

## **Requirements for Field and Analytical Work**

Performed for  
The Department of Environmental Protection  
Under Contract

DEP-QA-002/02



Bureau of Laboratories  
Environmental Assessment Section

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Requirements for Direct Contracts  
Sampling and Analysis Plan

## **1. SAMPLING AND ANALYSIS PLAN**

A Sampling and Analysis Plan may be required by the contract manager in lieu of a Quality Assurance Project Plan. When required, the content must be consistent with the topics outlined below. If some of these topics are discussed in other documents such as a research proposal, or project scope, the Sampling and Analysis Plan may reference these other documents. If all of the required topics are provided in other documents, the contract manager may waive the requirement for a sampling and analysis plan. Where possible, use tables to provide information (such as organization, 1.1.3 or Sampling/Test Locations, 1.3.1,).

Whether or not DEP Standard Operating Procedures are used or the laboratory is certified by the Department of Health Environmental Laboratory Certification Program (DoH ELCP), **all organizations must have an effective and operating quality system.** Field Operations are expected to follow the quality system, documentation and other requirements outlined in FA 1000 and FD 1000 of the Field SOPs. Laboratories shall comply with the applicable standards of the National Environmental Laboratory Accreditation Conference.

The Sampling and Analysis Plan must contain the following information:

### **1.1. Introduction**

#### **1.1.1. PROJECT DESCRIPTION:**

Provide a general description of the project including the history. State the specific problem or question that the project intends to resolve or answer. The discussion may be by reference to information in other contract-related documents such as a contract proposal.

#### **1.1.2. PROJECT SCOPE AND PURPOSE:**

Outline the purpose of the current project. Include:

- 1.1.2.1. Purpose
- 1.1.2.2. Anticipated Length
- 1.1.2.3. Projected Schedule for the project

#### **1.1.3. PROJECT ORGANIZATION:**

Identify by name, title and phone number the person(s) or contractor(s) that will be working on the project. Include a brief description of the duties and responsibilities of each individual or organization.

### **1.2. Data Quality Objectives (DQO)**

#### **1.2.1. DATA USE:**

Discuss the intended use of the data including the types of decisions that will be made based on the results.

#### **1.2.2. DATABASES/DATA REPOSITORIES:**

- 1.2.2.1. If applicable, identify the databases or data repositories into which the data will be entered.
- 1.2.2.2. Discuss the mechanisms to be used to ensure that the data are accurately entered into any database.
- 1.2.2.3. Discuss the mechanisms to be used to verify that the data in the database are correct.

#### **1.2.3. EXPECTED DATA QUALITY:**

State the level of data quality to be acceptable for this project based on the analytes of interest, and the purpose of the study. Data quality refers to the level of uncertainty that is associated with a particular data point or value and answers the questions "How sure are you

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that the value of the data point represents the true value?" All activities from sampling design, through laboratory analysis and data analysis affect the quality of the data. Consider the following:

- 1.2.3.1. What analytes are to be studied, and what are the expected levels.
- 1.2.3.2. What biological indicators are being assessed, and what is the expected outcome.
- 1.2.3.3. Are there any action levels of concern (e.g., drinking water standards, surface water criteria, groundwater guidance concentrations)?
- 1.2.3.4. Will the sampling design provide sufficient information to reach conclusions, or make decisions?
- 1.2.3.5. What types of quality control measures will be used to monitor the data quality, and how frequently will they be used?

**1.2.4. TEST METHODS:**

Based on 1.2.3.1, 1.2.3.2 and 1.2.3.3, identify and list the test methods that will satisfy the criteria. Identify by method number.

**1.3. Data Quality Indicators (DQI)**

**1.3.1. QUANTITATIVE DQIs:**

Based on the DQOs and for each test method, indicate the acceptable ranges for accuracy, precision, completeness and detection limit (may be combined in a table with 1.2.4 above).

**1.3.2. QUALITATIVE DQIs:**

Based on the DQOs, state the acceptable limits of representativeness and comparability.

**1.3.3. QUALITY CONTROL MEASURES:**

Identify the specific quality control measures to be used (both field and laboratory). Include the type, and frequency of use. Note: the minimum quality control as specified in the DEP SOPs, the NELAC standards and the contract must be met. State the outcome of a failed QC measure (e.g., data rejected, data qualified, data not reported, etc.)

**1.4. Field Activities**

**1.4.1. SAMPLING DESIGN:**

Discuss how sampling points will be selected. This discussion must state how the number, location, and sampling method relate to the stated data quality objectives and quantitative data quality indicators.

**1.4.2. SAMPLING/TEST LOCATIONS:**

Identify the test area and include a map with sampling and/or testing locations. Specify the activities (e.g., collect samples for metals; assess the biological integrity, etc) to be conducted at each site.

**1.4.3. SAMPLE COLLECTION METHODS:**

Identify all procedures that will be used to collect samples. If using the DEP Standard Operating Procedures (SOPs), cite by specific reference. If other procedures are to be used, provide copies of the procedures for review and approval by the Department (see FA 2100).

**1.4.4. FIELD TESTING ACTIVITIES:**

Identify all anticipated test measurements to be conducted in the field. Provide copies of procedures that are not included in the DEP SOPs for review and approval (see FA 2100).

**1.4.5. EQUIPMENT:**

List the equipment to be used for sample collection. If collecting chemical samples, specify construction materials of all devices that contact the sample. This list must be consistent with FS 1000 of the DEP SOPs.

**1.4.6. TESTING EQUIPMENT:**

List the equipment to be used to collect field measurements.

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1.4.6.1. **OTHER ACTIVITIES:** Unless otherwise specified, all field activities shall be consistent with the DEP SOPs.

1.4.7. **NON-STANDARD OR ALTERNATE FIELD METHODS:**

Attach, for review and approval, copies of any non-standard field procedures to be used. See FA 2100 for specific information to be included.

**1.5. Laboratory Activities**

1.5.1. **LABORATORY CERTIFICATIONS:**

If required, attach copies the Department of Health Environmental Laboratory Certification Program certificates (must include the list of test methods).

1.5.2. **NON-STANDARD LABORATORY METHODS:**

1.5.2.1. Method(s) Already Approved by DEP

1.5.2.1.1. Attach copies of any non-standard laboratory method with a summary table of the initial demonstration of capability and method detection limit studies.

1.5.2.1.2. State how the use of these methods meets the DQOs and DQIs outlined in 1.2 and 1.3 above.

1.5.2.1.3. Include a copy of the letter of approval from DEP.

1.5.2.2. New or Alternative Methods

1.5.2.2.1. Provide all information and studies as directed by DEP-QA-001/02.

1.5.2.2.2. State how the use of these methods meets the DQOs and DQIs outlined in 1.2 and 1.3 above.

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## **2. DOCUMENTATION, RECORD KEEPING REQUIREMENTS**

All laboratory and field records and data must be retained for at least 5 years after the completion of the project. The contract manager may specify longer time periods.

### **2.1. Documentation**

#### **2.1.1. FIELD**

Documentation for field activities shall be consistent with the Department's Standard Operating Procedures and Chapter 3 of this document.

