure to record corrections appropriately?				
5. Is there a program for second-party peer data review and validation?				
6. Is there a way to prevent changes to the data after validation?				
7. In the event of a measurement failure that could be corrected by the lab technician was the failure corrected and recorded in the laboratory record? (pg 99)				
8. In the event of a measurement failure that could not be corrected by the lab technician, was it forwarded to the supervisor to determine if the data is reportable and was the problem included in the report, qualified correctly as outlined in the SWAMP IM Plan, and sent to the SWAMP manager? (pg 98)				
9. Are appropriate QA codes applied to the data and are applicable comments included?				
10. Are sample results that are between the MDL and the RL appropriately flagged?				
11. Were there any unsolvable failures in the data report submitted to the RWQCB's and the MLML Data Management Team? (pgs 99,130)				
12. Is data reported using formats and lookup list that are current (presumably less than 6 months old)?				
13. If applicable, was draft data submitted electronically to the RWQCB? (pg 49)				
14. Once data was finalized, was it submitted electronically in the required format to the SWAMP Logistics Coordinator (if under Master contract) or the RWQCB staff (if not through Master Contract)? (pg 49)				
15. Is there a secure archive of original data?				
16. Is there a system for electronic back-up of the data?				
17. Is there a document control procedure for logbooks?				
18. Are records protected against fire, damage, or loss?				

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Additional Notes:

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Appendix A: Conventional Constituents in Water

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation of the calibration curve based on linear regression and is the $r > 0.995$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard or Continuing Calibration Verification analyzed after the initial calibration and at a frequency of every 20 samples with a recovery within 85-115%?				
5. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
6. Is the percent recovery for the reference material 80-120% or within a measured value $< 95\%$ confidence intervals?				
7. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
8. Is the level of the target analyte in the laboratory blank $< \text{MDL}$?				
9. Is a reagent blank prepared prior to use if a new batch of reagent and if the method blank exceeds the control limits?				
10. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL and analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
11. Is the percent recovery for the matrix spike and matrix spike replicate within 80-120% and is the RPD between them $< 25\%$?				
12. Is a laboratory duplicate analyzed at a frequency of one per every 20 samples or per batch which ever is more frequent?				
13. Is the RPD for the laboratory duplicates $< 25\%$?				
14. Are corrective actions documented and followed through?				

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Appendix A: Conventional Constituents in Water

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
15. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
16. Is initial demonstration of laboratory capability through performance of a SWAMP program performance evaluation sample documented?				
17. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

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B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Are samples to be analyzed for Alkalinity, Chloride, Sulfate, Fluoride, Ortho-phosphate, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Total Dissolved Solids, Ammonia, and Total Phosphorus collected in polyethylene bottles and stored at 4 °C and in the dark?				
2. Were samples preserved according to SWAMP and method specifications?				
3. Were samples to be analyzed for Ortho-phosphate, Nitrate, Nitrite, and Ammonia (not acidified) analyzed within 48 hours of collection?				
4. Were samples to be analyzed for Total Dissolved Solids analyzed within 7 days of collection?				
5. Were samples to be analyzed for Total Kjeldahl Nitrogen analyzed within 7-28 days of collection?				
6. Were samples to be analyzed for Alkalinity analyzed within 14 days of collection?				
7. Were samples to be analyzed for Chloride, Sulfate, Fluoride, Total Phosphorus, and Ammonia (only if acidified) analyzed within 28 days of collection?				
8. Were samples to be analyzed for Total and Dissolved Organic Carbon collected in glass vials, stored at 4 °C and in the dark, and analyzed within 28 days of collection?				

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B. Sample Handling and Custody Requirements (continued.)	Yes	No	N/A	Comments
9. Were samples to be analyzed for Total Suspended Solids and Suspended Sediment Concentration collected in amber glass jars, stored at 4 °C and in the dark, and analyzed within 7 days of collection?				
10. Were samples to be analyzed for Chlorophyll a collected in amber glass jars, stored at 4 °C and in the dark, and analyzed within 7 days of collection?				
11. Were samples to be analyzed for Pheophytin a collected in amber polyethylene bottles, stored at 4 °C and in the dark, filtered within 48 hours, and analyzed within 30 days of collection (if filters are stored frozen)?				

