Quality Management Plan

For the

New Hampshire
Department of Environmental Services

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Quality Management Plan

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LIST OF DEFINITIONS

Data Quality Objective (DQO)

Qualitative and quantitative statements clarifying the purpose of a study, determining the most appropriate data to collect and the most appropriate conditions from which to collect that information, and specify tolerable levels of potential decision errors (See Section **Error! Reference source not found.**).

Data Validation

An analyte- and sample-specific process that extends the qualification of data beyond method, procedural, or contractual compliance (*i.e.,* data verification) to determine the analytical quality of a specific data set. Data validation criteria are based on the measurement performance criteria documented in the project quality assurance project plan (QAPP). Data validation must be performed by an organization independent of the group that generates the data. Data validation results in accepted, qualified, or rejected data.

Data Verification

A process of evaluating the completeness, correctness, and conformance or contractual compliance of a data set against the method standard, standard operating procedure (SOP), or contract requirements documented in the project QAPP. Data verification should be performed internally by the analytical group or fixed laboratory generating the data. Additionally, data can be checked by an entity external to the analytical group or fixed laboratory. Data verification may result in accepted, qualified, or rejected data.

Data Usability Assessment

The process of evaluating validated data to determine if it can be used for the purpose of the project, (*i.e.*, to answer the environmental question or to make the environmental decisions that must be made). Data usability includes the following sequence of evaluations:

i. Individual data sets are evaluated to identify the measurement performance/usability issues/problems affecting the ultimate achievement of project quality objectives.
ii. An overall evaluation of <u>all</u> data generated for the project is performed.
iii. The project-specific measurement performance criteria and data validation criteria documented in the QAPP are evaluated to determine if they were appropriate for meeting project quality objectives.

Document

Any written, recorded information that is subject to change over time. Procedures, plans, policies and records are documents. Documents may be controlled. See Records.

Environmental Conditions

The description of a physical medium (e.g., air, water, soil, sediment) or biological system expressed in terms of its physical, chemical, radiological or biological characteristics.

Environmental Data

Any measurements or information that describe environmental processes, location or conditions; ecological or health effects and consequences; environmental modeling**;** or the performance of environmental technology.

Environmental Data Operations

Work performed to obtain, use or report information pertaining to environmental data.

Environmental Processes

Manufactured or natural processes that produce discharges to or that impact the ambient environment.

Environmental Programs

A term pertaining to any work or activities involving the environment, including: characterization of environmental processes and conditions; environmental monitoring; environmental modeling, environmental research and development; the design, construction, and operation of environmental technologies; and laboratory operations on environmental samples.

Program Manager

The person responsible for conducting a specific NHDES program; this program management function is vested in people at different administrative levels within NHDES. The term "project manager" is used to describe staff that have direct knowledge and/or responsibility at the project or site-specific level.

Quality Assurance (QA)

An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the client.

NHDES Quality Assurance Manager

The person assigned to manage (NHDES') QA system.

Quality Assurance Program Plan (QAPP), Master/ Program

A planning document, written to USEPA specifications, which describes quality assurance procedures for a USEPA-funded program or a set of projects. Often used in conjunction with a Sampling and Analysis Plan (SAP – see Definition).

Quality Assurance Project Plan (QAPP)

A planning document, written to USEPA specifications, which describes quality assurance procedures for a specific USEPA-funded project.

NHDES Quality Assurance Team

A group of NHDES staff from various programs with interest and expertise in QA/QC matters which provides assistance to the Quality Assurance Manager and NHDES programs on QA/QC matters.

Quality Control (QC)

The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

Quality Management

That aspect of the overall management system of the organization that determines and implements the quality policy. Quality management includes strategic planning, allocation of resources, and other systematic activities (e.g., planning, implementation, and assessment) pertaining to the quality system.

Quality Management Plan (QMP)

A formal document or manual that describes the quality system in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, and assessing all activities conducted. This QMP describes the quality system for all NHDES, regardless of funding source(s).

Records

A completed document that provides objective evidence of an item or process. Records may include photographs, drawings, magnetic tape, or other data recording media. See documents.

Sampling and Analysis Plan (SAP)

A planning document used in conjunction with a Master/Program QAPP, which documents the procedural and analytical requirements for projects involving the collection of water, soil, sediment, air, or other samples taken to characterize areas of potential environmental contamination.

Site Specific Project Plan (SSPP)

A planning document also used in conjunction with a Master/Program QAPP, which describes the quality assurance procedures for a specific program/task that is not covered by the Master/ Program QAPP for the program. This document is similar to a SAP, but is often more involved and can include tasks other than sampling and analysis.