#### **2.1.2. LABORATORY**

Keep records of all laboratory activities. The records to be maintained must be consistent with the NELAC requirements and Chapter 3 of this document.

### **2.2. Organization**

#### **2.2.1. PROJECT RECORDS**

2.2.1.1. The laboratory and field records for a project must be linked so that information on the project can be easily and quickly retrieved.

2.2.1.2. A project file, or electronic tracking is recommended.

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Documentation, Record keeping Requirements

### **3. REPORTING REQUIREMENTS**

#### **3.1. Format**

##### **3.1.1. LABORATORY REPORT FORMAT**

All laboratory test data must be submitted on formal laboratory reports that are consistent with section 5.13 of the NELAC standards. The contract manager may also require data to be presented in another format (summary tables, graphs, etc.)

##### **3.1.2. FIELD INFORMATION**

Field information and test measurements shall be submitted according to the contract manager's specifications.

#### **3.2. Report Contents**

In addition to formal laboratory reports (see 3.1 above), the Department may request some or all of the following field and laboratory information and any documentation records as noted in 2.1. The laboratory-related information may be incorporated into the formal laboratory report (see 3.1.1 above.)

##### **3.2.1. FIELD-RELATED DATA - GEOLOCATIONAL INFORMATION**

- 3.2.1.1. Site and/or facility name, address and phone number;
- 3.2.1.2. Site and/or facility locational information to include:
- 3.2.1.3. Latitude measure in degrees-minutes-seconds (seconds may contain up to four decimal places);
- 3.2.1.4. Longitude measure in degrees-minutes-seconds (seconds may contain up to four decimal places);
- 3.2.1.5. Datum – the horizontal reference for measuring locations on the Earth's surface;
- 3.2.1.6. Spheroid – the ellipsoid used as a model for the surface of the Earth;
- 3.2.1.7. Collection method – the method or mechanism used to derive the measurements;
- 3.2.1.8. Collector name – name of individual who collected the locational data;
- 3.2.1.9. Collector affiliation – collector's agency or entity affiliation;
- 3.2.1.10. Collection date – date locational data were collected;
- 3.2.1.11. Relationship of point to feature – the type of the feature for which the measurement is being made; and
- 3.2.1.12. Coordinate accuracy level – the measured, estimated or deduced degree of correctness of the measurement;

##### **3.2.2. FIELD ACTIVITIES**

- 3.2.2.1. Client or field identification number for each sample;
- 3.2.2.2. Replicate sample reference (an unambiguous reference to any field replicate samples);
- 3.2.2.3. Sampling method(s) used;
- 3.2.2.4. Sample field filtered? (Yes or No – was the sample filtered in the field?);
- 3.2.2.5. Results of any field measurements;
- 3.2.2.6. Analytical method;
- 3.2.2.7. Calibration activities including date(s) and time(s) of initial and calibration checks
- 3.2.2.8. Results of all calibration checks including acceptance
- 3.2.2.9. Date and time of sample collection;
- 3.2.2.10. Sampler(s);
- 3.2.2.11. Meteorological information;
- 3.2.2.12. Purging and sampling equipment (including construction);

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- 3.2.2.13. Quality control samples taken with results;
- 3.2.2.14. Date and Time of Field Measurements
- 3.2.2.15. If applicable, Calculations to Determine Purge Volume;
- 3.2.2.16. If applicable, Purge Beginning and Ending Times and Volume Purged;
- 3.2.2.17. Preservation Method;
- 3.2.2.18. Sample Collection Depth
- 3.2.3. LABORATORY RELATED DATA - UNIVERSAL INFORMATION**
  - 3.2.3.1. Laboratory name, address and phone number;
  - 3.2.3.2. Client name and/or site name;
  - 3.2.3.3. Client or field identification number for each sample;
  - 3.2.3.4. Date and time of sample collection;
  - 3.2.3.5. Sample matrix (e.g., groundwater, effluent, waste, soil, etc.);
  - 3.2.3.6. Sample type (e.g., environmental sample, field blank, matrix spike);
  - 3.2.3.7. Laboratory identification number for each sample fraction;
  - 3.2.3.8. Type of chemical and/or physical sample preservative and if intact at sample receipt/analysis;
  - 3.2.3.9. Sample analysis method;
  - 3.2.3.10. Sample preparation method, if applicable;
  - 3.2.3.11. Date of sample preparation, if applicable;
  - 3.2.3.12. Time of sample preparation if the holding time specified in Rule 62-160.400, F.A.C. is less than or equal to 48 hours;
  - 3.2.3.13. Date of sample analysis;
  - 3.2.3.14. Time of sample analysis if the holding time specified in Rule 62-160.400, F.A.C. is less than or equal to 48 hours;
  - 3.2.3.15. Identification of all laboratories providing analytical results in the report and the appropriate laboratory certification numbers from the DOH ELCP (if applicable) for each laboratory;
  - 3.2.3.16. Textual comments, if applicable, that specify any samples failing to meet preservation, container or holding time as determined by laboratory at sample receipt;
  - 3.2.3.17. Textual comments, if applicable, that specify any deviations (such as failed quality control), additions to, or exclusions from, the analytical method (such as environmental conditions), and any non-standard conditions that may have affected the quality of results;
  - 3.2.3.18. The analytical result for each analysis with applicable Data Qualifiers, as specified in Table 1: Data Qualifiers Codes;
    - 3.2.3.18.1. Non-detected analytes shall be indicated by the method detection limit value, followed by the code "u";
    - 3.2.3.18.2. Laboratories may report a non-detected analyte whose method detection limit is two orders of magnitude below the target criterion with a value no greater than one order of magnitude below the target criteria. Such values shall be reported with a "u" qualifier.
- 3.2.4. LABORATORY DATA - CHEMICAL TESTING:**
  - 3.2.4.1. Analyte name;
  - 3.2.4.2. Analyte CAS registry number, if available;
  - 3.2.4.3. Result units;
  - 3.2.4.4. Sample lab filtered? (Yes or No – was the sample filtered in the laboratory?);
  - 3.2.4.5. Method detection limit(s);
  - 3.2.4.6. Practical quantitation limit(s);
  - 3.2.4.7. Dilution factor;
  - 3.2.4.8. Batch ID (unambiguous reference linking samples prepared or analyzed together);

