Quality Systems Assessment for Contract Laboratories

July 1, 2010

Approved by Beverly H. van Buuren, Surface Water Ambient Monitoring Program Quality Assurance Officer, on July 1, 2010

1. Purpose

This document describes the process used by the Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Team (QAT) to perform quality system assessments of the program's contract laboratories. The purpose of these assessments is to evaluate laboratory procedures, personnel, and facilities against the requirements of the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan* (QAPrP).

2. Responsibilities

Implementation of this process is shared among the SWAMP Coordinator, SWAMP QA Officer, QAT, and the assessed contract laboratory. Specific roles are described below.

The SWAMP Coordinator is responsible for:

- Selecting a desktop or remote assessment format; and
- Selecting the frequency of assessment events.

The SWAMP Quality Assurance (QA) Officer is responsible for:

- Ensuring that this process is implemented by the QAT as possible within in each fiscal year work plan;
- Scheduling assessments;
- Selecting a desktop or remote assessment format;
- Selecting the frequency of assessment events; and

- Approving the contract laboratory's assessment response.

The SWAMP QAT is responsible for:

- Scheduling the assessment;
- Providing a pre-assessment packet to the contract laboratory;
- Conducting the assessment;
- Drafting an assessment report; and
- Drafting an assessment report summary.

Contract laboratory personnel are responsible for:

- Providing the QAT the materials requested in the pre-assessment packet;
- Hosting onsite assessments; and
- Drafting an assessment response.

3. Procedure

Each fiscal year, the SWAMP Coordinator and QA Officer draft an assessment schedule for the SWAMP contract laboratories. They also determine whether each laboratory will receive an onsite or remote assessment (see sections 3.3 and 3.4, respectively). The program does not assess contract laboratories on an annual basis.

The following sections detail the assessment process from initiation to closure. At the discretion of the lead assessor, deliverable deadlines may be adjusted from those specified below.

3.1 Initial Contact with Laboratory

Three months prior to the assessment, the lead assessor or a designee contacts the involved laboratory's QA Officer and Project Manager. At this time, an assessment is scheduled, and the pre-assessment packet is described.

3.2 Pre-Assessment Packet

Two weeks before the onsite or remote assessment, a packet is mailed to the laboratory via electronic mail. Upon receipt, the laboratory is required to respond to this packet and forward to the QAT any requested information.

The pre-assessment packet includes the following items:

- A cover letter documenting the assessment schedule and packet contents;
- A request for materials to be assessed;
- An assessment agenda; and
- Assessment checklists (see Appendices A and B).

3.3 Onsite Assessment

The onsite visit follows the agenda provided in the pre-assessment packet, and includes an opening and closing meeting. The assessment itself examines laboratory procedures, personnel, and facilities against the requirements of the QAPrP. While the assessor records all notes in a bound logbook containing the assessment checklists (see Appendices A and B), the assessment is not limited to items on this checklist.

Typically, the assessment follows a sample batch through the entire laboratory process from receipt to reporting. It also includes a review of all accompanying documentation (e.g., training, equipment, and QA records). The closing meeting is a preliminary summary of the issues likely to appear on the assessment report.

3.4 Remote Assessment

At the discretion of the SWAMP Coordinator and SWAMP QA Officer, a remote assessment may be conducted in lieu of an onsite visit. Typically, a remote assessment

focuses on the documentation associated with all aspects of laboratory operations. The required documents are requested by the SWAMP QAT in the pre-assessment packet.

As appropriate, a remote assessment may include the review of:

- The laboratory quality assurance plan (QAP);
- Organizational charts;
- Standard operating procedures (SOPs);
- Method detection limit (MDL) studies;
- SWAMP-specific data reports - including raw data;
- Quality control charts; and
- Program, project, or assessment reports.

Unless standing alone, the remote assessment will be performed prior to the onsite assessment. However, to the extent applicable, it will be based on the same checklist.

3.5 Assessment Report

Within two months of the assessment, the lead assessor will compile notes into a report. The report will detail *findings* and *observations*, which the Environmental Protection Agency (EPA) defines as follows:

- Finding: a statement of importance that is based on a comparison of objective evidence obtained during the assessment to the assessment criteria.