Standard Operating Procedures (SOPs)

A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the method of performing certain routine or repetitive tasks.

CHAPTER 1 PURPOSE

1.1 INTRODUCTION

The mission of the New Hampshire Department of Environmental Services (NHDES) is to help sustain a high quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire. In carrying out its mission, NHDES relies upon many different types of data that enable it to better evaluate and measure existing environmental conditions, to identify and understand areas of concern, to assign responsibility for these areas, and to enable credible communication on environmental issues to a wide variety of audiences. The data NHDES uses must be credible, and the quality of that data must be appropriate for its intended uses.

To meet these data objectives, all NHDES staff within environmental programs must understand how their activities affect data quality issues, and all staff must know what they have to do to help produce quality data. NHDES accomplishes this by having this central documented plan, which is reviewed annually and fully updated every five years so that the overall data quality system continuously improves and to address changes to the program and NHDES.

Each environmental program within NHDES is responsible for assuring that the data that is collected and managed is of appropriate quality for its intended uses. This NHDES Quality Management Plan (QMP) documents the policies and procedures that ensure the appropriate quality of the environmental data used by the Department.

This QMP also documents how the Quality Management System (QMS) at NHDES is structured and implemented, as well as how it provides a framework for continuous improvement across the department. The QMP is a controlled document, the most up-to-date version of which is always accessible on the NHDES Intranet under the "Operations - Quality Assurance" folder and also on the NHDES Website at: http://des.nh.gov/organization/commissioner/p2au/pis/qap/index.htm. It is the responsibility of all pertinent staff to be familiar with this material.

This QMP:

- Identifies the mission of NHDES.
- Describes how NHDES is organized to accomplish its mission.
- Identifies NHDES' commitment to quality and the quality systems needed to ensure that it accomplishes its mission.
- Outlines the roles and responsibilities within the organization to ensure data quality.

Scope: All of NHDES' major environmental programs will be covered by this QMP, regardless of funding source(s).

1.2 ENVIRONMENTAL DATA QUALITY POLICY

BACKGROUND: The mission of the New Hampshire Department of Environmental Services (NHDES) is to help sustain a high quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire. In carrying out its mission, NHDES relies upon environmental data that enable it to better evaluate existing environmental conditions, to identify and understand areas of concern, to assign responsibility for these areas, and to promote and enhance credible communication on environmental issues to a wide variety of audiences.

Environmental data are used for setting priorities and strategic direction, targeting inspections, measuring compliance, identifying violations, measuring progress and trends, measuring ecological health, and many other purposes. These data are critical because they can affect NHDES's direction and emphasis, determine whether an enforcement case will be successful, dictate which option will be followed to address a problem, document a problem, or demonstrate progress to the general public and the General Court.

KEY PURPOSE: The environmental data NHDES uses must be credible, of known quality, and the quality and quantity of these data must be appropriate for its intended uses. To accomplish this, everyone at NHDES must understand how his or her activities affect data quality issues, and all staff must know what they have to do to help produce quality data.

POLICY STATEMENT: The Department of Environmental Services will ensure, within its authority, that all of its programs deliver environmental data of known quality to allow all parties to make appropriate decisions about the environment in New Hampshire.

IMPLEMENTATION STRATEGY: NHDES's environmental data quality management efforts will follow written plans and guidance, which each program must generate. Copies of this policy will be provided to all staff via e-mail and will be placed on the NHDES Intranet. The *NHDES Quality Management Plan* (QMP) provides guidance for all NHDES programs. As described in the QMP, all programs managing environmental data will prepare written standard operating procedures for sampling, testing, gathering information on field conditions, checking and validating this information, and reviewing their own data quality systems.

All programs will ensure that the purpose of every data gathering effort is understood by their personnel. NHDES has assigned a Quality Assurance Manager, Assistant Quality Assurance Manager, and a Quality Assurance Team, comprised of representatives of programs throughout NHDES, to lead these efforts. All NHDES programs managing environmental data will have written data quality guidance, in accordance with the NHDES QMP.

The NHDES Quality Assurance (QA) System relies upon first-party audits in the form of annual QA Self-Audits, which are the primary reporting mechanism to be used by NHDES Program Managers. All NHDES programs managing environmental data (and meeting the reporting criteria outlined in the NHDES QMP), must conduct an annual review of their data quality systems, and report the results of that review, including recommendations and actions for improvements, to the Quality Assurance Manager by the requested annual deadline.

NOTE: This policy is subject to revision. It is the responsibility of all employees to ensure that they are familiar with the most recent policy.