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- 3.2.4.9. Replicate sample reference (an unambiguous reference to laboratory replicate samples);
- 3.2.4.10. Matrix spike concentration level (level of analyte added to a spiked sample);
- 3.2.4.11. Matrix spike recovery (results for matrix spike/duplicate sample analysis required by methods);
- 3.2.4.12. Matrix spike duplicate recovery (results for matrix spike/duplicate sample analysis as required by the method);
- 3.2.4.13. Matrix spike precision (results for matrix spike/duplicate sample analysis as required by methods expressed as Relative Percent Difference or % Relative Standard Deviation, as defined in DEP-QA-001/01 (January 1, 2002);
- 3.2.4.14. Matrix spike recovery limits (in-house recovery limits used by the data generator to control their process);
- 3.2.4.15. Matrix spike precision limits (in-house recovery limits used by the data generator to control their process);
- 3.2.4.16. Results for laboratory replicate samples (results for duplicate/replicate sample analysis as required by the method);
- 3.2.4.17. Laboratory blank results (results for any laboratory blank analysis as required by the method and DEP-SOP-001/01 (January 1, 2002);
- 3.2.4.18. Field quality control results including trip blanks, field blanks, equipment blanks, and field replicates as specified in the sampling and analysis plan or quality assurance project plan;
- 3.2.4.19. Surrogate spike recovery (if surrogate spikes are required by the method);
- 3.2.4.20. Surrogate recovery limits (if surrogates are required by the method);
- 3.2.4.21. Laboratory control spike concentration level (level of analyte added to a spiked sample);
- 3.2.4.22. Laboratory control spike recovery (results for matrix spike/duplicate sample analysis required by methods);
- 3.2.4.23. Laboratory control spike duplicate recovery (results for matrix spike/duplicate sample analysis as required by the method);
- 3.2.4.24. Laboratory control spike precision (results for matrix spike/duplicate sample analysis as required by methods expressed as Relative Percent Difference or % Relative Standard Deviation, as defined in DEP-QA-001/01 (January 1, 2002);
- 3.2.4.25. Laboratory control spike recovery limits (in-house recovery limits used by the data generator to control their process);
- 3.2.4.26. Laboratory control spike precision limits (in-house recovery limits used by the data generator to control their process);
- 3.2.5. **LABORATORY DATA - TOXICITY (BIOASSAY) TESTING:**
  - 3.2.5.1. Test type (acute or chronic);
  - 3.2.5.2. Test organism(s) used;
  - 3.2.5.3. Age(s) of test organism(s);
  - 3.2.5.4. Test result(s);
  - 3.2.5.5. Statistical method used to generate the result(s);
  - 3.2.5.6. Control data (mortality/weight/reproduction, etc.) as appropriate to test type;
  - 3.2.5.7. Test end points and confidence intervals;
  - 3.2.5.8. Standard reference toxicant data associated with batch of test organisms;
  - 3.2.5.9. Physical and chemical measures (pH, temperature, dissolved oxygen, etc.).
- 3.2.6. **LABORATORY DATA - BENTHIC INVERTEBRATE TAXONOMIC IDENTIFICATION:**
  - 3.2.6.1. Sorting efficiency, as percent (%);
  - 3.2.6.2. Number and identity of taxa in sample;
  - 3.2.6.3. Percent agreement between or among identifications performed by two or more independent taxonomists associated with period when results were generated;

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- 3.2.6.4. Were all organisms verified against standard reference collection? (Yes or No);
- 3.2.6.5. Does organism range include Florida? (Yes or No).
- 3.2.7. **LABORATORY DATA - ALGAL TAXONOMIC IDENTIFICATION:**
  - 3.2.7.1. Percent agreement between or among identifications performed by two or more independent taxonomists associated with period when results were generated;
  - 3.2.7.2. Number and identity of taxa in sample;
  - 3.2.7.3. Microscope magnification;
  - 3.2.7.4. Dilution factor;
  - 3.2.7.5. Surface area sampled (periphyton); volume sampled (phytoplankton);
  - 3.2.7.6. Number of fields counted;
  - 3.2.7.7. Counting chamber dimensions.
- 3.2.8. **LABORATORY DATA - MICROBIOLOGICAL TESTING:**
  - 3.2.8.1. Identity of test;
  - 3.2.8.2. Test result with applicable data qualifiers, as specified in Table 1: Data Qualifiers Codes;
  - 3.2.8.3. Test result units;
  - 3.2.8.4. Results for laboratory replicate samples (results for duplicate/replicate sample analysis as required by the method) and field replicate samples, if performed;
  - 3.2.8.5. Replicate sample reference (an unambiguous reference to laboratory replicate samples);
  - 3.2.8.6. Verification/Confirmatory tests as applicable
  - 3.2.8.7. Field and laboratory blank results (results for any field and laboratory blank analysis as required by the method and DEP-SOP-001/01- January 1, 2002);
  - 3.2.8.8. Number of colonies in dilution water suitability test associated with samples;
  - 3.2.8.9. Optimal growth in media test? (Yes or No).

### **3.3. Reporting Levels**

The designations for reporting levels are related to specific types of electronic or manual data review protocols. When a specific tier is required by contract, all the information for that tier must be provided. Additional information may be requested by the contract manager for any of the tiers. When electronic submission is required, the format specified in 3.4 must be used.

#### **3.3.1. TIER 1**

The following items must be provided and may be included in the formal laboratory report (see 3.1):

- 3.3.1.1. Analytical Information:
  - ▶ Sample ID
  - ▶ Parameter name (Field & Laboratory Test Measurements)
  - ▶ Analytical result (Field & Laboratory Test Measurements)
  - ▶ Result units (Field & Laboratory Test Measurements)
  - ▶ DEP Qualifiers (Field & Laboratory Test Measurements)
  - ▶ Result comment
  - ▶ Date (Time) of sample preparation
  - ▶ Date (Time) of sample analysis
  - ▶ Analytical/Test method
  - ▶ Preparation intact upon receipt at laboratory
  - ▶ Sample matrix
  - ▶ DoH ELCP certification number for each laboratory
  - ▶ MDL
  - ▶ PQL
  - ▶ Sample Type

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- ▶ Field, Lab Blank Results:
  - ▶ Laboratory blank results (results for any laboratory blank analysis as required by the method and DEP-SOP-001/01 (January 1, 2002);
  - ▶ Field quality control results including trip blanks, field blanks, equipment blanks, and field replicates as specified in the sampling and analysis plan or quality assurance project plan;
- ▶ CAS Number
- ▶ Batch Identification (for analytical method blank)
- 3.3.1.2. Field Information:
  - ▶ Site and/or facility name, address and phone number
  - ▶ Field ID for each sample containers that corresponds to the laboratory sample ID
  - ▶ Date (Time) of sample collection
  - ▶ Sample Collection Method identified by the DEP SOP number
  - ▶ Field Test method References (use DEP SOP numbers)
  - ▶ If Performed, indicate Samples that were Filtered
  - ▶ Meteorological Information
  - ▶ Preservatives added
- 3.3.1.3. Other Test Information:
  - 3.3.1.3.1. Toxicity Testing:
    - ▶ Test organism(s) used
    - ▶ Statistical method used to generate the results
    - ▶ Test end points and confidence intervals
  - 3.3.1.3.2. Algal and Benthic Invertebrate Taxonomic Identification
    - ▶ Number and identity of taxa in sample
- 3.3.2. **TIER 2**