- Observation: an assessment finding that identifies a neutral condition that does not represent a significant impact (either positive or negative) on the quality of an item or activity, based on observations, measurements, or tests that can be verified.

Recommendations may also be included, but do not require a response by the contract laboratory.

The assessment report will be sent with a cover letter requesting a laboratory response within two months of receipt.

3.6 Assessment Response

Within two months of receiving the assessment report, the contract laboratory is required to submit a written response to the lead assessor. The response must include detailed plans for corrective actions and associated due dates. Corrective actions must be well documented and should include a follow-up plan to confirm their efficacy.

Within two weeks of receipt, the assessment response will be reviewed by the lead assessor and the SWAMP QA Officer. If the response is satisfactory, the lead assessor will send the contract laboratory a letter of acceptance. If it is not satisfactory, both parties will coordinate before revised responses are resubmitted.

4. Assessment Report Summary

The QAT will compile all individual assessment reports into an annual summary that includes suggestions for further development of the assessment program. This document will be submitted to the SWAMP QA Officer and the SWAMP Coordinator for review. The QAT will also present each annual summary to the SWAMP Roundtable via the *Surface Water Ambient Monitoring Program Quality Assurance Annual Report.*

Individual assessment reports remain confidential and are only available to the QAT, the SWAMP Coordinator, the involved Regional Board, and the contract laboratory.

5. References

Guidelines for Assessing Quality Systems; ISO 10011-1-3:1990 (E). International Organization for Standardization: Geneva, Switzerland, 2005.

National Environmental Laboratory Accreditation Conference Quality Systems; EPA/600/R-04/003. U.S. Environmental Protection Agency, U.S. Government Printing Office: Washington, DC, 2003.

Guidance on Technical Assessments and Related Assessments for Environmental Data Operations; EPA QA/G-7; U.S. Environmental Protection Agency, U.S. Government Printing Office: Washington, DC, 2000.

Guidance for Preparing Standard Operating Procedures; EPA QA/G-6; U.S. Environmental Protection Agency, U.S. Government Printing Office: Washington, DC, 2001.

Puckett, M. *Quality Assurance Management Plan for the State of California's Surface Water Ambient Monitoring Program*; California Department of Fish and Game, Monterey, CA, 2002.

Surface Water Ambient Monitoring Program Quality Assurance Program Plan; Moss Landing Marine Laboratories, Moss Landing, CA, 2008.

Appendix A. General Assessment Checklist

Assessment Information	
Date:	
Lead Assessor:	
Assessment Team:	
Contract Laboratory Information	
Organization:	
Address:	
Laboratory Manager:	
Phone:	
Email:	
Laboratory Quality Assurance Officer:	
Phone:	
Email:	

Facilities

	Y	N	N/A	Comments
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?				
6. Does the laboratory have an appropriate water source and purification system?				
7. Are ultra-clean facilities available when appropriate?				

8. Is equipment (e.g., ovens, refrigerators, freezers, hot plates, water baths) checked on a regular basis with National Institute of Standards and Technology- (NIST-) traceable references and is that process documented in an assigned logbook?				
9. Are balances located on vibration-free bench tops?				
10. If equipment is calibrated by an outside source, are calibration certificates available?				

Training

	Y	N	N/A	Comments
1. Are standard operating procedures (SOPs) and method procedures read and followed by laboratory staff and is this process documented?				
2. Is there a documented training program including training evaluation and documentation?				
3. Have personnel been adequately trained to perform each analysis and is that training documented?				
4. Is training of staff on a new procedure supervised until demonstration of initial capability is completed?				
5. Are staff training files reviewed and updated annually?				
6. Is demonstration of capability documented for all analyses in an appropriate matrix for each analyst?				
7. Is demonstration of capability performed each time there is a change in method or instrumentation?				
8. Does the lab participate in proficiency tests, intercomparisons, or round robin studies and is that data readily available for review?				
9. Does the lab participate in SWAMP Kickoff meetings as appropriate				

