FM 1000. FIELD PLANNING AND MOBILIZATION

This SOP is advisory; however, the following procedures are designed as best management practices, for use as guidance for designing and implementing a field sampling program and when selecting a laboratory.

FM 2000. LABORATORY SCHEDULING

FM 2100. Selecting a Laboratory

1. CONSUMER RESPONSIBILITIES

Each organization that uses laboratory services has certain responsibilities to ensure that the laboratory has the appropriate credentials and that the data are useable for the intended needs, and acceptable to DEP. A consumer's responsibilities include:

1.1. Evaluating the Laboratory

1.1.1. Ensure that the laboratory has the proper credentials.

1.1.2. Ensure that the laboratory can produce data of a quality that will be acceptable to DEP.

1.2. Thinking in Terms of Quality not Dollars: A laboratory that produces data that are not acceptable to DEP usually means that the laboratory will need to repeat the work. It is more cost effective to select a laboratory that will meet the quality needs of the project even if that laboratory is not the lowest bidder.

1.3. Continuing Evaluation: In order to ensure that the laboratory provides data of a consistent quality, do not rely on just the initial evaluation of a laboratory. Other quality control measures will provide the ability to continuously evaluate the laboratory data quality.

1.4. Evaluating the Reported Data: Review the final laboratory reports against the original expectations and acceptable quality control measures.

1.5. Asking Questions: The consumer has the right to question laboratory results and receive a logical and clear response.

An informed client increases the probability of quality data and data acceptability.

FM 2110. IDENTIFYING LABORATORY NEEDS

The consumer should be able to identify these critical needs before considering any laboratory:

1. The purpose for which the data are needed.

   1.1. The consumer must determine DEP's expectations for data quality in terms of the precision, accuracy, and detection limit (reporting level or criteria) for each reported value.

   1.2. Examples include: permit compliance at some specified concentration levels; compliance monitoring at specified reporting levels; and site cleanup to specified soil and water criteria levels.

2. The benefits of using contracted or in-house analytical services.

3. The specific laboratory services that are required:

3.1. Are sample collection and sample analysis required, or just sample analysis.

3.2. Types of samples (groundwater, drinking water, soils, sediments, hazardous wastes, etc.).

3.3. The sample delivery schedule including:

3.3.1. The number of samples to be collected.

3.3.2. The frequency with which samples will be submitted to the laboratory.

3.3.3. The types of matrices to be analyzed.

3.4. The test methods that must be used (normally found in the permit requirements, consent orders, contracts, or relevant rules).

3.5. The expected quality based on DEP's requirements.

3.6. The expected turnaround time for laboratory analysis.

3.7. The deliverables including the report format.

3.8. Field related services such as:

3.8.1. Sample collection

3.8.2. Sample containers

3.8.3. Sample preservation

3.8.4. Equipment rental or cleaning services; or

3.8.5. Instrument calibration services.

4. Any required laboratory credentials such as certification.

5. Identifying key personnel in the consumer's organization that will be interfacing with the laboratory:

5.1. Administrative contact: Usually responsible for obtaining laboratory services.

5.2. Technical contact: Usually a person who will be evaluating the laboratory's performance.

5.3. Sample control contact: Usually a person who will be scheduling services with the laboratory.

6. Have an understanding of the current market price for the tests to be performed.

6.1. Gather information on pricing from several laboratories.

6.2. Request current and historical pricing schedules.

FM 2120. EVALUATING THE LABORATORY

1. LABORATORY CREDENTIALS

1.1. The laboratory must hold National Environmental Laboratory Accreditation Program (NELAP) certification from the Florida Department of Health's Environmental Laboratory Certification Program (DoH ELCP).

1.2. Out-of-state laboratories must be either certified by DoH, or be NELAP-certified by another state **with secondary accreditation** by DoH.

1.3. The laboratory must be certified for the test technology, analyte, and matrices that will be requested. This does not apply to analysis being done for drinking water.

1.4. Request a copy of the Current Certification and Analyte Sheets (must be for the current fiscal year which runs July 1 to June 30).

1.5. Verify the certification through the DEP Web Site, or the DoH offices.

2. ON-SITE VISIT

Conduct an on-site visit to verify the laboratory's capabilities and to determine if the laboratory has the equipment and personnel resources necessary for proposed services.

2.1. The laboratory must show a willingness to meet the client's needs.

2.2. The laboratory (both the analytical and administrative areas) should appear organized.

2.3. The analytical staff must be knowledgeable about the services to be provided.

2.3.1. At least one person (supervisor or analyst) must be experienced in performing all activities on the proposed scope of work.