In addition to the information in Tier 1, these additional data must be provided:
- 3.3.2.1. Laboratory Data - Chemical
  - ▶ Dilution Factor
  - ▶ Batch ID (unambiguous reference linking samples prepared or analyzed together);
  - ▶ Replicate sample reference (an unambiguous reference to laboratory replicate samples);
  - ▶ Matrix spike concentration level (level of analyte added to a spiked sample);
  - ▶ Matrix spike recovery (results for matrix spike/duplicate sample analysis required by methods);
  - ▶ Matrix spike duplicate recovery (results for matrix spike/duplicate sample analysis as required by the method);
  - ▶ Matrix spike precision (results for matrix spike/duplicate sample analysis as required by methods expressed as Relative Percent Difference or % Relative Standard Deviation, as defined in DEP-QA-001/01 (January 1, 2002);
  - ▶ Matrix spike recovery limits (in-house recovery limits used by the data generator to control their process);
  - ▶ Matrix spike precision limits (in-house recovery limits used by the data generator to control their process);
  - ▶ Results for laboratory replicate samples (results for duplicate/replicate sample analysis as required by the method);
  - ▶ Surrogate spike recovery (if surrogate spikes are required by the method);
  - ▶ Surrogate recovery limits (if surrogates are required by the method);
  - ▶ Laboratory control spike concentration level (level of analyte added to a spiked sample);

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- ▶ Laboratory control spike recovery (results for matrix spike/duplicate sample analysis required by methods);
- ▶ Laboratory control spike duplicate recovery (results for matrix spike/duplicate sample analysis as required by the method);
- ▶ Laboratory control spike precision (results for matrix spike/duplicate sample analysis as required by methods expressed as Relative Percent Difference or % Relative Standard Deviation, as defined in DEP-QA-001/01 (January 1, 2002);
- ▶ Laboratory control spike recovery limits (in-house recovery limits used by the data generator to control their process);
- ▶ Laboratory control spike precision limits (in-house recovery limits used by the data generator to control their process);
- 3.3.2.2. Laboratory Data - Toxicity
  - ▶ Age(s) of test organism(s)
  - ▶ Control data (mortality/weight/reproduction, etc.) as appropriate to the test type
  - ▶ Standard reference toxicant data associated with batch of test samples
  - ▶ Physical and chemical measures (pH, temperature, dissolved oxygen, etc.)
- 3.3.2.3. Laboratory Data – Benthic Invertebrate Taxonomic Identification
  - ▶ Sorting Efficiency
  - ▶ Percent agreement between or among identifications performed by two or more independent taxonomists
  - ▶ Percentage verified against standard reference collection
  - ▶ Range checking
- 3.3.2.4. Laboratory Data – Periphyton
  - ▶ Percent agreement between or among identifications performed by two or more independent taxonomists associated with period when results were generated
  - ▶ Microscope magnification
  - ▶ Dilution factor
  - ▶ Surface area sampled (periphyton); volume sampled (phytoplankton)
  - ▶ Number of field counted
  - ▶ Counting chamber dimensions
- 3.3.2.5. Laboratory Data – Microbiological
  - ▶ Results for laboratory replicate samples (results for duplicate/replicates sample analysis as required by the method.
  - ▶ Replicate sample reference
  - ▶ Verification/Confirmatory tests as applicable
  - ▶ Number of colonies in dilution water suitability test associated with samples
  - ▶ Indication of optimal growth in media tests.
- 3.3.2.6. Field Data -
  - ▶ Replicate sample reference (an unambiguous reference to any field replicate samples)
  - ▶ Calibration activities including date(s) and time(s) of initial and calibration checks
  - ▶ Results of all calibration checks including acceptance
  - ▶ Sampler(s)
  - ▶ Purging and sampling equipment (including construction)



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- Date and Time of Field Measurements
- If applicable, Calculations to Determine Purge Volume
- If applicable, Purge Beginning and Ending Times and Volume Purged
- Preservation Method
- Sample Collection Depth
- Geolocational data as specified in 3.2.1

**3.3.3. TIER 3**

Tier 3 consists of Tier 1, Tier 2 and all remaining applicable information in 3.2 and may require copies of original documents (field notes, chromatograms, etc.) as required by 2.1

**3.4. *Electronic Reports***

- 3.4.1.1. Data must be provided in a tab-delimited format.
- 3.4.1.2. The data elements specified in Table 2 must be included.
- 3.4.1.3. A specific format when required will be specified in the contract.

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Reporting Requirements

#### **4. QUALITY CONTROL REQUIREMENTS**

##### **4.1.1. QUANTITATIVE DATA QUALITY INDICATORS**

4.1.1.1. All quality control measures specified by the NELAC standards, the Department's standard operating procedures and the contract requirements shall be implemented.

4.1.1.2. Each QC measure shall be assessed against acceptance criteria and corrective actions taken if any criterion is not met.

4.1.1.3. Data that are associated with an unacceptable QC measure must be appropriately qualified (see Table 1).

4.1.1.4. All QC reviews, assessments and corrective actions shall be documented.

##### **4.1.2. COMPARISON CHECKING**

When relevant chemical analyses are performed, the following comparisons must be calculated. Any observed failures of criteria specified below must be investigated by reanalysis of sample aliquots. Only results for samples meeting criteria will be accepted by FDEP unless the laboratory provides a plausible, documented explanation.

4.1.2.1. The total anion charge must be within 80% - 110% of the total cation charge, if the measured conductivity is greater than 100 umho/cm. At a minimum, calcium, magnesium, sodium, alkalinity, sulfate, and chloride must be analyzed for the charge balance check to be valid. Potassium and nitrate analyses must be included in the calculation if these analyses were performed.

4.1.2.2. The measured specific conductivity (umho/cm) must be within 80% - 120% of the conductivity estimated from major cation concentrations (calcium, magnesium, sodium, and potassium). The conductivity may be estimated from the major cations by multiplying the sum of the major cation concentrations (in mg/L) by a factor of five. For measured conductivities below 100 umho/cm, meeting this criterion is unnecessary. If the initial charge balance calculation passes the criterion, comparison of conductivity with major cation concentrations is not required.

4.1.2.3. The measured specific conductivity (umho/cm) must be within 80% - 120% of the conductivity estimated from major anion concentrations. The conductivity may be estimated from the major anions by multiplying the quantity  $[0.6 \times (\text{alkalinity concentration in mg CaCO}_3/\text{L}) + (\text{chloride concentration in mg/L}) + (\text{sulfate concentration in mg/L})]$  by a factor of three. For measured conductivities below 100 umho/cm, meeting this criterion is unnecessary. If the initial charge balance calculation passes the criterion, comparison of conductivity with major anion concentrations is not required.

4.1.2.4. The measured laboratory conductivity must be within 80% - 120% of the measured field conductivity. If both conductivity measurements are both below 100 umho/cm, meeting this criterion is unnecessary.

4.1.2.5. The TDS concentration (in mg/L) must be within 40% - 120% of the measured conductivity (in umho/cm). If both measurements are below 100 (in mg/L or umho/cm<sup>2</sup>, respectively), meeting this criterion is unnecessary.

4.1.2.6. The measured TDS must be within 80% - 130% of the calculated TDS. If both measurements are below 100 umho/cm, meeting this criterion is unnecessary.