Documents and Records

	Y	N	N/A	Comments
1. Does the staff have necessary references (e.g., methods, SOPs) for all analytical procedures?				
2. Are the quality assurance plan (QAP), policies, and SOPs identified with a title, date of issue, and revision number?				
3. Have SOPs been written and approved for all elements performed by the laboratory?				
4. Is there a program for annual review and updating of SOPs?				
5. Are changes to SOPs documented with revision numbers and the dates that the changes become effective?				
6. Do SOPs include a corrective action section for departure from policy or failed quality control (QC)?				
7. Are all logbooks bound with titles, page numbers, and revision numbers?				
8. Are logbooks regularly reviewed by the quality assurance (QA) officer for compliance with policies?				
9. Is there a record management system for control of logbooks and lab notebooks?				
10. Are internal audits conducted on equipment, personnel, procedures, and data review?				
11. Does the laboratory have a policy that includes established procedures for documentation and follow-up of corrective actions?				
12. Does the lab have policies and procedures in place to ensure the protection of its electronic data storage and confidential information?				
13. Does the lab have policies and procedures in place to ensure the protection of its hard copy data storage and confidential information?				
14. Is a written ethics policy available?				

15. Is a written and approved QAP available?				
16. Is the QAP updated on a regular basis?				
17. Are SOPs listed and accurately referenced in the QAP?				
18. If deviations from the QAP occur, are they documented?				
19. Is a signed, SWAMP-comparable QAPP available?				
20. Is there a document control procedure for logbooks?				

Sample Handling and Custody

	Y	N	N/A	Comments
1. Does the lab have documented procedures for sample transportation, receipt, handling, storage, and disposal?				
2. Are all procedures to which a sample is subjected documented - including the date, time, and initials of the person performing the procedure?				
3. Is the history of the sample readily understood through this documentation?				
4. Is there a sample identification system that provides unique labels to each sample?				
5. Does the sample custodian check for correct documentation, container type, and holding times?				
6. Does the sample custodian record the time and date of receipt, tracking information, sample and temperature blank temperature, client information, and the name and signature of sample custodian?				
7. Is all of the sample receipt information logged into a sample book?				
8. Was a chain of custody started in the field? If so, has that chain of custody been maintained and returned to client with the report?				
9. Are copies of completed chains of custody archived?				
10. After receipt, are samples preserved and stored according to the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan* (QAPrP) and/or method?				
11. Does the sample system include a documentation procedure and labeling protocol for sample splits?				
12. Are sample identifications (IDs) retained throughout the life of the sample in the lab?				
13. Is sample storage information properly documented?				
14. Is all labware to come in contact with the sample cleaned according to method protocols and/or tested for target analytes and interferences? Is this testing documented?				

15. Are disposal records maintained and available?				

Instrument Performance

	Y	N	N/A	Comments
1. Is instrumentation maintained according to SOP specifications and equipment manufacturer recommendations?				
2. Is all maintenance recorded in a separate equipment logbook for each instrument?				
3. Is there a preventative maintenance plan for each instrument?				
4. Are instruments under a service contract?				
5. Is there a list of all equipment including brand name, model number, and serial number?				
6. Is there back-up power for instruments or back-up instruments available?				
7. Is there an instrument logbook that records daily instrument settings, tuning, and calibration?				

Reagents and Standards

	Y	N	N/A	Comments
1. Are all reagents tested to be low for target analytes and interferences, and is this testing documented?				
2. Is there a logbook documenting receipt of reagents - including chemical name, vendor name, lot number, and receipt date?				
3. Is there a logbook for prepared reagents containing information such as date prepared, expiration date of the reagent, lot number, and initials of person preparing the reagent?				
4. Are all reagent and standard containers labeled with name, vendor name, date received or prepared, expiration date, and initials?				
5. Is all preservation recorded in a logbook - including date of preservation, preservation method, and initials?				
6. Are all samples prepared according to SWAMP- and method-specific requirements?				
7. Is sample prep documented in a logbook - including sample ID, volume or weight, final dilution, reagents, and calculations?				
8. Are all datasets uniquely identified and paginated?				
9. Are all standards and certified reference materials (CRMs) traceable to NIST standards?				
10. Are CRMs entered into a logbook, labeled with receipt and opened dates, and stored properly?				
11. Is there a standard/surrogate logbook in use that includes stock standard ID, dilution created, name/initials of preparer, date prepared, and date expired?				
12. Are all prepared standards tested prior to use and is this data available?				