2.4. The administrative staff must appear organized.

2.5. The laboratory must have the capacity to accommodate the proposed scope of work in terms of personnel and equipment.

3. LABORATORY PERFORMANCE EVALUATION

3.1. Blind Check Samples: Prior to contract signing or any agreement, submit a set of blind check samples to the laboratory.

3.1.1. A blind check sample is a sample in a real matrix (water, soil, sediment, etc.) that appears to be a real sample, except that the submitter has a list of the components and their known concentration values.

3.1.2. Submit the sample(s) to the laboratory as a routine sample(s).

3.1.3. Evaluate the results of the reported values against the certified values in the sample(s).

3.1.4. The values must be within the laboratory's stated precision for the measurement.

4. CUSTOMER SATISFACTION

4.1. Obtain a list of current and previous clients.

4.2. Call several of the clients to determine:

- Satisfaction with laboratory
- Were problems resolved satisfactorily?
- Reasons for not using the laboratory (if applicable)
- Reasons for using the laboratory

5. FISCAL STABILITY

5.1. Request a copy of the current financial statement.

FM 2130. CONTRACTING

1. PURPOSE

   1.1. Provide a detailed list of the scope of services to be contracted.

   1.2. Include the purpose for which the data are to be used (permit, compliance, etc.).

2. KEY CONTACTS: Identify key contacts for both laboratory and client:

   2.1. Administrative: Dealing with billing, contract writing, invoicing, etc.

   2.2. Technical: Dealing with data, and quality control issues and problems.

   2.3. Sample Control: Dealing with scheduling, shipping supplies, sample receipt.

3. ANTICIPATED NEEDS: Specify:

   3.1. The schedule of activities;

   3.2. The expected number of samples, analytes, matrices and tests; and

   3.3. Field support services, including containers, preservatives, cleaning and calibration services.

4. EXPECTATIONS

   4.1. Certification

      4.1.1. The laboratory must maintain certification for the analyte, technology, and matrices to be performed.

      4.1.2. The laboratory must immediately notify its clients if the certification status for any analyte changes.

      4.1.3. The laboratory must state that is will generate all results in strict compliance with the National Environmental Laboratory Accreditation Conference (NELAC) Standards.

      4.1.4. The laboratory must flag and justify any results that were not generated in accordance with NELAC.

   4.2. Analytical Expectations

      4.2.1. Provide a list of analytical methods to be performed and the matrices for each method.

      4.2.2. Provide a copy of the permit, QAPP, Sampling Plan or other document that outlines DEP's requirements.

      4.2.3. Specify the expected turn-around time for the analyses.

      4.2.4. Specify the shipping schedule if sample containers or supplies are to be provided.

   4.3. Container/Equipment Services: State the scope of container and equipment services:

      4.3.1. Precleaned Containers: Types and Numbers

         4.3.1.1. Must be cleaned according to DEP SOP procedures (see FC 1000) or purchased precleaned from a vendor.

         4.3.1.2. Provide copy of procedures, if the laboratory does not follow the DEP SOP procedures.

4.3.1.3. Determine if containers must be certified clean by either the laboratory or the vendor.

4.3.2. Preservatives

4.3.2.1. Premeasured into containers, where appropriate.

4.3.2.2. Provided in appropriate containers with dispensing implement.

4.3.3. Equipment

4.3.3.1. Type and numbers.

4.3.3.2. Condition of equipment (precleaned, etc.).

4.3.3.3. Equipment must be cleaned according to DEP SOP procedures (see FC 1000). Obtain a copy of the laboratory procedures if the laboratory does not follow the DEP SOP procedures.

4.3.3.4. Determine if equipment must be certified clean by the laboratory.

4.3.4. Equipment Calibration

4.3.4.1. The calibration method;

4.3.4.2. The frequency of calibration;

4.3.4.3. Preventative maintenance on instrument;

4.3.4.4. Certification statement verifying the calibration; and

4.3.4.5. Documentation of all maintenance and calibrations in laboratory records.

4.4. Quality Control

4.4.1. State adherence to NELAC quality control requirements.

4.4.2. Specify any additional quality control measures that are required but are different from NELAC.

4.4.3. Specify acceptable ranges for spikes, duplicates, surrogates, and other QC measures if appropriate.

4.5. Custody/Sample Tracking

4.5.1. Specify adherence to NELAP documentation and record keeping requirements.

4.5.2. State a time-period for retaining all records if greater than 5 years.

4.5.3. Make arrangement for transfer of records should the laboratory go out of business or transfer ownership before the records retention time period has lapsed.