Date First Established: **June 2001** **Date Revised:** **August 2018**

CHAPTER 2 NHDES' ORGANIZATION

2.1 HOW NHDES IS ORGANIZED

NHDES was established by statute, effective January 2, 1987, combining several separate agencies and boards into a single department. The enabling legislation for NHDES, New Hampshire Revised Statutes Annotated (RSA) Chapter 21-O, sets forth the following broad areas of responsibility for the then new agency:

- Water pollution control.
- Water supply protection.
- Regulation of waste disposal.
- Maintenance of state-owned dams.
- Inspection of dams.
- Flood control.
- Pollution prevention.
- Compliance assistance, especially for small businesses.
- Air pollution control.

The text below and the organizational charts included in Appendix A set forth the current (as of February 2019) structure of the department down to the Bureau/Unit level. (Individual Sections and Programs are not included in the basic organizational charts.) While there are some satellite offices around the state for certain functions, NHDES functions are generally managed from the Concord, NH, headquarters location. NHDES operates with approximately 440 staff. Because most personnel are generally housed in the same building, it is common NHDES practice for programs to consult and cooperate on all pertinent issues at all administrative levels. Such cooperation helps to ensure that new issues, or issues that may affect more than one statutory program, are addressed in a systematic and holistic fashion.

The quality assurance-related responsibilities of NHDES management are outlined in this QMP. The NHDES Senior Leadership Team is comprised of the Commissioner, Assistant Commissioner, Chief Operations Officer and the three Division Directors (as described below). This team is responsible for reviewing the annual Quality Assurance System Status Report presented by the QA Manager, authorizing necessary resources and changes to support the NHDES QA System, and is ultimately responsible for the effective implementation of the NHDES QA System. Bureau and Unit Administrators (*i.e.,* the "middle management") are also involved in the NHDES QA System in terms of the effective management of the environmental programs they oversee, and the QA System Program Self-Audits that they oftentimes review and approve.

NHDES' programs interact with many federal, state, and local government agencies and many other organizations in order to maximize efforts to protect and enhance public health and the environment in the state. They are an integral part of the Department's environmental data gathering and analysis activities. This QMP includes guidance on assuring that any such data generated by these outside parties through contracted, delegated, or volunteer activities meet NHDES' data quality needs (See Section 4.2 - "Volunteer Qualification and Proficiency" and Section 5.2 – "Procurement of Services").

2.1.1 COMMISSIONER

The Governor, with the approval of the New Hampshire Executive Council, appoints the Commissioner of NHDES for four-year terms. The Commissioner reports to the Governor. The Commissioner chairs the Senior Leadership Team.

The functions of these positions with respect to the QMP are described briefly below.

2.1.2 ASSISTANT COMMISSIONER AND CHIEF OPERATIONS OFFICER

The Assistant Commissioner is an appointed position with a four-year term. The Chief Operations Officer is also a four-year, appointed position. The Assistant Commissioner (with the Chief Operations Officer as Successor) oversees the implementation of the NHDES QA System. In this function, the Assistant Commissioner will resolve any quality assurance-related disputes that cannot be resolved by the Quality Assurance Manager with the Quality Assurance Team's assistance.

2.1.2.1 COMMISSIONER'S OFFICE UNITS

The following Units report to the Assistant Commissioner.

- **Administrative Services Unit**
- **New Hampshire Geological Survey**
- **Human Resources (HR) Unit**
- **Department of Information Technology (NHDoIT)** - A separate State agency, NHDoIT staff embedded at NHDES are responsible for all computer hardware and software issues at NHDES (as their counterparts are at all other state agencies), including purchases, installation, and maintenance. NHDES' Geographic Information Systems (GIS) efforts are also coordinated by NHDoIT. NHDoIT's website is located at: http://www.nh.gov/doit/internet/.
- **Legal Unit**
- **Planning, Prevention & Assistance Unit -** The Chief of Planning and Policy/Assistant NHDES QA Manager/Unit Administrator is located in this Unit, as is the Civil Engineer V/NHDES QA Manager.
- **Project Management and Innovation Unit** - This Unit within the Office of the Commissioner was established in late-2015 to administer large-scale procedural, system, and policy changes and innovations, improve project success rates, develop and oversee the implementation of new standardized practices, and lead department-wide efforts in support of organizational excellence.
- **Public Information and Permitting Unit (PIP)**

2.1.3 DIRECTOR, AIR RESOURCES DIVISION

The Director of the Air Resources Division (ARD) is a four-year, appointed position. The Director is responsible for all NHDES functions related to air pollution and air quality. ARD operates ambient air quality monitoring stations throughout the state. Air quality monitoring data is collected on a continuous basis and evaluated based on the National Ambient Air Quality Standards established by the USEPA.