4.1.2.7. The total ammonia concentration must be less than 120% of the TKN concentration.

4.1.2.8. The orthophosphate concentration must be less than 120% of the total phosphorus concentration.

4.1.2.9. The DOC measurement must be less than 120% of the TOC measurement.

4.1.2.10. The nitrate concentration must be less than 120% of the total nitrite/nitrate concentration.

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4.1.2.11. The nitrite concentration must be less than 120% of the total nitrite/nitrate concentration.

4.1.2.12. The sum of nitrite and nitrate concentrations must be within 80% - 120% of the measured total nitrite/nitrate concentration.

4.1.2.13. All filtered sample results must be less than 120% of the corresponding unfiltered sample results.

**4.1.3. DATA USABILITY ASSESSMENT, VALIDATION AND VERIFICATION REQUIREMENTS**

4.1.3.1. An assessment of aliquot, sample and sample set results for the final deliverables must be conducted to ensure that project data quality objectives are met and to correct errors not readily apparent from the assessment of analytical runs. In addition assessing the contract-specified quality control measures and comparison checking, each of the usability assessment checks described below must be conducted for all samples, when relevant to the analysis.

4.1.3.2. These checks must be authorized by a reviewer different from the technician and/or analyst who produced the result, and who is a degreed natural scientist with at least 3 years of relevant postgraduate experience. If errors or problems are identified through any of the following checks, corrective action must be taken that is appropriate to the problem (e.g., reanalysis, confirmation, data qualification, troubleshooting, documentation, etc.).

4.1.3.3. All verifications and reviews must be clearly documented by date, nature of the review and the reviewer/verifier.

4.1.3.3.1. Verify that all other requirements specified in the contract have been satisfied.

4.1.3.3.2. Recalculate at least 5% of all manual calculations for accuracy. This includes field data such as purging volume.

4.1.3.3.3. Verify at least 5% of all data transfers that are not totally electronic.

4.1.3.3.4. Verify that the received date/time precedes the preparation date/time and that both dates/times precede the analysis date/time for all analytes, samples and tests.

4.1.3.3.5. Verify that the preparation and/or analysis dates and times and names of sample preparation staff are correctly reported for each analyte. This is particularly important whenever samples have been prepared more than once.

4.1.3.3.6. Verify that the analysis methodologies used were those required for the project.

4.1.3.3.7. Verify that preservation was intact upon receipt of samples by the laboratory, and that preservation was appropriate for the sample aliquot. Results for improperly preserved samples must be appropriately qualified per Chapter 62-160, F.A.C., with an explanatory comment.

4.1.3.3.8. Verify that preparations and analyses were performed within holding times. Any data generated from sample aliquots that exceeded holding times must be properly qualified with a "Q" qualifier code and an appropriate explanatory comment.

4.1.3.3.9. Verify that reported MDLs meet project data quality objectives (unless precluded by sample matrix interference).

4.1.3.3.10. Verify that all comments in the final report are appropriate to the analysis and that each result associated with a QC failure has an appropriate explanatory comment.

4.1.3.3.11. Verify that all quality control elements are available and reported for all analytes, tests and batches. If the quality control elements do not meet criteria or are unavailable, appropriate qualification codes and comments must be present in the final report.

4.1.3.3.12. Review sample results relative to project-specific criteria or action levels, such as surface water criteria, historical levels, expected results, etc. Confirm any

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exceedences of criteria or action levels that may be suspect or challenged, providing appropriate comments in the final report.

4.1.3.3.13. Verify that suitable qualifiers and comments are employed for all qualified results, ensuring that qualifier codes from Chapter 62-160, F.A.C. are used, where relevant.

4.1.3.3.14. Verify that that the results between analytes run by two different methods are comparable.

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Appendix A Tables

**APPENDIX A - TABLES**

Requirements for Direct Contracts  
Appendix A Tables



Requirements for Direct Contracts  
Appendix A Tables  
**Table 1**  
**Data Qualifiers**

The following codes shall be used by laboratories when reporting data values that either meet the specified description outlined below or do not meet the quality control criteria of the laboratory:<sup>1</sup>

SYMBOL	MEANING
A	Value reported is the arithmetic mean (average) of two or more determinations. This code shall be used if the results of two or more discrete and separate samples are averaged. These samples shall have been processed and analyzed (e.g., laboratory replicate samples, field duplicates, etc.) independently. Do not use this code if the data are the result of replicate analysis on the same sample aliquot, extract or digestate. Under most conditions, replicate values shall be reported as individual analyses.
B	Results based upon colony counts outside the acceptable range. This code applies to microbiological tests and specifically to membrane filter colony counts. The code is to be used if the colony count is generated from a plate in which the total number of coliform colonies is outside the method indicated ideal range. This code is not to be used if a 100 mL sample has been filtered and the colony count is less than the lower value of the ideal range.
F	When reporting species: F indicates the female sex.
H	Value based on field kit determination; results may not be accurate. This code shall be used if a field screening test (i.e., field gas chromatograph data, immunoassay, vendor-supplied field kit, etc.) was used to generate the value and the field kit or method has not been recognized by the Department as equivalent to laboratory methods.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate. This code shall be used in the following instances: <ol style="list-style-type: none"><li>1. Surrogate recovery limits have been exceeded;</li><li>2. No known quality control criteria exist for the component;</li><li>3. The reported value failed to meet the established quality control criteria for either precision or accuracy;</li><li>4. The sample matrix interfered with the ability to make any accurate determination; or</li><li>5. The data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample).</li></ol> Note: a "J" value shall be accompanied by justification for its use. A "J" value shall not be used if another code applies (e.g., K, L, M, T, V, Y, I).

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<sup>1</sup> Table 1 from Chapter 62-160, F.A.C.

Requirements for Direct Contracts  
Appendix A Tables  
**Table 1**  
**Data Qualifiers**

SYMBOL	MEANING
K	Off-scale low. Actual value is known to be less than the value given. This code shall be used if: 1. The value is less than the lowest calibration standard and the calibration curve is known to be non-linear; or 2. The value is known to be less than the reported value based on sample size, dilution or some other variable. This code shall not be used to report values that are less than the laboratory practical quantitation limit or laboratory method detection limit.
L	Off-scale high. Actual value is known to be greater than value given. To be used when the concentration of the analyte is above the acceptable level for quantitation (exceeds the linear range or highest calibration standard) <u>and</u> the calibration curve is known to exhibit a negative deflection.
M	When reporting chemical analyses: presence of material is verified but not quantified; the actual value is less than the value given. The reported value shall be the laboratory practical quantitation limit. This code shall be used if the level is too low to permit accurate quantification, but the estimated concentration is greater than the method detection limit. If the value is less than the method detection limit use "T" below.
N	Presumptive evidence of presence of material. This qualifier shall be used if: 1. The component has been tentatively identified based on mass spectral library search; <u>or</u> 2. There is an indication that the analyte is present, but quality control requirements for confirmation were not met (i.e., presence of analyte was not confirmed by alternative procedures).
O	Sampled, but analysis lost or not performed.
Q	Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.
T	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes, only and shall not be used in statistical analysis.
U	Indicates that the compound was analyzed for but not detected. This symbol shall be used to indicate that the specified component was not detected. The value associated with the qualifier shall be the laboratory method detection limit. Unless requested by the client, less than the method detection limit values shall not be reported (see "T" above).
V	Indicates that the analyte was detected in both the sample and the associated method blank. Note: the value in the blank shall not be subtracted from associated samples.