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C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for Conventional analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix B: Volatile Organic Analytes in Water

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 5 or more standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the %RSD for CCCs (Calibration Check Compounds) <30%?				
3. Is the RF for SPCCs (System Performance Check Compounds) >0.1 (except 1,1,2,2-tetrachloroethane which should be > 0.3)?				
4. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
5. Is the Calibration Check Standard analyzed every 12 hours?				
6. Is the Calibration Check Standard RF for the SPCC the same as the initial calibration and the RF for the CCC's <20% different from the initial calibration?				
7. Is a surrogate spike performed in every calibration standard, field sample, and blank?				
8. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
9. Is the measured value of the reference material <95% confidence intervals from the certified value? Or, If the reference material is not certified is the %recovery 50-150%?				
10. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
11. Is the level of the target analyte in the laboratory blank <MDL?				
12. Is a reagent blank prepared prior to use if a new batch of reagent and if the method blank exceeds the control limits?				
13. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL and analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				

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Appendix B: Volatile Organic Analytes in Water

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
14. Is the percent recovery for the matrix spike and matrix spike replicate within 50-150% (or based on 3x the SD of actual recoveries) and is the RPD between them <25%?				
15. Are corrective actions documented and followed through?				
16. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
17. Is initial demonstration of laboratory capability through performance of a SWAMP program performance evaluation sample documented?				
18. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected in amber glass bottles with Teflon lid-liner (VOA vials) and stored at 4 °C and in the dark?				
2. Did the sample bottles or vials contain method appropriate preservatives and/or were samples preserved according to SWAMP and method specifications?				
2. Were samples extracted within 7 days of collection?				
3. Were samples analyzed within 40 days of collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for Volatile Organics analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix C: Synthetic Organic Compounds in Water (semi- and non-volatiles) in water: PCB's, PAH's, Pesticides

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation for the curve linear regression with an $r > 0.995$ or is there a %RSD $< 10\%$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard analyzed after the initial calibration and after every 10 samples with a recovery of 85-115%?				
5. Is a surrogate spike performed in every calibration standard, field sample, and blank?				
6. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
7. Is the measured value of the reference material $< 95\%$ confidence intervals from the certified value? Or, If the reference material is not certified is the %recovery 50-150%?				
8. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
9. Is the level of the target analyte in the laboratory blank and reagent blank $< MDL$?				
10. Is a reagent blank prepared prior to use if a new batch of reagent and if the method blank exceeds the control limits?				
11. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
12. Is the percent recovery for the matrix spike and matrix spike replicate within 50-150% (or based on 3x the SD of actual recoveries) and is the RPD between them $< 25\%$?				
13. Are corrective actions documented and followed through?				

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Appendix C: Synthetic Organic Compounds in Water (non-volatiles) in water: PCB's, PAH's, Pesticides

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
14. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
15. Is initial demonstration of lab capability through performance of a SWAMP performance evaluation sample documented?				
16. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected 40 mL VOA vials and stored at 4 °C and in the dark?				
2. If method appropriate, were sample collection containers rinsed with pesticide grade solvent before collection?				
3. Were samples preserved according to SWAMP and method specifications?				
4. Were samples analyzed within 14 days of collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for Synthetic Organic Compound analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix D: Trace Metals in Water

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation of the curve linear regression with an $r > 0.995$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard or Continuing Calibration Verification analyzed after the initial calibration and after every 10 samples with a recovery of 90-110%, except for Hg with a recovery of 80-120%?				
5. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
6. Is the recovery of the reference material 75-125%?				
7. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
8. Is one bottle blank analyzed per analytical batch?				
9. Is a reagent blank tested prior to use of a new batch of reagent or if the method blank exceeds control limits?				
10. Is a filter blank prepared and analyzed per new lot?				
11. Is the level of the target analyte in the laboratory blank, bottle blank, reagent blank, and filter blank $< \text{MDL}$?				
12. Are laboratory duplicates analyzed once per every 20 samples or per batch whichever is more frequent?				
13. Is the RPD for the laboratory duplicates $< 25\%$?				
14. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				

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Appendix D: Trace Metals in Water

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
15. Is the percent recovery for the matrix spike and matrix spike replicate within 75-125% and is the RPD between them <25%?				
16. Are corrective actions documented and followed through?				
17. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
18. Is initial demonstration of laboratory capability through performance of a SWAMP program performance evaluation sample documented?				
19. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples (except for samples to be analyzed for Hg) collected pre-cleaned polyethylene bottles and stored at 4 °C and in the dark?				
2. Were samples to be analyzed for Hg collected in glass or pre-cleaned Teflon bottles and stored at 4 °C and in the dark?				
3. Were samples acidified and filtered (if requested) within 48 hours of collection or according to SWAMP and method specifications?				
2. Were samples to be analyzed for Hexavalent Chromium analyzed within 48 hours of collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for trace metals in water analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix E: Methyl Mercury in Water