Sample Analysis

	Y	N	N/A	Comments
1. Are tests for contamination, instrument detection limits, and range performed with the initial instrument calibration? Is this documented?				
2. For each analysis, are method detection limit (MDL) studies performed annually and each time the instrument or method is modified? Are these studies documented?				
3. Do analytical records include lab sample ID, date and time of analysis, instrument identification, and calculations?				
4. Are the calibrations for each instrument in a logbook containing calibration data, maintenance, and troubleshooting?				
5. Is calibration prepared with at least three standards - including one at the reporting limit?				
6. Is the linearity and slope of the calibration within acceptable range?				
7. Are all calibrations confirmed with a second source standard such as a CRM?				
8. If calibration is not within specifications, are corrective actions documented?				
9. Is background concentration established by running blanks?				
10. Are blanks run at the appropriate frequency?				
11. Are samples diluted prior to analysis? If so, is the dilution documented and carried through calculations?				
12. Is carry-over monitored throughout the analytical run?				
13. Are clean-up solvents run at the appropriate intervals?				
14. Are check standards measured at the correct frequency and at the beginning and end of the analytical run?				

15. Are check standard recoveries in an acceptable range?				
16. Are CRMs processed with the sample batch through all steps of the analysis, including the sample prep?				
17. Does the laboratory attempt to matrix-match and concentration-match CRMs to field samples?				
18. Are samples above the range of the calibration re-run at an appropriate dilution?				
19. Are precision measurements (e.g., matrix duplicates [MDs], matrix spike duplicates [MSDs]) performed at the proper frequency and are they within acceptable range?				
20. Are accuracy measurements (e.g., CRMs, matrix spikes [MSs]) recoveries at the proper frequency and are they within an acceptable range?				
21. Is the MS spiking level appropriate?				
22. If applicable, are recoveries of internal standards within an acceptable range?				
23. If applicable, are surrogate recoveries within an acceptable range?				
24. As appropriate, are samples corrected for blanks, interference, surrogate recoveries, or instrument drift?				
25. Were all samples analyzed within the holding times listed in the QAPrP or method?				
26. If performance-based analyses are used, are they fully documented and validated?				
27. Does the laboratory maintain control charts for QC and sample monitoring?				
28. Are all QC protocols in the SWAMP QAPrP and laboratory QAP followed?				

Data Management

	Y	N	N/A	Comments
1. Is there a program for second-party data review and validation?				
2. Is there an established SOP to ensure that calculations and data transfers are performed correctly?				
3. Is there a procedure to record corrections appropriately?				
4. Is there a way to prevent changes to data after validation?				
5. Is raw data (e.g., chromatograms, peaks) available?				
6. Are all records traceable and retrievable?				
7. Once data is finalized, is it submitted electronically in the required format?				
8. If applicable, is draft data submitted electronically to the applicable Regional Water Quality Control Board (Regional Board)?				
9. Are unsolvable failures in the data report submitted to the Regional Board or SWAMP Data Management Team (DMT)?				
10. In the event of a measurement failure that can't be corrected by the lab technician, is it forwarded to the supervisor to determine if the data is reportable?				
11. In the event of a measurement failure that can be corrected by the lab technician, is the failure corrected and recorded in the laboratory record?				
12. Are sample results that are between the MDL and the reporting limit (RL) appropriately flagged?				
13. Are appropriate QA codes applied to the data, and are applicable comments included?				
14. Is there a secure archive of original data?				

15. Is there a system for electronic back-up of the data?				
16. Are records protected against fire, damage, or loss?				
17. Is data reported using current formats and lookup lists?				

Appendix B. Analyte-Specific Checklist

Assessment Information	
Date:	
Lead Assessor:	
Assessment Team:	
Contract Laboratory Information	
Organization:	
Laboratory Manager:	
Address:	
Phone:	
Email:	
Laboratory Quality Assurance Officer:	
Phone:	
Email:	

Conventional Analytes in Water

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or standard operating procedure?				
	Does the instrument calibration meet the performance criteria specified in the method or standard operating procedure (SOP)?				
Continuing Calibration Verification	Is a continuing calibration verification (CCV) performed every 10 analytical runs?				
	Are CCV recoveries 80-120%?				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries less than the reporting limit (RL) of the target analyte?				
Reference Material	Are certified reference materials (CRMs) analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 80-120%?				