4.5.4. Specify the level of custody (routine, legal, etc.).

4.6. Minimum Reporting Levels

4.6.1. Provide the laboratory with the minimum acceptable values to be reported (method detection limit, etc.).

4.6.2. Describe contingencies if these levels cannot be met.

4.7. Reporting Format

4.7.1. All analytical reports issued by the laboratory must comply with DEP and NELAP reporting requirements.

4.7.2. Specify whether the information must be provided as hardcopy, electronic or both.

4.7.2.1. If electronic, specify the format for submission.

4.7.3. The use of appropriate DEP data qualifiers (see Table FM 1000-1) must be used.

4.8. Deliverables: In addition to the NELAP-compliant report, specify any other deliverables that must be provided with the laboratory report such as:

- Laboratory Quality Control results;
- Field Quality Control results;
- Performance Test results;
- Copies of all raw data and associated records;
- Written narrative of the analytical event; and/or
- Description of any modifications to methods.

4.9. Subcontracting

4.9.1. The laboratory must inform the client **before** any analytical services are subcontracted to another laboratory.

4.9.2. The laboratory must ensure that the subcontracted laboratory meets the same qualifications and requirements as the primary laboratory.

4.9.3. If the results from subcontracted laboratories are incorporated into the final laboratory report, the subcontracted results must be clearly identified.

4.10. Method Modifications

4.10.1. The laboratory must identify any modifications that have been made to the requested analytical methods.

4.10.2. The client must be notified of any method modifications prior to use in the laboratory, and must provide written consent.

4.11. Dilutions

4.11.1. Negotiate how multiple dilutions will be handled. They may be considered a separate analysis and therefore an additional cost.

4.11.2. Agree to pay for the analysis of dilutions only if:

4.11.2.1. The sample concentration exceeds the calibration range and the laboratory was not aware of the expected sample concentration; or

4.11.2.2. A dilution is required to quantitate all required components.

5. PENALTIES AND CONSEQUENCES

5.1. Negotiate penalties or other consequences (no payment) for these problems:

- Failure to provide data or associated (expected) information;
- Failure to meet deadlines;
- Failure to provide acceptable data; and
- Failure to meet contract requirements.

5.2. Consider these consequences:

- Costs of resampling;
- Fines incurred because of unacceptable data;
- Costs associated with having evaluated and/or processed unacceptable data; and
- Reanalysis costs (if reanalysis is due to laboratory error or failed QC).

5.3. Reserve the right to reject data. If any data are used, laboratory should be paid according to negotiated terms.

FM 2140. ON-GOING EVALUATION

1. Monitor laboratory's performance against the specific contract requirements.
2. Continue to use blind QC samples as a measure of routine performance.
   2.1. Vendor supplied samples;
   2.2. Samples prepared to a known concentration; or
   2.3. Split samples with another laboratory.

FM 2150. DATA REVIEW

1. Review the data for logical trends:
   1.1. Are the reported concentrations different from the routine (expected) levels?
   1.2. Is the same value reported for the same analyte (except non detects) in the same set of samples or over a historical period of time?
   1.3. Do the parts add up to the total?
      1.3.1. Ortho phosphate must be less than total phosphate.
      1.3.2. Total nitrate-nitrite must be equal to nitrate plus nitrite.
      1.3.3. Total values must be greater than or equal to dissolved values.
   1.4. Are different but related analyses consistent?
      1.4.1. High turbidity and high total suspended solids.
      1.4.2. High turbidity and increased method detection limits for other tests.
   1.5. Do results indicate a sample collection problem?
      1.5.1. High dissolved oxygen in groundwater.
      1.5.2. High turbidity and elevated metals results.
   1.6. Are the QC check samples within acceptable ranges?
      1.6.1. Are the ranges reasonable?
   1.7. Are non-detects reported correctly (should be a value with a "U")?
   1.8. Over the history of laboratory use, were any QC problems reported?
   1.9. Is there any laboratory or field blank contamination?

1.10. Do the reports contain all required information?

FM 2160. ASK QUESTIONS

Ask questions if:

- There are problems associated with the data review.
- The QC check sample data are not acceptable.
- The laboratory consistently reports the same QC failure.
- The laboratory uses different methods than requested.
- The laboratory subcontracts analyses without notifying the client.
- The laboratory does not meet contract requirements.
- The laboratory misses holding times.
- The laboratory fails to provide requested resource(s) (containers, calibration, etc.) in a timely manner.
- There any doubts about the acceptability of the data.
- Detection limits are above the expected values and the laboratory provides no reasonable explanation.