ARD is actively involved in regional and national policy decisions to seek emission reductions from sources in upwind areas. In particular, New Hampshire's long-range air quality modeling data is used extensively to support these national policy positions.

ARD is divided into several functional units as follows:

- **Atmospheric Science and Analysis Unit** – includes greenhouse gases, ozone and regional transport of pollutants.
- **Permitting and Environmental Health Bureau**
- **Technical Services Bureau** – includes ambient air monitoring and mobile source pollution
- **Compliance Bureau**

2.1.4 DIRECTOR, WASTE MANAGEMENT DIVISION

The Director of the Waste Management Division (WMD) is a four-year, appointed position. The Director is responsible for all NHDES functions related to solid and hazardous waste management, contaminated site investigation, hazardous material storage, and hazmat and petroleum spill response.

Field testing to address complaints or to confirm results reported by others is conducted as necessary. In a few cases, WMD personnel conduct on-going soil and groundwater sampling and testing programs at contaminated sites. In the majority of cases, WMD personnel review sampling and testing results reported by others such as outside contractors and consultants, who are hired by outside parties such as property owners.

WMD is divided into two major functional units or branches – "Waste Management Programs" and "Site Remediation Programs" – with Bureaus:

- **Waste Management Programs**. These include:
    - **The Solid Waste Management Bureau**
    - **The Hazardous Waste Management Bureau**
    - **The Reporting & Information Management Section** - This Section handles information management functions relative to the Resource Conservation and Recovery Act (RCRA) Subtitle C program, especially hazardous waste manifests.
- **Site Remediation Programs**. These includes:
    - **The Oil Remediation and Compliance Bureau** - This program also houses NHDES' emergency response and investigation capability for petroleum and hazardous materials incidents, and monitors the compliance of all hazardous waste transporters operating vehicles in New Hampshire.
    - **The Hazardous Waste Remediation Bureau**
    - **The MTBE Remediation Bureau**

2.1.5 DIRECTOR, WATER DIVISION

The Director of the Water Division (WD) is a four-year, appointed position. The Director is responsible for all Department functions related to water pollution, water quality, drinking water supplies, wetlands protection, water resources and dam safety. WD personnel review data submitted to NHDES from a variety of sources, including operators of public water supplies, holders of National Pollutant Discharge Elimination System (NPDES) permits, individuals associated with the Volunteer Lake Assessment and Volunteer River Assessment

Programs, the Shellfish Program, Beach Program and many others. The WD may take enforcement actions or set water quality or public-health standards based upon these results. Field testing to address complaints or to confirm results reported by others is conducted as necessary.

The WD is divided into six functional units:

- Land Resource Management Programs. These are:
    - **The Wetlands Bureau**
    - **Shoreland Program** (administered under the Wetlands Bureau)
    - **The Subsurface Systems Bureau -** Permitting of sub-divisions (outside of sewered areas) and septic systems.
    - **Alteration of Terrain Bureau**

- **Drinking Water and Groundwater Bureau** - Includes drinking water source protection and environmental laboratory accreditation.

- **The Wastewater Engineering Bureau**

- **The Watershed Management Bureau** - This Bureau includes many surface water quality-related Sections/Programs, including:
    - **Lakes and Rivers Management & Protection**
    - **Watershed Assistance**
    - **Water Quality Planning**
    - **Biology**
    - **Shellfish Program**
    - **NH Coastal Program**
    - **Data Management**

- **The Dam Bureau** - This Bureau operates and maintains all state-owned dams, (approximately 270 dams, or about 8 percent of the approximately 3,400 dams in New Hampshire), reviews applications to construct and remove dams, inspects all dams for safety, and manages the water resources of the state, including gathering such data as snow-pack measurements and river and lake water levels.

- **The Winnipesaukee River Basin Program (WRBP**) - WRBP operates the Winnipesaukee River Basin Wastewater Treatment Plant, an 11.5 million-gallon-per-day (design flow) wastewater treatment plant covering most of the developed areas around Lakes Winnipesaukee and Winnisquam and the Winnipesaukee River downstream of the Lakes.

CHAPTER 3 QUALITY SYSTEM COMPONENTS

3.1 OVERVIEW OF NHDES' QUALITY SYSTEM

The NHDES quality system consists of the people, functions, tools and procedures used to improve and assure the quality of data generated for data users and decision-makers for the environmental programs operated under the Bureaus and Units outlined in Section 2.1. The NHDES quality system applies to all aspects of its environmental data operations.