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Appendix A Tables  
**Table 1**  
**Data Qualifiers**

SYMBOL	MEANING
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*	Not reported due to interference.
The following codes deal with certain aspects of field activities. The codes shall be used <u>if</u> the laboratory has knowledge of the specific sampling event. The codes shall be added by the organization collecting samples if they apply:	
D	Measurement was made in the field (i.e., in situ). This applies to any value (except pH, specific conductance, dissolved oxygen, temperature, total residual chlorine, transparency, or salinity) that was obtained under field conditions using approved analytical methods. If the parameter code specifies a field measurement (e.g., "Field pH"), this code is not required.
E	Indicates that extra samples were taken at composite stations.
R	Significant rain in the past 48 hours. (Significant rain typically involves rain in excess of ½ inch within the past 48 hours.) This code shall be used when the rainfall might contribute to a lower than normal value.
!	Data deviates from historically established concentration ranges.

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Appendix A Tables  
**Table 1**  
**Data Qualifiers**

Requirements for Direct Contracts  
Appendix A Tables  
**Table 2**  
**Data Elements**

<b>Data Element</b>	<b>Description</b>	<b>Data Type</b>	<b>Data Dictionary Required</b>
Laboratory Sample ID	Unique sample identifier assigned by contract laboratory. Each sample must have a unique value, including laboratory and field QC samples.	Text (20)	N
Parameter Name	Name of the parameter measured	Text (60)	Y
CAS Number	Chemical Abstracts registry number of the parameter measured	Text (15)	Y
Result	Analytical Result reported at an appropriate number of significant digits, using no non-numeric characters. For non-detects, enter the MDL and place the "U" qualifier in the appropriate field.	Text (20)	N
Result Units	Units in which the measurement is reported	Text (15)	Y
Qualifiers	FDEP qualifiers associated with the result, as listed in Chapter 62-160, FAC	Text (7)	Y
Result Comments	Free-form text where data provides relates information they consider relevant to the result. Not intended to replace the qualifier.	Text (255)	N
Date/Time Sampled	Date and time of sample collection	Date/Time	N
Date/Time Prepared	Date and time of sample preparation	Date/Time	N
Date/Time Analyzed	Date and time of sample analysis	Date/Time	N
Preparation Method	Laboratory preparation method name, expressed according to a data dictionary provided by the Bureau of Laboratories.	Text (35)	Y
Analysis Method	Laboratory analysis method name, expressed according to a data dictionary provided by the Bureau of Laboratories.	Text (35)	Y
Matrix	Indication of whether the sample is surface or groundwater, fresh or marine, water or sediment, etc., according to a data dictionary provided by the Bureau of Laboratories	Text (10)	Y
Laboratory ID	Certification number issued by the Florida Department of Health	Text (10)	N
Preservation	Description of the preservatives added or applied to the sample after collection	Text (50)	N
Method Detection Limit	Laboratory specific method detection limit for the parameter, corrected for volume, dilution, and dry weight as applicable.	Text (20)	N
Practical Quantitation Limit	Laboratory specific practical quantitation limit for the parameter, corrected for volume, dilution, and dry weight as applicable	Text (20)	N
Sample Type	Field identifying the nature of the sample (target compound, trip blank, field duplicate, etc)	Text (10)	Y
Batch ID	Unambiguous reference linking samples collected, prepared or analyzed together	Text (20)	N
Field Sample	Unambiguous identifier, assigned by sample collector that	Text	N

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Appendix A Tables  
**Table 2**  
**Data Elements**

<b>Data Element</b>	<b>Description</b>	<b>Data Type</b>	<b>Data Dictionary Required</b>
ID	links the collected sample to the collection date, time, and place and sample container.	(20)	
Preservation Intact?	Indication by laboratory that preservation was appropriate upon receipt	Text (3)	No

## **APPENDIX B - GLOSSARY OF TERMS AND ACRONYMS**

<b>Acceptance criteria</b>	The numerical limits, prescribed by an approved analytical method, internal data or other preestablished data quality objectives, by which an analytical system or analysis result is verified. Also known as control limits. Acceptance criteria are usually established for calibration, precision, sensitivity and accuracy.
<b>Accuracy</b>	The degree of agreement of a measurement (or an average of measurements of the same thing), $X$ , with an accepted reference or true value, $T$ , usually expressed as the difference between the two values, $X-T$ , or the difference as a percentage of the reference or true value, $100 (X-T)/T$ , and sometimes expressed as a ratio, $X/T$ . Accuracy is a measure of the bias in a system.
<b>Alternative method</b>	A field procedure or analytical laboratory method that involves the collection or testing of environmental samples for an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved method already exists. An alternative method is one intended to be used in place of an existing Department-approved laboratory method or field procedure.
<b>Analyte</b>	Any measured quantity reported in final units of concentration.
<b>Analyte group</b>	A categorical grouping of analytes based on shared sample collection procedure and equipment construction restrictions. See Tables FA 1000-1 and FA 1000-2.
<b>Analyte-free water</b>	Water free of all positive or negative analytical interferences in which all analytes of interest are below method detection limits.
<b>Audit</b>	A systematic check to determine the quality of the operation of a function, procedure or activity.
<b>Blank</b>	An artificial quality control sample of an analytical matrix designed to monitor the introduction of artifacts and interferences into a sample collection or analytical system.
<b>Blind sample</b>	A quality control sample of known composition whose analytical characteristics are unknown to an audited analyst or organization.
<b>Calibration</b>	The process by which the correlation between instrument response and actual value of a measured analyte or parameter is determined.

Requirements for Direct Contracts  
Appendix B - Glossary of Terms and Acronyms

<b>Calibration curve</b>	A curve that plots the concentration of known analyte standards against the instrument response to the analyte. Also known as a standard curve.
<b>Calibration standard</b>	Solutions or purified quantities of a substance or material with a verifiable composition that are used to measure the amount or value of an analyte or parameter in an unknown sample. Calibration standards are used to establish a calibration curve or instrument response factor.
<b>Chemical Abstracts Service (CAS) Registry Number</b>	A unique number assigned to a chemical by the Chemical Abstracts Service Registry. The CAS is a division of the American Chemical Society and is internationally recognized as the producer of the largest and most comprehensive database of chemical information. The CAS Registry Number provides an unambiguous way to identify a chemical substance or molecular structure.
<b>Comparability</b>	Expresses the statistical confidence with which one data set can be compared to another.
<b>Completeness</b>	Expressed as the amount of usable data obtained compared to the amount that was expected to have been obtained. (Takes into account samples or data that did not meet the specified data quality objectives.
<b>Confidence level</b>	The statistical probability associated with an interval of variance. Usually expressed as percent probability. The result being tested is significant if the calculated probability is greater than 90 percent and is highly significant if the probability is greater than 99 percent.
<b>Continuing calibration standard</b>	A standard analyzed during a measurement process to verify the accuracy of a calibration curve or other instrument calibration.
<b>Data quality</b>	The features and characteristics of a set of data that determine its suitability for a given purpose. Examples of data quality include accuracy, precision, sensitivity, representativeness and comparability.
<b>Data quality indicators (DQI)</b>	A series of indicators that collectively define the quality of the submitted data. These indicators include <i>qualitative indicators</i> such as precision, accuracy, completeness and detection limits, and the <i>quantitative indicators</i> of representativeness and comparability.
<b>Data quality objectives (DQO)</b>	A set of specifications established for an intended use of a set of data.