FM 2200. Scheduling Services

1. Notify the laboratory about the analytical and equipment needs at least a week in advance of the actual sampling trip.

2. Even if the trip is routine (monthly, weekly, quarterly compliance sampling), provide the laboratory with a written request. Include:

- Number and types of samples to be collected;
- Test methods to be performed;
- Expectations for quality control acceptance criteria (if not already listed in a contract);
- Estimated numbers of each type of container;
- Required preservatives, including whether the laboratory will dispense premeasured quantities into the sample containers;
- Preservation supplies such as graduated, disposable pipets;
- Additional preservatives (even if the containers are prepreserved);
- Sampling equipment including material construction;
- Shipping containers;
- Forms (both courier and transmittal/custody forms);
- Any calibration services;
- Estimated time of delivery;
- Expected turn-around time;

- Special needs such as "requires legal chain of custody" or "requires 24-hour turn-around time";
- Data processing services (such as completing regulatory forms); and
- Expected contamination levels. This is important if a highly contaminated site is sampled.

FM 3000. TRIP PLANNING

1. Ensure that everyone involved with the event understands the purpose of the trip:

   1.1. Review the associated sampling plan, quality assurance project plan or permit requirements.

   1.2. Review the applicable safety plans and site files.

2. Determine the number of people that will be required to complete the sampling activities within the allotted time frame. For safety and efficiency, a field team should consist of at least two people.

3. Identify sampling team member(s) and schedule a meeting of the sampling team.

   3.1. Develop a detailed itinerary and schedule.

      3.1.1. Plan to sample from the least contaminated to the most contaminated sampling point.

      3.1.2. Plan to work upstream in flowing water.

   3.2. Review personnel training and make assignments based on experience.

      3.2.1. Ensure that at least one trained, experienced individual is part of the team.

   3.3. Review the SOPs and any associated documents (sampling plan, quality assurance project plan, permit, etc.).

   3.4. Review project/site files for unusual procedures or site peculiarities.

   3.5. Review the safety plan and discuss contingencies (weather, broken equipment, site access, etc.).

      3.5.1. If the sampling event is more than 3 - 5 days, a written contingency plan is recommended.

      3.5.2. If a boat will be used, a float plan is highly recommended.

      3.5.3. At a minimum discuss and have available:

         3.5.3.1. Phone and directions to nearest emergency facility;

         3.5.3.2. Phone number(s) of supervisor and/or project manager;

         3.5.3.3. Locations of power lines and underground utilities; and

         3.5.3.4. Expected environmental hazards.

4. Schedule the date for deployment and the duration of the sampling event.

   4.1. Obtain the necessary entry permits, keys, etc.

   4.2. Identify name(s) and phone number(s) of landowner, tenant or other responsible party.

5. Assemble any needed maps, directions and site descriptions. Include information on:

   5.1. Traffic conditions and/or traffic patterns; and

   5.2. Parking areas.

6. Identify the number of sampling points, and for each sampling point:

   6.1. Determine the matrices that will be sampled;

   6.2. Identify the specific analyses to be performed per matrix;

   6.3. Identify the sampling equipment needs based on the matrix and analytes to be collected. Include tubing, mixing implements and other support equipment;

   6.4. Based on the analytical tests and the matrices, determine the number and types of sample containers;

   6.5. Based on the analytical tests and the matrices, determine the types of preservatives that will be needed;

   6.6. Determine what field measurements must be made; and

   6.7. Identify transportation mode to reach the location (boat, truck, etc.).

7. Calculate the total number of each container types (both preserved and unpreserved).

8. Determine the total number of sampling equipment sets (tubing, mixing trays, coring devices, etc.) that will be needed for the sampling event.

9. Notify the laboratory of the trip and arrange for necessary containers, preservatives and other supplies (see FM 2200).

10. Reserve appropriate vehicles.

11. Assemble all field records (notebooks, forms, transmittal forms, etc.).

FM 4000. EQUIPMENT AND SUPPLY PREPARATION

1. SAMPLING EQUIPMENT: Assemble all equipment identified in FM 3000, section 8.

   1.1. Inspect equipment for cracks, breaks, and other signs of wear.

   1.2. If necessary, repair any equipment and document the repairs in appropriate maintenance logs.

   1.3. Reclean any equipment that was cleaned but not protected from the environment (stored on dusty shelves).

      1.3.1. If not already clean, decontaminate equipment according to FC 1000.

      1.3.2. Clean all transport ice chests and water transport containers (see FC 1190 and FC 1180, respectively).

   1.4. Check to make sure fuel and battery powered pumps are working.

   1.5. See "Field Sample Collection Equipment Checklist".

2. FIELD MEASUREMENTS: Assemble field instruments to make the measurements identified in FM 3000, section 6.6.

   2.1. Inspect instruments for damage.

2.1.1. Repair and/or replace parts as necessary, and document in appropriate maintenance logs.

2.1.2. Assemble the appropriate calibration standards and supplies.

2.1.3. Determine the accuracy of the instruments by either performing an initial calibration or checking the calibration before leaving the base of operations. Document the calibration check.