This QMP is the main guidance document at NHDES to ensure that environmental programs (whether they are located within NHDES, or are working with NHDES programs under a variety of arrangements), produce the type, quality, and quantity of data needed and expected to make informed decisions.

Implementation of the NHDES QMP is the responsibility of staff throughout the Department, led by the NHDES Senior Leadership Team, and supported by Bureau and Unit Administrators, Environmental Program Managers, the QA Manager, the Assistant QA Manager, and the QA Team. Staff are fully informed and trained as to how their activities affect data quality issues and what they must do to help produce quality data. The procurement of items and services associated with environmental programs is carried out in accordance with this QMP. Quality-related planning and implementation tools, such as Data Quality Objectives (DQOs), Quality Assurance Project Plans (QAPPs), Standard Operating Procedures (SOPs), and general document and records control are applied as described in this QMP. These documents, and various other guidance documents, are posted on the NHDES intranet under "Operations - Quality Assurance."

An essential element of the NHDES QA System is the first-party audit process (*i.e.,* "QA Self-Audits") which are conducted by NHDES programs that manage environmental data operations. Note: The QA Manager and Assistant QA Manager maintain a program tracking spreadsheet which lists all programs (regardless of funding source) that manage environmental data operations. In general, these self-audits are completed each calendar year using forms provided, and updated annually, following notice transmitted by e-mail by the QA Manager and/or the Assistant QA Manager to the programs. Notice is typically sent between December and February of each year, and the audit reports are received by the end of March/April. Response memos are sent, typically by the QA Manager, indicating receipt, acknowledging corrective actions noted in the self-audit report, and pointing out any areas for improvement that the reviewer has noted which the program may not have seen.

There is an important exception, (which started in January 2014), to the above scenario: Where a given program has effectively submitted its QA Self-Audit Reports for four consecutive years, and where there are no instances of non-reporting for any two consecutive years (both conditions being met during the preceding six years), the QA Manager, with the concurrence of the Assistant QA Manager, has the authority to allow such programs to submit their QA Self-Audit reports every other year, until such time that the aforementioned criteria are no longer met.

Following review of the self-audit reports, the QA Manager and Assistant QA Manager, sometimes with the assistance of the QA Team, prepares a Quality Assurance System Status Report covering the previous year. The QA Manager briefs the NHDES Senior Leadership Team and identifies any quality areas requiring improvement. The Commissioner and Assistant Commissioner have final review and approval authority for the status report. The QA System Status Report will be maintained on file with the QA Manager, and will also be sent to USEPA Region 1 QA staff to fulfill an annual reporting requirement.

The QMP is reviewed annually to ensure that all information contained within it is relevant and up-to-date. Any necessary QMP revisions are made, and the document submitted to USEPA Region 1 annually, along with a listing of any substantive changes made to the document. Five years from the date of approval of a QMP, the QA Manager, Assistant QA Manager, and QA Team undertakes a complete review of the document and submits a revised QMP to USEPA Region 1 for review and approval.

The current approved QMP is posted on the NHDES Intranet under the "Operations - Quality Assurance" folder and on the NHDES Website (http://des.nh.gov/organization/commissioner/p2au/pis/qap/documents/r-co-16-02.pdf) for ease of access by program managers and others. Program-specific quality documents may also be posted on the NHDES intranet for staff use. Implementation of the quality assurance system is incorporated into the appropriate Performance Partnership Agreement and Comprehensive Work Plan documents for each environmental program.

3.2 QUALITY ASSURANCE MANAGER AND ASSISTANT MANAGER

The QA Manager serves as coordinator for all matters relating to QA policies and procedures. The QA Manager chairs the QA Team which administers NHDES' quality assurance and control processes. The QA Manager has the training necessary to carry out quality assurance oversight, QA System Administration activities, and Quality Assurance Project Plan (QAPP) reviews, except as indicated in Chapter 8. Currently, the Civil Engineer V of the NHDES Planning, Prevention & Assistance Unit (PPAU) serves as the NHDES QA Manager, among other duties. This QA-related duty is currently documented in the QA Manager's Supplemental Job Description (SJD).

The QA Manager maintains independence and impartiality of the data quality review. This individual has direct access to the Senior Leadership Team in order to communicate:

1) findings from reviews and audits;
2) status of the QA System and QMP;
3) problems with QA operations;
4) clarification and/or guidance on QA issues; and
5) 5) resolutions to QA issues that may be in conflict with other management guidelines.

This individual has no data gathering or reviewing responsibilities that would lead to a possible conflict with the QA Manager role.