Requirements for Direct Contracts  
Appendix B - Glossary of Terms and Acronyms

<b>Data validation</b>	An audit in which data are evaluated according to predetermined validation criteria established as data quality objectives.
<b>DEP / The Department</b>	Florida Department of Environmental Protection
<b>Detection limit (MDL)</b>	The smallest amount of an analyte that can be measured with a stated probability of significance.
<b>DoH ELCP</b>	Department of Health Environmental Laboratory Certification Program. This program is recognized by the National Environmental Laboratory Accreditation Program (NELAP) as an authority with responsibility and accountability for granting accreditation for specified fields of laboratory testing. The standards used by the DOH ELCP are those established by the National Environmental Laboratory Accreditation Conference (NELAC) as specified in Chapter 64E-1, F.A.C.
<b>Environmental sample</b>	Any sample from a natural or other source that may reasonably be expected to contribute pollution to or receive pollution from ground waters or surface waters of the state. [Definition per Rule 10D-41.101(7), F.A.C.]
<b>EPA</b>	Refers to the United States Environmental Protection Agency
<b>Equipment blank</b>	Quality control blanks prepared on-site during sampling by pouring analyte-free water through decontaminated field equipment into appropriate sample containers for each matrix and analyte group of interest. Equipment blanks are chemically preserved, stored, transported and analyzed with the collected field samples.
<b>External</b>	Refers to operations, personnel, documents and protocols from a party that is separate from or outside the specified organization.
<b>Field blanks</b>	Quality control blanks prepared on-site during sampling by pouring analyte-free water into appropriate sample containers for each analyte group of interest. Field blanks are chemically preserved, stored, transported and analyzed with the collected field samples.
<b>Field spike</b>	An environmental sample fortified to a known and validated concentration in the field during sampling. These quality control samples are sometimes submitted as blind samples to the analyzing laboratory.
<b>Instrument detection limit</b>	The smallest amount of an analyte of interest that generates an instrument response (signal) under prescribed conditions such that the magnitude of the signal is larger than the absolute uncertainty (error) associated with the signal.

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Appendix B - Glossary of Terms and Acronyms

<b>Interference</b>	Any substance in a sample that may fortify or diminish the amount of an analyte or otherwise affect the ability to detect and quantify an analyte in the sample.
<b>Internal</b>	Refers to operations, personnel, documents and protocols within the specified organization.
<b>Internal standard</b>	A compound having similar chemical characteristics to the compounds of interest but which is not normally found in the environment or does not interfere with the compounds of interest. A known and specified concentration of the standard is added to each sample prior to analyses. The concentration in the sample is based on the response of the internal standard relative to that of the calibration standard and the compound in the standard.
<b>Legal or evidentiary chain of custody</b>	A sample custody protocol in which all personnel, time intervals and supporting activities associated with the collection, possession, handling, processing, analysis, transport, storage and disposal of a specific sample are documented.
<b>Method blank</b>	A blank of an appropriate analyte-free matrix that is processed (digested, extracted, etc.) and analyzed with a specified sample set.
<b>Method detection limit</b>	The smallest amount of an analyte that can be analyzed by a given measurement system under specified conditions of sample processing and analysis and reported with a 99% confidence that the concentration of the analyte in the sample is greater than zero.
<b>Parameter</b>	For the purposes of the FDEP SOPs, any measured quantity not reported in units of concentration.
<b>National Environmental Laboratory Accreditation Conference (NELAC)"</b>	A voluntary organization of state and federal environmental agencies, sponsored by the EPA, and formed to establish and promote mutually acceptable performance standards for the operation of environmental laboratories. These standards cover both analytical testing of environmental samples and the laboratory accreditation process. The goal of NELAC is to foster the generation of environmental laboratory data of known and documented quality through the development of national performance standards for environmental laboratories and other entities directly involved in the environmental field measurement and sampling process.
<b>National Environmental Laboratory Accreditation Program (NELAP)</b>	The program that implements the NELAC standards. NELAP is administered by the EPA.
<b>Parent sample</b>	A sample from which aliquots or subsamples are taken for processing or testing purposes.

Requirements for Direct Contracts  
Appendix B - Glossary of Terms and Acronyms

<b>Performance audit</b>	An audit where quantitative data are independently obtained for comparison with routinely obtained data in a measurement system. Examples of these audits are EPA performance evaluation programs, commercial performance evaluation programs, split sampling programs involving at least two laboratories and/or sampling organizations and blind samples.
<b>Performance test samples</b>	A sample submitted for analysis whose composition and concentration are known to the submitter but unknown to the analyst. Also known as a blind sample.
<b>Practical quantitation limit (PQL)</b>	The smallest concentration of an analyte that can be reported with an associated precision. FDEP defines a practical quantitation limit as: $PQL = 4 \times MDL$ .
<b>Precision</b>	A measure of mutual agreement among individual measurements of a parameter or an analyte, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision are used depending upon the "prescribed similar conditions".
<b>Project audit</b>	An independent review of all sampling and analytical documentation associated with a specific project or event in order to determine if the resulting data are valid and acceptable according to preestablished validation criteria and other data quality objectives. Enough documentation must be available so that a reviewer is able to reconstruct the history of a sample from time of sample collection (or sample container acquisition) through final results and sample disposal.
<b>Quality assurance (QA)</b>	The system of management activities and quality control procedures implemented to produce and evaluate data according to preestablished data quality objectives.
<b>Quality assurance plans / Quality Manual</b>	An orderly assembly of detailed and specific procedures that delineates how data of known and accepted quality are produced.
<b>Quality assurance project plans (QAPP)</b>	A document required by the EPA for certain activities conducted for or funded by the EPA. The plan outlines the quality assurance criteria, as well as all protocols and quality control measures needed to meet the project data quality objectives. These plans are prepared in accordance with "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5", (EPA/240/B-01/003 March 2001). These QAPPs are reviewed and approved by the appropriate EPA office or delegated authority.
<b>Quality control (QC)</b>	The system of measurement activities used to document and control the quality of data so that it meets the needs of data users as specified by preestablished data quality objectives.