2.2. See "General Field Support Equipment Checklist", item 7.

3. DOCUMENTATION: Assemble field record supplies:

- Notebooks, and/or forms
- Indelible/waterproof pens
- Clipboards
- Cameras
- GPS unit, if needed
- See "General Field Support Equipment Checklist ".

4. SAMPLE CONTAINERS: Assemble the appropriate types of sample containers or obtain them from the contracted laboratory. See "General Field Support Equipment Checklist", item 8.

5. PRESERVATIVES: Assemble preservation supplies if not provided by the laboratory.

5.1. Discard any old solutions; clean containers; and prepare fresh solutions.

5.2. See "General Field Support Equipment Checklist", item 2.

6. FIELD DECONTAMINATION SUPPLIES: Assemble field decontamination supplies.

6.1. Discard any old solutions; clean containers; and prepare fresh solutions.

6.2. Discard analyte-free water and obtain fresh water.

6.3. See "General Field Support Equipment Checklist", item 1.

7. SHIPPING SUPPLIES: Assemble shipping supplies:

7.1. Determine nearest point to obtain ice;

7.2. Marking pens, shipping labels, tape, custody seals (if required);

7.3. See "General Field Support Equipment Checklist", item 3.

8. VEHICLES:

8.1. Make sure vehicle maintenance is up-to-date.

8.2. Check fluids.

8.3. Check tire pressure.

8.4. Check fuel and fuel supply.

8.5. See "General Field Support Equipment Checklist", item 10.

9. SAFETY EQUIPMENT: Assemble any needed safety equipment:
    - Protective gloves.
    - Protective clothing including boots.
    - SCUBA gear or other supplied air supply.
    - First aid kit.
    - Drinking water.
    - Float plan.
    - Address and phone numbers for nearest emergency room.
    - See "General Field Support Equipment Checklist", item 6.

Appendix FM 1000

Tables, Figures and Checklists

Table FM 1000-1 Data Qualifier Codes

General Field Support Equipment Checklist

Field Sample Collection Equipment Checklist

Table FM 1000-1
DATA QUALIFIER CODES

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

Symbol	Meaning
A	Value reported is the arithmetic mean (average) of two or more determinations. This code shall be used if the reported value is the average of results for two or more discrete and separate samples. These samples shall have been processed and analyzed independently. Do not use this code if the data are the result of replicate analysis on the same sample aliquot, extract or digestate.
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 greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
J	Estimated value. A “J” value shall be accompanied by a detailed explanation to justify the reason(s) for designating the value as estimated. Where possible, the organization shall report whether the actual value is estimated to be less than or greater than the reported value. A “J” value shall not be used as a substitute for K, L, M, T, V, or Y, however, if additional reasons exist for identifying the value as an estimate (e.g., matrix spiked failed to meet acceptance criteria), the “J” code may be added to a K, L, M, T, V, or Y. Examples of situations in which a “J” code must be reported include: instances where a quality control item associated with the reported value failed to meet the established quality control criteria (the specific failure must be identified); instances when the sample matrix interfered with the ability to make any accurate determination; instances when data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample); instances when the analyte was detected at or above the method detection limit in a blank other than the method blank (such as calibration blank or field-generated blanks and the value of 10 times the blank value was equal to or greater than the associated sample value); or instances when the field or laboratory calibrations or calibration verifications did not meet calibration acceptance criteria.