The Assistant QA Manager co-administers the department's overarching QA System, along with the QA Manager and the QA Team. Currently, the NHDES Chief of Planning and Policy/Administrator of the PPAU within the Office of the Commissioner serves as the Assistant QA Manager. This QA-related duty is also currently documented in the Assistant QA Manager's SJD. Both the Assistant QA Manager and QA Manager work within the same unit within the agency, which allows for frequent communications on QA-related matters.

In the absence of the QA Manager, the Assistant QA Manager serves as acting NHDES QA Manager. The following activities are typically conducted by the QA Manager, but can be delegated to the Assistant QA Manager:

1) Maintaining the QA Team meeting log book;
2) Creating and updating various QA-related guidance documents, standard operating procedures, forms, and checklists;
3) Updating training/presentation materials and delivering QA Awareness Training sessions;
4) Reviewing QAPPs;
5) Overseeing the department's QA System Self-Audit Process; and
6) Drafting the NHDES QA System Status Report.

The QA-related procedures followed by the QA Manager, Assistant QA Manager and QA Team are documented in an SOP titled, "NHDES Quality Assurance System Standard Operating Procedure for Review of NHDES QA System Program Self-Audits."

3.3 QUALITY ASSURANCE TEAM

The mission of the QA Team is to implement NHDES' goal of assuring the quality of environmental information used for decision-making. To achieve this goal, the QA Team works to:

- Increase quality awareness and quality consciousness and commitment throughout NHDES;
- Provide appropriate training to all relevant staff; and
- Assure that all procedures related to data quality are properly observed and documented.

The NHDES QA Manager, Assistant QA Manager and the QA Team have the overall responsibility for assessing the procedures that are implemented throughout the Department to determine whether they are in compliance with the QMP.

The QA Team is the quality assurance resource for NHDES as a whole. It is anticipated that Team membership will change as circumstances dictate. The QA Team is comprised of individuals who have been identified by the NHDES Senior Leadership Team as qualified and available to serve as representatives of various programs. Members represent all major branches of NHDES. These individuals have varied responsibilities depending on which programs they represent. The current members of the NHDES QA Team are listed in Appendix B.

All QA-related tasks for the QA Manager, Assistant QA manager and QA Team members are accounted for in an on-line Time Allocation System using an established QA task code. Reports are available from the Time Allocation System to document an actual written record of time spent by the QA Manager and other staff on QA-related activities.

3.4 QUALITY SYSTEM TOOLS

The following are the primary tools utilized in NHDES' Quality Management System:

- Overall, this Quality Management Plan;
- An Environmental Data Quality Policy (see Section 1.2);
- Designated roles and responsibilities of those involved with quality assurance functions, in particular, the NHDES Quality Assurance Team (led by the NHDES Quality Assurance Manager), and NHDES Program Managers (see Chapter 2 and Sections 3.2 and 3.3);
- Communications processes (internal, external, confidential and non-confidential);
- Up-to-date QA resources and references on the NHDES Intranet under the "Operations - Quality Assurance" folder and the NHDES Quality Assurance Website at http://des.nh.gov/organization/commissioner/p2au/pis/qap/index.htm;
- Requirements and specifications, such as state and federal statutes, NHDES rules, federal regulations, Performance Partnership Agreements, grant work plans, Performance Partnership Grants, and contracts;
- Quality assurance planning tools, including strategic and organizational plans, project and program-specific quality assurance project plans (QAPPs), and similar documents such as sampling and analysis plans (SAPs), site specific plans (SSPPs), and data quality objectives (DQOs) (see Chapter 8);
- Quality assurance implementation tools, such as SOPs, training requirements, procurement procedures, and record keeping requirements;

- Annual quality assurance assessment and response tools, including quality system audits, Quality Assurance System Status Reports, corrective actions, data quality assessments, and performance evaluations (see Chapter 9); and
- Management assessments (see Chapter 10).

CHAPTER 4 PERSONNEL QUALIFICATION AND TRAINING

The quality of data NHDES collects and manages is dependent upon the qualifications and levels of proficiency of NHDES staff and citizen volunteers who collect and manage the data. NHDES' adherence to set procedures that define and control staff hiring and training, and adherence to its training requirements for volunteers, assures that staff members and volunteers are sufficiently qualified and proficient.

