

## Laboratory Quality Assurance Plan

All laboratories analyzing drinking water compliance samples must adhere to the QC procedures specified in the methods. This is to ensure that routinely generated analytical data are scientifically valid and defensible and are of known and acceptable precision and accuracy. To accomplish these goals, each laboratory should prepare a written description of its QA activities (a QA plan). It is the responsibility of the QA manager to keep the QA plan up to date. All laboratory personnel must be familiar with the contents of the QA plan. This plan should be submitted to the auditors for review prior to the on-site visit or should be reviewed as part of the on-site visit.

The laboratory QA plan should be a separately prepared text. However, documentation for many of the listed QA plan items may be made by reference to appropriate sections of this manual, the laboratory's standard operating procedures. (SOPs) or other literature (e.g., promulgated methods, *Standard Methods for the Examination of Water and Wastewater*, etc.) The QA Plan should be updated as necessary.

At a minimum, the following items should be addressed in each QA plan:

1. Laboratory organization and responsibility
  - Include a chart or table showing the laboratory organization and line of responsibility, including QA managers;
  - List the key individuals who are responsible for ensuring the production of valid measurements and the routine assessment of measurement systems for precision and accuracy (e.g., who is responsible for internal audits and reviews of the implementation of the plan and its requirements);
  - Reference the job descriptions of the personnel and describe training to keep personnel updated on regulations and methodology, and document that laboratory personnel have demonstrated proficiency for the methods they perform.
2. Process used to identify clients Data Quality Objectives
3. SOPs with dates of last revision
  - Keep a list of SOPs
  - Ensure that current copies of SOPs are in the laboratory and in the QA Managers files;
  - Ensure that SOPs are reviewed annually and revised as changes are made;
  - Ensure that SOPs have signature pages and revisions dated.
4. Field sampling procedures
  - Describe the process used to identify sample collectors, sampling procedures and locations, required preservation, proper containers, correct sample container cleaning procedures, sample holding times from collection to analysis, and sample shipping and storage conditions;
  - Ensure that appropriate forms are legible filled out in indelible ink or hard copies of electronic data are available. See chapters IV, V, and VI for specific items to be included;

- Describe how samples are checked when they arrive for proper containers and temperature and how samples are, check for proper preservation (e.g., pH, chlorine residual) before analysis;
  - Ensure that sampling protocol is written and available to samplers.
5. Laboratory sample handling procedures
    - Use bound laboratory note books, filled out in ink; entries dated and signed (A secure, password protected, electronic data base is acceptable);
    - Store unprocessed and processed samples at the proper temperature, isolated from laboratory contaminants, standards and highly contaminated samples and, sometimes, each other; holding times may not be exceeded;
    - Maintain integrity of all samples, (e.g., by tracking samples from receipt by laboratory through analysis to disposal);
    - Require Chain-of Custody procedures for samples likely to be the basis for an enforcement action (see Appendix A);
    - Specify criteria for rejection of samples which do not meet shipping, holding time and/or preservation requirements and procedures for notification of sample originators.
  6. Calibration procedures for chemistry and radiochemistry (may reference SOP)
    - Specify type of calibration used for each method and frequency of use;
    - Describe standards' sources, age, storage, labeling;
    - Perform data comparability checks;
    - Use control charts and for radiochemistry, report counting errors with their confidence levels.
  7. Analytical procedures (may reference SOP)
    - Cite complete method manual;
    - Describe quality control procedures required by the methods that must be followed.
  8. Data reduction, validation, reporting and verification (may reference SOP)
    - Describe data reduction process: method of conversion of raw data to mg/L, picocuries/L, coliforms/100m/L, etc
    - Describe data validation process;
    - Describe reporting procedures, include procedures and format;
    - Describe data verification process;
    - For radiochemistry, describe reporting of counting uncertainties and confidence levels;
    - Describe procedure for data corrections.
  9. Type of quality control (QC) checks and the frequency of their use (see Chapters IV, V and VI), (may reference SOP) Parameters for chemistry and radiochemistry should include or reference:
    - Instrument performance check standards;
    - Frequency and acceptability of method detection limit (MDL) calculations;
    - Calibration, internal and surrogate standards;
    - Laboratory reagent blank, field reagent blank and trip blank;

- Field and laboratory matrix replicates;
- Quality control and performance evaluation samples;
- Laboratory fortified blank and laboratory fortified sample matrix replicates;
- Initial demonstration of method capability and use of control charts;
- Qualitative identification/ confirmation of contaminants.

Parameters for microbiology should include or reference:

- Positive and negative culture control;
- Confirmation/ verification of presumptive total coliform positive samples;
- Sterility controls
- Performance evaluation and quality control samples.

10. List schedules of internal and external system and data quality audits and inter laboratory comparisons (may reference SOP)

11. Preventive maintenance procedures and schedules

- Describe location of instrument manuals and schedules and documentation of routine equipment maintenance;
- Describe availability of instrument spare parts in a laboratory;
- List any maintenance contracts in place.

12. Corrective action contingencies

- Describe response to obtaining unacceptable results from analysis of PE samples and from internal QC checks;
- Name persons responsible for the various corrective actions;
- Describe how corrective actions taken are documented;

13. Record keeping procedures

- Describe procedures and documentation of those procedures;
- List length of storage, media type (electronic or hard copy);
- Describe security policy of electronic database.

If a particular item is not relevant, the QA plan should state this and provide a brief explanation. A laboratory QA plan should be responsive to the above items while remaining brief and easy to follow. Minimizing paperwork, while improving dependability and quality of data, are the intended goals.