Matrix Spike	Are matrix spikes (MSs) analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MS recoveries 80-120%?				
Matrix Spike Duplicate	Are matrix spike duplicates (MSDs) analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MSD recoveries 80-120% with a relative percent difference (RPD) < 25%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the RPD for laboratory duplicates <25% (n/a if native concentration of either sample <RL)?				
Internal Standard	Are internal standards analyzed in every analytical run as method appropriate?				
	Do internal standard recoveries meet the performance criteria specified in the method or SOP?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Is the RPD for field duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are chlorophyll a and pheophytin a samples frozen or analyzed within four hours of collection?				
	Are alkalinity and cyanide samples analyzed within 14 days of preservation?				
	Are ammonia (non-acidified), biochemical oxygen demand, nitrate + nitrite (non-acidified), nitrite, nitrate, orthophosphate (total and dissolved),				

	and turbidity samples analyzed within 48 hours of preservation?				
	Are ammonia (acidified), chemical oxygen demand, chloride, fluoride, total kjeldahl nitrogen (acidified), oil and grease (HEM), nitrate + nitrite (acidified), total organic carbon, dissolved organic carbon, perchlorate, phosphorous (total), phosphorous (dissolved), specific conductivity (or 24 hours if not filtered), and sulfate samples analyzed within 28 days of preservation?				
	Are phenol samples extracted within seven days of collection and analyzed within 28 days of extraction?				
	Are boron, calcium, hardness, iron, magnesium, potassium, silica, sodium, samples analyzed within six months of preservation?				
	Are total kjeldahl nitrogen (non-acidified) samples analyzed within seven days of preservation?				

Conventional Analytes in Water – Solids

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or SOP?				
	Does the instrument calibration meet the performance criteria specified in the method or SOP				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries <RL of the target analyte?				
Laboratory Duplicate	Are laboratory duplicates analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the RPD for the laboratory duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Is the RPD for field duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are samples analyzed within seven days of collection (ASAP for volatile suspended solids)?				

Conventional Analytes in Water - Pathogens

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Are incubator temperatures checked twice daily, with a minimum of four hours between checks?				
	Do temperature checks meet the performance criteria specified in the method or SOP?				
Filter Sterility Check	Is a filter sterility check performed each day samples are analyzed?				
	Is the filter sterility check free of any growth on the filter?				
Laboratory Blank	Are laboratory blanks analyzed per batch of bottles or reagents?				
	Is the laboratory blank free of any growth on the filter?				
Filtration Blank	Are filtration blanks analyzed per 20 samples or per analytical batch, whichever is more frequent?				
	Is the filtration blank free of any growth on the filter?				
Reference Material	Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 80-120%?				
Positive Control	Is a positive control analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are positive control recoveries 80-120%?				
Negative Control	Is a negative control analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the negative control free of any growth on the filter?				
Laboratory Duplicate	Are laboratory duplicates analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the RPD for the laboratory duplicates <25% (n/a if native concentration of either sample <RL)?				

Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count? For coliforms, are field duplicates analyzed one per 25 tube dilution tests?				
	Is the RPD for field duplicates <25% (n/a if native concentration of either sample <RL)? For coliforms, are field duplicates within a 95% confidence interval as defined by IDEXX laboratories?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are samples analyzed within 24 hours of collection (6 hours for regulatory samples)?				

Conventional Analytes in Sediments

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified by the method, SOP, or manufacturer?				
	Does the instrument calibration meet the performance criteria specified by the method, SOP, or manufacturer?				
Continuing Calibration Verification	Are continuing calibration verifications (CCVs) performed per 10 analytical runs (as applicable)?				
	Are CCV recoveries 80-120%?				
Laboratory Blank	For total organic carbon only: Are laboratory blanks analyzed at a frequency of once per batch?				
	For total organic carbon only: Are laboratory blank recoveries <RL of the target analyte or 30% of the lowest sample?				
Reference Material	For total organic carbon only: Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	For total organic carbon only: Are CRM recoveries 80-120%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the RPD for laboratory duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Is the RPD for field duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte or 30% of the lowest sample?				
Holding Times		Y	N	N/A	Comments

Holding Times	Are holding times consistent with the method or SOP?				