4.1 GENERAL STAFF QUALIFICATIONS AND PROFICIENCY

Administration of activities pertaining to staff qualifications and proficiencies of state agency employees are dictated by the New Hampshire Code of Administrative Rules of the Division of Personnel, Chapters Per 100 through 1500, adopted April 21, 1998 and amended October 18, 2006, (http://www.gencourt.state.nh.us/rules/state_agencies/Adm.html). Supplementing these rules are three Technical Assistance Manuals describing procedures that are followed pertaining to certain aspects of personnel management. These are *Technical Assistance Manual Chapter I – Classification; Technical Assistance Manual Chapter II – Recruitment and Certification; and Technical Assistance Manual Chapter III – Examinations.* The Division of Personnel, located at 25 Capitol Street in Concord, NH, holds copies of all these documents. Per 301.1 requires that the Division of Personnel have a *Personnel Classification Plan*, which consists of a complete set of published class specifications and the evaluation plan and point factors used to write class specifications. NHDES holds a reference copy of the current rules of the Division of Personnel. NHDES' Human Resources unit maintains a file of all current classifications used at NHDES and associated Supplemental Job Descriptions, or SJDs.

While the state classification system and the administrative rules provide the general framework for the creation of an SJD, NHDES may, however, request additions or modifications to the class specification based on unique position and/or program demands, especially for technical positions (*e.g.,* Engineer, Laboratory Scientist, etc.). NHDES may require that a Professional Engineer credential or some other external (to the NH Division of Personnel [DOP] or NHDES) certification of qualification be obtained and maintained. These extra qualifications may also be required under the Occupational Safety and Health Act (OSHA) due to the nature of the work performed. These are usually listed under the *Special Qualification* section of the SJD, or at times, some broad class specification will maintain a separate listing of qualifying education and experience by an agency. In short, the NH personnel system, as it is currently set up, allows flexibility for special qualifications and/or separate listings of qualification that reflect specific agency needs. Division of Personnel staff recognize that, at times, there are significant and unique concerns that need to be formally reflected in the class specification or SJD.

The state of New Hampshire and NHDES maintain a controlled process for defining job responsibilities and establishing qualifications, certifying that candidates meet those qualifications, and screening candidates through the prescribed examination and interview processes. Further, the personnel rules define procedures that address the manner and frequency of evaluations to ensure that personnel performance continues to meet the standard required of the position.

Personnel rules, however, are only part of the process through which NHDES ensures continued proficiency of its staff. NHDES provides in-house training for both staff and involved outside parties, as well as providing where possible for participation in other training, such as local and regional workshops.

4.2 VOLUNTEER QUALIFICATIONS AND PROFICIENCY

Volunteers perform an integral role in collecting data for various programs at NHDES. In order to ensure that NHDES volunteers are qualified to perform their data collection efforts, all volunteers are required to participate in NHDES-led training sessions pertaining to their particular collection effort. Attendance at this training is documented and serves as the qualifier for these NHDES volunteers. Data collected by volunteers who did not attend NHDES-sanctioned training sessions is not accepted by NHDES, unless a qualified NHDES volunteer closely supervised the untrained volunteers in the collection efforts. The proficiency of the volunteers is assessed as part of the program's normal annual review.

If volunteers collect data as part of an USEPA-funded project, the qualification and proficiency requirements will be specified in the USEPA-approved QAPP, or in the case of a project managed under a Master/Program QAPP, an approved Sampling and Analysis Plan or Site-Specific Project Plan. The Volunteer Monitor's Guide To Quality Assurance Project Plans, EPA 841-B-96-003 September 1996 (or later edition), is a primary reference.

4.3 TRAINING PROGRAMS - GENERAL

Bureau and Unit Administrators, as well as Environmental Program Managers are responsible for evaluating positions, determining the need for training or certification, and ensuring that staff (and volunteers) performing work are trained and qualified based on project-specific requirements prior to the start of the work or activity. In addition to maintaining accurate staff training records (as described below in Section 4.5 – Training Tracking), program managers should also document suggested or required minimum training needs by creating a separate document recording such information.

4.4 TRAINING PROGRAMS – QUALITY ASSURANCE

The NHDES QA Manager and Assistant QA Manager may arrange, offer, or alert staff to courses that are available to satisfy staff quality training needs. The QA Manager, Assistant QA Manager, and QA Team provide QA Awareness Training every three years. The required audience for is all staff who manage environmental data. All other staff are encouraged to take the training as well.

4.5 TRAINING TRACKING

Documentation of quality assurance-related staff training must be maintained in a known and retrievable location at the program level. Forwarding quality assurance-related training records to the NHDES Human Resources Unit is optional, and is at the discretion of the individual program managers.

NHDES program managers track their volunteers' training efforts and maintain records of that training within their own program files. It is not necessary to forward volunteer training records to the NHDES Human Resources Unit.