Table FM 1000-1
DATA QUALIFIER CODES

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.
	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) and 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 or equal to 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; or
	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 at or above the method detection limit in both the sample and the associated method blank and the value of 10 times the blank value was equal to or greater than the associated sample value. Note:

Table FM 1000-1
DATA QUALIFIER CODES

Symbol	Meaning
	unless specified by the method, the value in the blank shall not be subtracted from associated samples.
X	Indicates, when reporting results from a Stream Condition Index Analysis (LT 7200 and FS 7420), that insufficient individuals were present in the sample to achieve a minimum of 280 organisms for identification (the method calls for two aliquots of 140-160 organisms), suggesting either extreme environmental stress or a sampling error.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present for accurate counting. Historically, this condition has been reported as “too numerous to count” (TNTC). The “Z” qualifier code shall be reported when the total number of colonies of all types is more than 200 in all dilutions of the sample. When applicable to the observed test results, a numeric value for the colony count for the microorganism tested shall be estimated from the highest dilution factor (smallest sample volume) used for the test and reported with the qualifier code.
?	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 if the laboratory has knowledge of the specific sampling event. The codes shall be added by the organization collecting samples if they apply:

Symbol	Meaning
D	Measurement was made in the field (i.e., in situ). This code applies to any value (except field measurements of pH, specific conductance, dissolved oxygen, temperature, total residual chlorine, transparency, turbidity 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 1/2 inch within the past 48 hours.) This code shall be used when the rainfall might contribute to a lower than normal value.
!	Data deviate from historically established concentration ranges.

General Field Support Equipment Checklist

Date: _____ Project/Site: _____

DECONTAMINATION SUPPLIES

- ☐ Basins, buckets or bowls to hold wash water and various rinse waters
- ☐ Brushes or other implements to clean equipment
- ☐ Detergents
  - ☐ Liqui-Nox or equivalent
  - ☐ Alconox or equivalent
- ☐ Acids
  - ☐ Nitric
  - ☐ Hydrochloric
- ☐ Solvents
- ☐ Pesticide grade isopropanol
  - ☐ Other: _____
- ☐ Protective wrapping
  - ☐ Foil
  - ☐ Untreated Plastic bags
  - ☐ Bubble wrap
- ☐ Analyte-free water
  - ☐ Distilled in HDPE
  - ☐ Deionized in HDPE
- ☐ Organic-free in HDPE, Teflon or glass
- ☐ Dispensing bottles
- ☐ HDPE for acids and detergents
- ☐ Teflon for solvents and organic-free water
- ☐ Paper towels or other absorbent material
- ☐ Containers for IDW

PRESERVATION SUPPLIES

- ☐ Acids
  - ☐ Nitric
  - ☐ Hydrochloric
  - ☐ Sulfuric
- ☐ Dechlorination reagents
  - ☐ Sodium thiosulfate
  - ☐ Ascorbic acid
- ☐ Sodium hydroxide
- ☐ Dispensing devices
- ☐ Graduated disposable plastic pipets
- ☐ Glass Pasteur pipets
- ☐ Bulbs
- ☐ Premeasured reagents in vials
- ☐ Narrow range pH paper (range of no more than 3 pH units)
  - ☐ pH range of 1 – 3
  - ☐ pH range of 11 – 14
  - ☐ pH range of 6 – 8
- ☐ Cyanide processing
  - ☐ Sulfide test paper
  - ☐ Precipitating Chemical
  - ☐ Cadmium nitrate or
  - ☐ Cadmium carbonate or
  - ☐ Lead nitrate or
  - ☐ Lead carbonate
  - ☐ KI starch paper
  - ☐ Ascorbic acid
  - ☐ Filter paper

SAMPLE TRANSPORTATION SUPPLIES

- ☐ Ice chests
- ☐ Wet ice
- ☐ Sealing tape
- ☐ Shipping labels
- ☐ Shipping forms
- ☐ Bubble wrap
- ☐ Plastic bags
- ☐ Vermiculite
- ☐ Custody seals

DOCUMENTATION SUPPLIES

- ☐ Notebooks/logs/field forms
- ☐ Pens and markers (waterproof)
- ☐ Sample container labels/tags
- ☐ Custody tags
- ☐ Custody/transmittal forms
- ☐ Clipboard
- ☐ Camera
  - ☐ Film
- ☐ GPS equipment
- ☐ Calculator

REFERENCE MATERIALS

- ☐ Site maps and directions
- ☐ QAPP
- ☐ Sampling plan
- ☐ SOPs
- ☐ Itinerary
- ☐ Float plan
- ☐ Contingency plan

HEALTH & SAFETY SUPPLIES

- ☐ Cell phone
- ☐ First aid kit
- ☐ Drinking water
- ☐ Protective gloves
- ☐ Insect repellent
- ☐ Sunscreen
- ☐ Numbers for nearest emergency facilities
- ☐ Safety goggles
- ☐ Applicable MSDS sheets
- ☐ Respirators
- ☐ Fire extinguisher
- ☐ Hard hats
- ☐ Flotation jackets
- ☐ Cable cutters
- ☐ Traffic cones
- ☐ SCUBA gear
- ☐ SCBA gear
- ☐ Other personal protection gear