Inorganic Analytes in Water, Sediment, and Tissue

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or SOP?				
	Does the instrument calibration meet the performance criteria specified in the method or SOP?				
Continuing Calibration Verification	Are CCVs performed per 10 analytical runs?				
	Are CCV recoveries 80-120%?				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries <RL of the target analyte?				
Reference Material	Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 75-125% (70-130% for methylmercury)?				
Matrix Spike	Are MSs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MS recoveries 75-125% (70-130% for methylmercury)?				
Matrix Spike Duplicate	Are MSDs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MSD recoveries 75-125% (70-130% for methylmercury) with an RPD < 25%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Is the RPD for the laboratory duplicates <25% (n/a if native concentration of either sample <RL)?				

Internal Standard	Are internal standards accompanying every analytical run when appropriate?				
	Are internal standard recoveries 60-125%?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Is the RPD for field duplicates <25% (n/a if native concentration of either sample <RL)?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are water samples acidified within 48 hours of collection and analyzed within 6 months of acidification? (except hexavalent chromium)				
	Are hexavalent chromium water samples analyzed within 24 hours of collection?				
	Are sediment samples analyzed within 14 days of collection or thawing (samples may be stored for 1 year at -20 °C)?				
	Are methylmercury sediment samples analyzed within 1 year of collection? (samples may be stored for 1 year at -20 °C)?				
	Are methylmercury sediment samples analyzed at first thaw?				
	Are tissue samples analyzed within 1 year of collection? (samples may be stored for 1 year at -20 °C)?				

Volatile Organic Compounds in Water and Sediment

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or SOP?				
	Does the instrument calibration meet the performance criteria specified in the method or SOP?				
Continuing Calibration Verification	Are CCVs performed every 12 hours?				
	Is the response factor of CCV recoveries 80-120%?				
	Is the response factor for system performance check compounds the same as the initial calibration?				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries <RL of the target analyte?				
Reference Material	Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 70-130%, or 50-150% if uncertified?				
Matrix Spike	Are MSs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MS recoveries 50-150% (or based on three times the standard deviation of the laboratory's actual method recoveries)?				
Matrix Spike Duplicate	Are MSDs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MSD recoveries 50-150% (or based on three times the standard deviation of the laboratory's actual method recoveries) with an RPD < 25%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at the frequency specified in the method or SOP?				
	Do laboratory duplicate recoveries meet the performance criteria specified in the method or SOP?				

Internal Standard	Are surrogates/internal standards analyzed at the frequency specified in the method or SOP?				
	Do surrogate/internal standard recoveries meet the performance criteria specified in the method or SOP?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Do field duplicate recoveries meet the performance criteria specified in the method or SOP?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are water samples analyzed within14 days of collection or thawing				
	Are sediment samples analyzed within 14 days of collection or thawing. (samples may be stored for 1 year at -20 °C)?				

Semi-Volatile Organic Compounds in Water and Sediment

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or SOP?				
	Does the instrument calibration meet the performance criteria specified in the method or SOP?				
Continuing Calibration Verification	Are CCVs performed every 12 hours?				
	Is the response factor of CCV recoveries 80-120%?				
	Is the response factor for system performance check compounds the same as the initial calibration?				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries <RL of the target analyte?				
Reference Material	Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 70-130%, or 50-150% if uncertified?				
Matrix Spike	Are MSs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MS recoveries 50-150%, or based on three times the standard deviation of the laboratory's actual method recoveries?				
Matrix Spike Duplicate	Are MSDs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MSD recoveries 50-150% (or based on three times the standard deviation of the laboratory's actual method recoveries) with an RPD < 25%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at the frequency specified in the method or SOP?				
	Do laboratory duplicate recoveries meet the performance criteria specified in the method or SOP?				

Internal Standard	Are surrogates/internal standards analyzed at the frequency specified in the method or SOP?				
	Do surrogate/internal standard recoveries meet the performance criteria specified in the method or SOP?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Do field duplicate recoveries meet the performance criteria specified in the method or SOP?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are water samples extracted within 7 days of collection and analyzed within 40 days of extraction?				
	Are sediment samples extracted within 14 days of collection or thawing and analyzed within 40 days of extraction (samples may be stored for 1 year at -20 °C)?				