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation of the curve linear regression with an $r > 0.995$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard or Continuing Calibration Verification analyzed after the initial calibration and after every 10 samples with a recovery of 80-120%?				
5. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
6. Is the recovery of the reference material 70-130%?				
7. Are laboratory blanks analyzed at a frequency of 3 per 20 samples or per batch?				
8. Is one bottle blank analyzed per analytical batch?				
9. Is a reagent blank tested prior to use of a new batch of reagent or if the method blank exceeds control limits?				
10. Is the level of the target analyte in the laboratory blank, bottle blank, and reagent blank $< \text{MDL}$?				
11. Are laboratory duplicates analyzed once per every 20 samples or per batch whichever is more frequent?				
12. Is the RPD for the lab duplicates $< 25\%$?				
13. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
14. Is the percent recovery for the matrix spike and matrix spike replicate within 70-130% and is the RPD between them $< 25\%$?				
15. Are corrective actions documented and followed through?				
16. Is there a record of performance of an MDL study that includes at least 7 spikes at 3-10 times the estimated MDL annually?				

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Appendix E: Monomethyl Mercury in Water

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
17. Is initial demonstration of lab capability through performance of a SWAMP performance evaluation sample documented?				
18. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected pre-cleaned polyethylene bottles and stored at 4 °C and in the dark?				
2. Were samples preserved according to SWAMP and method specifications?				
3. Were samples acidified within 48 hours of collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for monomethyl mercury in water analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix F: Sediment Total Organic Carbon and Sediment Grain Size

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Is a method blank analyzed for each sample batch for TOC?				
2. Is the result for the method blank <MDL or <30% of the lowest sample?				
3. Is a laboratory control material (LCM) once per batch of 20 or fewer samples for TOC?				
4. Is the result of the LCM within 20-25% of the consensus value?				
5. Is a reference material analyzed at a frequency of once per every 15 samples for TOC?				
6. Is the recovery of the reference material within 95% of the confidence interval?				
7. Are replicates analyzed once per batch?				
8. Is the RSD of the replicates <20%?				
9. When performing TOC analysis, are blanks and a reference material analyzed three times daily during sample analysis?				
10. When performing Grain Size analysis, is a standard reference analyzed with every batch of samples?				
11. When performing Grain Size analysis, is a laboratory duplicate analyzed once per every twelve samples?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected pre-cleaned clear glass jars and stored at 4°C and in the dark?				
2. Were samples preserved according to SWAMP and method specifications?				
3. Were samples acidified within 28 days of collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for total organic carbon and sediment grain size analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix G: Organic Compounds in Sediments and Tissues and Sediments (PCB's, PAH's, and Pesticides) and for Semi-Volatiles and Volatiles in Sediment only:

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation for the curve linear regression with an $r > 0.995$ or is there a %RSD $< 10\%$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard analyzed after the initial calibration and after every 10 samples with a recovery of 85-115%?				
5. Is a surrogate spike performed in every calibration standard, field sample, and blank?				
6. Is a reference material covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
7. Is the measured value of the reference material $< 95\%$ confidence intervals from the certified value? Or, If the reference material is not certified is the %recovery 50-150%?				
8. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
9. Is a travel blank analyzed at a frequency of one per 20 samples or per batch whichever is more frequent (volatiles only)?				
10. Is the level of the target analyte in the laboratory blank, reagent blank, and travel blank (for volatiles only) $< MDL$?				
11. Is a reagent blank prepared prior to use if a new batch of reagent and if the method blank exceeds the control limits?				
12. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				

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Appendix G: Organic Compounds in Sediments and Tissues and Sediments (PCB's, PAH's, and Pesticides) and for Semi-Volatiles and Volatiles in Sediment only:

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
13. Is the percent recovery for the matrix spike and matrix spike replicate within 50-150% (or based on 3x the SD of actual recoveries) and is the RPD between them <25%?				
14. Are corrective actions documented and followed through?				
15. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
16. Is initial demonstration of lab capability through performance of a SWAMP performance evaluation sample documented?				
17. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected in 250-500 mL pre-cleaned amber jars and stored at 4 °C and in the dark?				
2. Were samples stored at 20 °C after 14 days from collection?				
4. Were samples analyzed within 12 months of collection?				
4. If method appropriate, were sample collection containers rinsed with pesticide grade solvent before collection?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for Synthetic Organic Compound analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix H: Trace Metals in Tissue and Sediment

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation of the curve linear regression with an $r > 0.995$?				
3. Is a Calibration Check Standard prepared independently from the initial calibration standards at mid-range?				
4. Is the Calibration Check Standard or Continuing Calibration Verification analyzed after the initial calibration and after every 10 samples with a recovery of 80-120% for Mercury and 90-110% for other metals?				
5. Is a reference material prepared from fish or sediment covering the range of expected target analyte concentration analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
6. Is the recovery of the reference material 75-125%?				
7. Are laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
8. Is one bottle blank analyzed per analytical batch?				
9. Is a reagent blank tested prior to use of a new batch of reagent or if the method blank exceeds control limits?				
10. Is the level of the target analyte in the laboratory, bottle, and reagent blanks $< MDL$?				
11. Are laboratory duplicates analyzed once per every 20 samples or per batch?				
12. Is the RPD for the laboratory duplicates $< 35\%$ for Hg in sediment and $< 25\%$ for all other metals?				
13. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
14. Is the percent recovery for the matrix spike and matrix spike replicate within 75-125% and is the RPD between them $< 25\%$?				
15. Are corrective actions documented and followed through?				

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Appendix H: Trace Metals in Tissue and Sediment

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
16. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
17. Is initial demonstration of lab capability through performance of a SWAMP performance evaluation sample documented?				
18. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected pre-cleaned glass jars with Teflon lid-liners and stored at 4 °C and in the dark?				
2. Were samples preserved according to SWAMP and method specifications?				
3. Were samples frozen to -20 °C after 14 days?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for trace metals in tissue and sediment analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix I: Methyl Mercury in Tissue and Sediment

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does calibration include 3-5 standards over the expected range of the target analyte and include 1 standard at or near the MDL?				
2. Is the calculation of the curve linear regression with an $r > 0.995$?				
3. Is a reference material prepared from fish or sediment covering the range of expected target analyte concentration and approved by the SWAMP QA program analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
4. Is the Calibration Check Standard or Continuing Calibration Verification analyzed after the initial calibration and after every 10 samples with a recovery of 80-120%?				
5. Is a reference material prepared from fish or sediment covering the range of expected target analyte concentration and approved by the SWAMP QA program analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				
6. Is the recovery of the reference material 70-130%?				
7. Are three laboratory blanks analyzed at a frequency of one per 20 samples or per batch whichever is more frequent?				
8. Is one bottle blank analyzed per analytical batch?				
9. Is a reagent blank tested prior to use of a new batch of reagent or if the method blank exceeds control limits?				
10. Is the level of the target analyte in the laboratory, bottle, and reagent blanks <MDL?				
11. Are laboratory duplicates analyzed once per every 20 samples or per batch whichever is more frequent?				
12. Is the RPD for the laboratory duplicates <25%?				
13. Are matrix spikes and matrix spike replicates spiked at 5 times the concentration of the analyte of interest or at 10 times the MDL analyzed at a frequency of once per every 20 samples or per batch whichever is more frequent?				

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Appendix I: Monomethyl Mercury in Tissue and Sediment

A. Data Acceptability Criteria (continued)	Yes	No	N/A	Comments
14. Is the percent recovery for the matrix spike and matrix spike replicate within 70-130% and is the RPD between them <25%?				
15. Are corrective actions documented and followed through?				
16. Is there a record of performance of an MDL study that includes at least seven spikes at 3-10 times the estimated MDL annually?				
17. Is initial demonstration of laboratory capability through performance of a SWAMP program performance evaluation sample documented?				
18. Has the lab participated in inter-laboratory exercises as mandated by the SWAMP Program?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected pre-cleaned polyethylene bottles and stored at 4 °C and in the dark?				
2. Were samples acidified within 48 hours of collection and according to SWAMP and method specifications?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for monomethyl mercury in tissue and sediment analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix J: Water Quality Samples for Bacteria-Pathogen Indicators