FIELD MEASUREMENT EQUIPMENT

- ☐ Lint-free tissues
- ☐ Flow-through cells
- ☐ pH meter
  - ☐ 4, 7 & 10 buffers
- ☐ Conductivity meter
  - ☐ Solution at expected conductivity
- ☐ DO meter
- ☐ Turbidimeter
  - ☐ Gel or Formazin standards

General Field Support Equipment Checklist

Date: _____ Project/Site: _____

- ☐ Residual chlorine
  - ☐ Secondary or primary standards
- ☐ Secchi disk
- ☐ MultiProbe

SAMPLE CONTAINERS

- ☐ Extractable Organics
- ☐ Volatile Organics
- ☐ Nutrients
  - ☐ Glass
  - ☐ Plastic
- ☐ Inorganic Non-metallics
  - ☐ Glass
  - ☐ Plastic
- ☐ Physical Parameters
  - ☐ Glass
  - ☐ Plastic
- ☐ Metals
  - ☐ Glass
  - ☐ Plastic
- ☐ Microbiology
  - ☐ Glass
  - ☐ Plastic
- ☐ Whole Effluent Toxicity
- ☐ Tissues
- ☐ Macrobenthic invertebrates
- ☐ Periphyton
- ☐ Sediment/Soil volatiles
- ☐ Sediment/Soil

Remember:

- ☐ Extra containers
- ☐ Extra VOC septa

FILTRATION EQUIPMENT

- ☐ 1 µm filter units
- ☐ 0.45 µm filters
- ☐ Peristaltic pump
- ☐ Pressurized bailers
- ☐ Syringe with Luer-Lok fitting
- ☐ Tripod filter with pressure/vacuum source
- ☐ Forceps for handling filters

VEHICLES

- ☐ Truck
- ☐ Fuel
- ☐ Boat
- ☐ Fuel
- ☐ Motor
- ☐ Paddles/oars
- ☐ Safety vests

MISCELLANEOUS SUPPLIES

- ☐ Hip boots
- ☐ Chest waders
- ☐ Rain gear
- ☐ Tool kit
- ☐ Extra batteries
- ☐ Stopwatch

Field Sample Collection Equipment Checklist

Date: _____ Project/Site: _____

GROUNDWATER

Pumps
- ☐ Peristaltic
- ☐ Centrifugal
- ☐ Variable speed submersible
- ☐ Submersible
- ☐ Variable speed bladder
- ☐ Bladder

Tubing
- ☐ Teflon ___Sets
- ☐ Polyethylene ___Sets
- ☐ Polypropylene ___Sets
- ☐ Vinyl ___Sets
- ☐ Rubber ___Sets
- ☐ Tygon ___Sets

Bailers
- ☐ Teflon
- ☐ Stainless steel
- ☐ Polyethylene
- ☐ Acrylic
- ☐ PVC

Support Equipment
- ☐ Graduated containers for measuring purge water
- ☐ Containers for holding purge waters
- ☐ Water level measuring device
- ☐ Plastic sheeting
- ☐ Lanyard material
- ☐ Reels
- ☐ Energy source for pumps

SURFACE WATER

Pumps:
- ☐ Peristaltic
- ☐ Automatic composite sampler
- ☐ Other

Tubing
- ☐ Teflon™ ___Sets
- ☐ Polyethylene ___Sets
- ☐ Polypropylene ___Sets
- ☐ Vinyl ___Sets
- ☐ Rubber ___Sets
- ☐ Tygon ___Sets

Bailers
- ☐ Teflon
- ☐ Stainless Steel
- ☐ Polyethylene
- ☐ Acrylic
- ☐ PVC

Grab Sampling Devices:
- ☐ Dipper
- ☐ Kemmerer
- ☐ Alpha water sampler
- ☐ Niskin
- ☐ Beta sampler
- ☐ Retrieval lines

Mixing Implements
- ☐ Churn splitter

WASTEWATER
- ☐ Pond sampler
- ☐ Dippers
- ☐ Peristaltic pump

Tubing
- ☐ Teflon ___Sets
- ☐ Polyethylene ___Sets
- ☐ Polypropylene ___Sets
- ☐ Vinyl ___Sets
- ☐ Rubber ___Sets
- ☐ Tygon ___Sets
- ☐ Kemmerer
- ☐ Van Dorn
- ☐ Nansen
- ☐ Alpha bottle
- ☐ Beta bottle
- ☐ Niskin
- ☐ DO dunker
- ☐ Automatic composite sampler