Requirements for Direct Contracts  
Appendix B - Glossary of Terms and Acronyms

<b>Quality control check sample</b>	A sample obtained from an independent source for which the level of an analyte has been validated or certified. Also known as a reference material. The sample is prepared and analyzed with a sample set of similar matrix. If the sample has been obtained from the National Institute of Standards and Technology, it is referred to as a Standard Reference Material.
<b>Quality control check standards</b>	Certified and traceable standard solutions or purified materials from a source other than routine calibration standards used to check the accuracy of a calibration.
<b>Quality control checks</b>	Standards or known samples from an independent source that are analyzed at a specified frequency.
<b>Reagent blank</b>	An aliquot of analyte-free water or solvent that is analyzed with a sample set.
<b>Reagent spike</b>	Samples of an appropriate analyte-free matrix (deionized water, sand, soil, etc.) that are fortified to a known and validated concentration of analyte(s) before sample preparation and subsequent analysis.
<b>Reagent water</b>	A sample of water that conforms to ASTM grades II, III or IV.
<b>Replicate sample</b>	Samples that have been collected at the same time from the same source (field replicates) or aliquots of the same sample that are prepared and analyzed at the same time (laboratory replicates). Duplicate samples are one type of replicate sample. The analytical results from replicates are used to determine the precision of a system. If the concentration of analytes in the sample is below detectable limits, duplicate spike samples may be used to determine precision. Blind replicates (or duplicates) are replicates that have been collected (field replicates) or prepared (laboratory replicates) and are analyzed as separate samples whose replicate nature remains unknown to the analyst or organization.
<b>Representativeness</b>	Expresses the degree to which data for a sampled source accurately and precisely represent a characteristic or variation of the sampled source in terms of a measured analyte or parameter.
<b>Research plan</b>	A quality assurance project plan written for research activities as defined by 62-160.600, F.A.C. The plan must contain or refer documents that contain the elements discussed in 62-160.600 (3), F.A.C.
<b>Sample custody</b>	All records and documentation that trace sample possession, handling and associated supporting activities from the point of sample collection through transport, storage, processing, analysis and disposal of the sample.

Requirements for Direct Contracts  
Appendix B - Glossary of Terms and Acronyms

<b>Sample matrix</b>	The natural or artificial medium from which a sample is collected. For the purposes of the FDEP SOPs, a matrix is categorized in terms of the sample source and associated collection technique. See Table FA 1000-1.
<b>Sample matrix spike</b>	An environmental sample fortified to a known and validated concentration of analyte(s) before sample preparation and subsequent analysis.
<b>Sampling Kit</b>	A set of sampling accessories that has been assembled for a specified use or project. Examples of sampling accessories include: sample containers, sampling equipment, chemical preservatives, trip blanks, reagent transfer implements (e.g., disposable pipets), calibration standards, indicator papers (e.g., pH paper), reagents, etc.
<b>Screening study</b>	A study where a body of water is being surveyed for the presence of contaminants in the tissues of aquatic organisms without prior knowledge of their presence.
<b>Spiked samples</b>	Any samples fortified with a known and validated concentration of analyte.
<b>Split samples</b>	Replicates of the same sample that are given to two independent laboratories for analysis.
<b>Standard Operating Procedures (SOPs)</b>	A set of protocols designed to result in a specific outcome. For purposes of this document, SOPs refer to DEP-SOP-001/02 and DEP-SOP-002/02.
<b>Subsample</b>	Refers to any derivative obtained from a sample. Examples of subsamples include: aliquots, filtrates, digestates, eluates, fractions, extracts, reaction products, supernatants, etc.
<b>Surface water</b>	Includes fresh or saline waters from water bodies such as streams, canals, rivers, lakes, ponds, bays and estuaries (natural or manmade).
<b>Surrogate spikes</b>	Samples fortified with a compound having similar chemical characteristics to the analytes of interest, but which is not normally found in environmental samples. Known concentrations of these compounds are added to all samples in the set before sample preparation and subsequent analysis.
<b>System audit</b>	A qualitative on-site review and evaluation of a laboratory or field operation quality assurance system and physical facilities utilized for sampling, sample processing, calibration and measurement or analysis.

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Appendix B - Glossary of Terms and Acronyms

**Trip blank**

Trip blanks are only used for VOC samples. Blanks of VOC-free water are prepared by the organization providing sample containers for VOC collection. These blanks are transported to the site with the empty VOC sample containers and shipped to the analyzing laboratory in the same transport containers as the VOC samples. They remain unopened for the entire trip and are analyzed at the laboratory with the environmental VOC samples.

**Wastewater**

Includes any influent or effluent associated with domestic or industrial waste treatment facilities.

## APPENDIX C - REFERENCES

The following documents are used to support this set of contract criteria:

1. "Department of Environmental Protection Standard Operating Procedures for Field Activities", DEP-SOP-001/01 (January 1, 2002), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section. This document is a compendium of standard operating procedures with the following major topics:
  1. FA 1000: Regulatory Scope and Administrative Procedures for Use of FDEP SOPs;
  2. FC 1000: Cleaning / Decontamination Procedures;
  3. FD 1000: Documentation Procedures;
  4. FM 1000: Field Planning and Mobilization;
  5. FQ 1000: Field Quality Control Requirements;
  6. FS 1000: General Sampling Procedures;
  7. FS 2000: General Aqueous Sampling;
  8. FS 2100: Surface Water Sampling;
  9. FS 2200: Groundwater Sampling;
  10. FS 2300: Drinking Water Sampling;
  11. FS 2400: Wastewater Sampling;
  12. FS 3000: Soil Sampling;
  13. FS 4000: Sediment Sampling;
  14. FS 5000: Waste Sampling;
  15. FS 6000: General Biological Tissue Sampling;
  16. FS 7000: General Biological Community Sampling;
  17. FS 8100: Contaminated Surface Sampling;
  18. FS 8200: Clean Sampling for Ultratrace Metals in Surface Waters;
  19. FT 1000: General Field Testing and Measurement; and
  20. FT 3000: Aquatic Habitat Characterization;
2. "Department of Environmental Protection Standard Operating Procedures for Laboratory Activities", DEP-SOP-002/01 (January 1, 2002), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section:
  1. LD 1000: Laboratory Documentation;
  2. LQ 1000: Laboratory Quality Control; and
  3. LT 7000: Determination of Biological Indices.
3. "New and Alternative Analytical Laboratory Methods", DEP-QA-001/01 (January 1, 2002), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section.
4. "EPA Requirements for Quality Assurance Project Plans", EPA QA/R-5 (EPA/240/B-01/003, March 2001), United States Environmental Protection Agency.
5. "National Environmental Laboratory Accreditation Conference Constitution, Bylaws and Standard", approved July 1999, EPA 600/R-99/068, United States Environmental Protection Agency.

### AVAILABILITY:

All Department documents can be obtained by going to: <http://www.dep.state.fl.us/labs/> and selecting the applicable topic.

Requirements for Direct Contracts  
Appendix C - References

EPA QA/R-5 can be obtained from: [http://www.epa.gov/quality/qa\\_docs.html](http://www.epa.gov/quality/qa_docs.html) and selecting the applicable document.

The NELAC standards can be downloaded from: <http://www.epa.gov/ttn/nelac/>.