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Is a field blank analyzed once per event?				
2. Is the result for the field blank <TRL or <sample/5?				
3. Is a lab method blank (sterility check) analyzed once per batch?				
4. Is the result for the lab method blank <TRL?				
5. Is a lab duplicate analyzed once per 10 samples and at least once per batch?				
6. Is the result of the lab duplicate meet the requirement of $R_{log} \leq 3.27 * \text{mean } R_{log}$?				
7. Is a laboratory negative control sample analyzed once per culture medium or reagent lot?				
8. Is the result of the laboratory negative control sample <TRL?				
9. Is a laboratory positive control sample analyzed once per culture medium or reagent lot?				
10. Is the result of the laboratory negative control sample \geq TRL?				
11. Is the percent of data successfully collected assessed once per each sample event?				
11. Is the result of the calculation of successfully collected data 90%?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected either a pre-sterilized Whirlpak® bag or a 125 mL sterile plastic high density polyethylene or polypropylene container?				
2. Was sodium thiosulfate pre-added to the sample containers?				
3. Were samples stored at 4 °C and analyzed within 6 or 24 hours (depending on regulatory purpose) and according to SWAMP and method specifications?				
4. Were sample diluted prior to analysis?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for bacteria-pathogen indicators analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix K: Benthic Invertebrates

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Is 1 of every 10 samples re-examined (sorting, counting, and identification)?				
2. Is the percent of data successfully collected assessed once per each sample event?				
3. Is the result of the calculation of successfully collected data 100%?				
4. Is the result of the sample re-analysis within 5% of the original total?				

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected a plastic or glass container?				
2. Was the sample preserved in the field based on the particular biota requirements and according to SWAMP and method specific requirements?				
2. Were samples analyzed within 5 years?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for benthic invertebrate analyses meet the requirements listed in the SWAMP QMP or in the method, if not detailed in the QMP?				

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Appendix L: Toxicity Testing and General Water Quality Measurements

Name of Person Interviewed: _____

A. Data Acceptability Criteria	Yes	No	N/A	Comments
1. Does the percent survival in the controls for each species of organism meet the requirements listed in the SWAMP QAMP or as specified in the method?				
2. Are the performance criteria outlined in the SOP for each species met?				
3. During the TIE acceptability criteria was the response in the treatment blank not significantly different from the baseline treatment control?				
4. Is the measured value of the external standard in the ELISA method within 20% of the nominal concentration?				
5. Were at least 5% of the samples measured with ELISA kits also measured with an EPA method for comparison?				
6. Is the RPD for the results between the ELISA kit and the EPA method <50%?				
7. Were field duplicates collected at a frequency of 5% per sampling event or to method specifications?				
8. Were positive-control reference toxicant tests conducted monthly?				
9. Were negative-controls conducted with each batch of toxicity test samples?				
10. Is a standard analyzed at the beginning of analysis and at the end of each set of 10 samples for dissolved oxygen, pH, conductivity, and ammonia analysis?				
11. Is the coefficient of the standard measurement <10% or <30% for ammonia?				
12. Is the temperature recorded continuously during dissolved oxygen, pH, conductivity, and ammonia analysis?				
13. If the measured temperature varied > +/- 1° C from the target temperature during dissolved oxygen, pH, conductivity, and ammonia analysis, was it reported?				
14. During Hardness and alkalinity analyses, were standards measured on a quarterly basis resulting in a coefficient of variation <10%?				
15. Is the RPD for dissolved oxygen, pH, conductivity, hardness, and alkalinity analyses <10% and for ammonia <30%?				

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Appendix L: Toxicity Testing and General Water Quality Measurements

B. Sample Handling and Custody Requirements	Yes	No	N/A	Comments
1. Were samples collected a plastic or glass container as specified in the specific toxicity test followed?				
2. Were samples stored at 4 °C and analyzed within 48 hours or to SWAMP and method specific requirements?				

C. Target Reporting Limits	Yes	No	N/A	Comments
1. Do all Target Reporting Limits for toxicity testing analyses meet the requirements listed in the SWAMP QAMP or in the method, if not detailed in the QAMP?				

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ATTACHMENT 3

ACRONYMNS

ISO	International Organization for Standardization
MDL	Method Detection Limit
NELAC	National Environmental Laboratory Accreditation Conference
QA	Quality Assurance
QAMP	Quality Assurance Management Plan
QC	Quality Control
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
SWQCB	State Water Quality Control Board

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