Tubing
- ☐ Teflon ___Sets
- ☐ Polyethylene ___Sets
- ☐ Polypropylene ___Sets
- ☐ Vinyl ___Sets
- ☐ Rubber ___Sets
- ☐ Tygon ___Sets

Bailers
- ☐ Plastic
- ☐ Teflon
- ☐ Stainless steel

Scoops
- ☐ Plastic
- ☐ Teflon
- ☐ Stainless steel

Beakers
- ☐ Plastic
- ☐ Teflon
- ☐ Stainless steel

Buckets
- ☐ Plastic
- ☐ Stainless steel

SEDIMENTS

Dredges
- ☐ Petersen
- ☐ Ponar
- ☐ Ekman
- ☐ Young Grab
- ☐ Van Veen
- ☐ Shipek
- ☐ Orange-peel grab
- ☐ Smith-McIntyre grab
- ☐ Drag buckets
- ☐ Winch
- ☐ Cable/line
- ☐ Messenger

Coring Devices
- ☐ Stainless steel
- ☐ Glass
- ☐ Plastic
- ☐ Teflon-lined

SOIL
- ☐ Bucket auger
- ☐ Split spoon sampler
- ☐ Stainless steel shovel
- ☐ Garden shovel
- ☐ Stainless steel trowel or scoop
- ☐ Plastic trowel or scoop
- ☐ Trenching device

Coring Devices
- ☐ Stainless steel
- ☐ Glass
- ☐ Plastic
- ☐ Teflon-lined
- ☐ Shelby tube
- ☐ EnCore

Field Sample Collection Equipment Checklist

Date: _____ Project/Site: _____

WASTE
- ☐ Stainless steel scoop
- ☐ Stainless steel spoons or spatulas
- ☐ Stainless steel push tubes
- ☐ Stainless steel auger
- ☐ Stainless steel Ponar dredge
- ☐ Glass coliwasa
- ☐ Drum thief
- ☐ Mucksucker
- ☐ Dipstick
- ☐ Stainless steel bacon bomb
- ☐ Stainless steel bailer
- ☐ Teflon bailer
- ☐ Peristaltic pump
- ☐ Stainless steel split spoon
- ☐ Roto-hammer
- ☐ Glass tubing

SHELLFISH
- ☐ Seine
- ☐ Trawl
- ☐ Bucket type/double pole
- ☐ Tong/Double handed grab
- ☐ Line or cable operated grab bucket
- ☐ Petersen
- ☐ Ponar
- ☐ Ekman
- ☐ Orange-peel grab
- ☐ Biological or hydraulic dredge
- ☐ Scoops/shovels
- ☐ Scrapers
- ☐ Rakes
- ☐ D-traps

Processing Equipment
- ☐ Holding trays
- ☐ Stainless steel shucking knife
- ☐ Calipers or ruler
- ☐ Aluminum foil
- ☐ Plastic bags

FINFISH
- ☐ Electrofishing devices
- ☐ Seines
- ☐ Trawls
- ☐ Angling
- ☐ Gill net
- ☐ Trammel net
- ☐ Hoop, fyke & pound nets
- ☐ D-traps

Processing Equipment
- ☐ Holding trays
- ☐ Measuring board or ruler
- ☐ Stainless steel descaler
- ☐ Stainless steel scalpel
- ☐ Balance
- ☐ Aluminum foil
- ☐ Plastic bags

BIOLOGICAL COMMUNITY SAMPLING

Phytoplankton
- ☐ Van Dorn
- ☐ Alpha bottle
- ☐ Logol's solution

Periphyton
- ☐ Periphytometer
- ☐ Microscope slides
- ☐ 100% buffered formalin
- ☐ Nylon twine

Qualitative Periphyton Sampling
- ☐ Stainless steel spatula/spool
- ☐ Stainless steel forceps
- ☐ Suction bulb
- ☐ Preservative
  - ☐ Buffered formalin
  - ☐ Lugol's solution
- ☐ M3
- ☐ Resealable plastic bags
- ☐ White picking pan

Benthic Macroinvertebrates
- ☐ Forceps
- ☐ Transfer pipettes
- ☐ White picking pans
- ☐ 10X hand lens
- ☐ Alcohol-filled jars
- ☐ Dip net (30 mesh)
- ☐ Hester-Dendy
- ☐ Coring device
- ☐ Dredge
  - ☐ Ekman
  - ☐ Petite ponar
- ☐ 30 mesh box sieve