Synthetic Organic Compounds in Water, Sediment, and Tissue

Laboratory Quality Control		Y	N	N/A	Comments
Calibration Standard	Is instrument calibration performed at the frequency specified in the method or SOP?				
	Does the instrument calibration meet the performance criteria specified in the method or SOP?				
Continuing Calibration Verification	Are CCVs performed per 10 analytical runs?				
	Are CCV recoveries 85-115% for water and sediment; or 75-125% for tissue?				
Laboratory Blank	Are laboratory blanks analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are laboratory blank recoveries <RL of the target analyte?				
Reference Material	Are CRMs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are CRM recoveries 70-130%, or 50-150% if uncertified?				
Matrix Spike	Are MSs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MS recoveries 50-150%, or based on three times the standard deviation of the laboratory's actual method recoveries?				
Matrix Spike Duplicate	Are MSDs analyzed at a frequency of once per 20 samples or per batch, whichever is more frequent?				
	Are MSD recoveries 50-150% (or based on three times the standard deviation of the laboratory's actual method recoveries) with an RPD < 25%?				
Laboratory Duplicate	Are laboratory duplicates analyzed at the frequency specified in the method or SOP?				
	Is the RPD for laboratory duplicates in water <25% (n/a if native concentration of either sample <RL)? Does the RPD for laboratory duplicates meet the performance criteria specified in the method or SOP?				

Internal Standard	Are surrogates/internal standards analyzed at the frequency specified in the method or SOP?				
	Do surrogate/internal standard recoveries meet the performance criteria specified in the method or SOP?				
Field Quality Control		Y	N	N/A	Comments
Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Do field duplicate recoveries meet the performance criteria specified in the method or SOP?				
Field Blank, Travel Blank, Equipment Blank	Are field, travel, and equipment blanks analyzed at the frequency specified in the method or SOP?				
	Are field, travel, and equipment blank recoveries <RL of the target analyte?				
Holding Times		Y	N	N/A	Comments
Holding Times	Are water samples extracted within 7 days of collection and analyzed within 40 days of extraction?				
	Are sediment samples extracted within 14 days of collection or thawing and analyzed within 40 days of extraction (samples may be stored for 1 year at -20 °C)?				
	Are tissue samples extracted within 14 days of collection or thawing and analyzed within 40 days of extraction (samples may be stored for 1 year at -20 °C)?				

Toxicity Testing (General)

Negative Controls		Y	N	N/A	Comments
Laboratory Control Water	Is laboratory control water analyzed at the frequency specified in U.S. Environmental Protection Agency (EPA) guidelines?				
	Does laboratory control water analysis meet the performance criteria specified in the method or SOP?				
Conductivity Control Water	When the conductivity of any freshwater ambient sample approaches the species' tolerance, is a conductivity control tested with each analytical batch?				
	Does analysis of conductivity control water follow EPA guidelines?				
Additional Control Water	Are additional method blanks analyzed whenever manipulations are analyzed on one or more of the ambient samples within an analytical batch (e.g., pH adjustments, continuous aeration)?				
	Is there a statistical difference between the laboratory control water and each additional control water within an analytical batch?				
Sediment Control	Is sediment control analyzed with each analytical batch of sediment toxicity tests?				
	Does sediment control analysis meet EPA data acceptability criteria for the species of interest?				
Positive Controls		Y	N	N/A	Comments
Reference Toxicant Tests	For species that are raised within a laboratory, are reference toxicant tests conducted monthly?				
	For commercial species, are reference toxicant tests conducted per analytical batch?				
	For test species or broodstocks that are field collected, are reference toxicant tests conducted concurrently?				
	Is the last reference toxicant test data point within two standard deviations of the cumulative mean (n=20)?				
Field Quality Control		Y	N	N/A	Comments

Field Duplicate	Are field duplicates analyzed at a frequency of 5% of the total project sample count?				
	Do field duplicate recoveries meet the performance criteria specified in the method or SOP?				
Field Blank	Are field blanks analyzed at the frequency specified in the method or SOP?				
	Is there a statistical difference between the laboratory control water (or sediment control) and the field blank within an analytical batch?				
Equipment Blank	Are equipment blanks analyzed at the frequency specified in the method or SOP?				
	Is there a statistical difference between the laboratory control water (or sediment control) and the field blank within an analytical batch?				