As described in Section 4.4, the QA Manager and Assistant QA Manager, with support from the QA Team, offer QA Awareness training every 2-3 years, or as needed. The list of training invitees and actual training attendees is documented and evaluated to determine the level of participation. This information is used in conjunction with assessments of program participation and performance associated with the Annual QA System Program Self-Audit process. Attendees of offered training receive "Certificates of Completion" to document their participation. The QA Manager or Assistant QA Manager maintain and track (in a central location), a list of individuals who have attended training.

CHAPTER 5 PROCUREMENT OF EQUIPMENT, SUPPLIES AND SERVICES

5.1 PROCUREMENT OF EQUIPMENT AND SUPPLIES

Several years ago, the State of New Hampshire implemented a Business Enterprise System called "NH First-Lawson." There were a number of phases to this state-wide software roll-out. Various accounting and payroll modules of the NH First-Lawson System were implemented. There were a number of expected changes to how the agencies manage their financial and related information. Any changes that significantly impact the NHDES QA System will be described in future QMP updates.

NHDES is subject to both state and federal requirements regarding the procurement of equipment and supplies. When using federal funds, NHDES complies with 40 CFR (Code of Federal Regulations) 33 – Procurement Under Assistance Agreements. The New Hampshire Department of Administrative Services, Division of Plant and Property Management, Bureau of Purchase and Property, is the state agency responsible under authority of RSA 21-I for the purchase of all equipment and supplies for use by state agencies. Equipment and supplies are ordered in accordance with the requisitioning agency's specifications which are submitted in conformance with the provisions of N.H. Code of Administrative Rules Adm – Sections 100 - 200 and 600, Plant and Property Management Rules.

NHDES staff requesting the purchase of equipment and/or supplies are responsible for ensuring that the equipment or supplies being ordered will meet their quality needs. They prepare an internal requisition form, obtain signatures from supervisory and other staff as appropriate (*e.g.,* Dept. of Information Technology staff must review and approve all computer software and hardware-related purchases – See Chapter 7, "Computer Hardware and Software)," and then forward it to the NHDES Accounts Payable Section. Accounting staff prepare a formal requisition form and forward it to the Bureau of Purchase and Property. The requisition form contains specifications on the quality and performance of the item(s) being purchased (after review and signature by the supervisor responsible for oversight of the project), as well as others involved in the in-house approval process, as described above. NHDES staff work with the State's Purchasing Agent to ensure that all items ordered and received meet the required specifications as identified by the agency (as determined by reviewed quality-related material from suppliers or otherwise), and work with the Purchasing Agent to rectify any discrepancies that may occur. The UESPA has the right to review the aforementioned quality-related documentation from suppliers, upon request.

The NHDES Facility Services Section within the Administrative Services Unit of the Commissioner's Office is responsible for tracking packages that arrive at NHDES' shipping dock. Packages that arrive through regular mail or that are directly delivered to staff or dropped off at the main NHDES Information Desk, while outside of the direct control of Facility Services staff, are still tracked as specified in NHDES Facility Services Policies and Standard Operating Procedures.

These Policies and Standard Operating Procedures outline the receipt and handling processes and protocols associated with packages received at NHDES. Facility Services is set up to function as a center for the receipt of packages, and is the designated office to receive and manage all packing slips that must be entered into the state's NH First-Lawson Database. There is a designated person, as well as a back-up, responsible for the handling of received items which include all packages from the United Parcel Service, Federal Express, the U.S. Postal Service, as well as miscellaneous packages that need to be confirmed as received in order to complete the vendor payment process thru the NH First system.

The overarching goals of the Facility Services Package Handling Policy/Standard Operating Procedure are to ensure that: 1) all packages are delivered to the individual named on the packing invoice; 2) all packing slips are entered into the NH First-Lawson system in an efficient and systematic manner for payment processing after the receiver has inspected the items; 3) all packages have been identified and processed correctly; and 4) to provide electronic tracking and back-up of all UPS deliveries to NHDES' main facility located at 29 Hazen Drive.

The basic steps that Facility Services staff adhere to when managing packages are as follows:

- Incoming packages received at the loading dock will be picked up daily by Facility Services staff and brought to the Facility Services Mail Room for sorting. Procedures are in place to handle packages that have been identified as suspicious in nature -- "Guidelines for Handling Suspicious Mail/Packages," as developed by the NHDES Spill Response and Complaint Investigation Section.

- All items received on a pallet that will need to be broken down will be left at the dock until the receiver is notified to come and pick up their items for inspection on the dock. It will be up the receiver to recycle all materials after the pallet is broken down to the appropriate areas located on or near the dock.

- Packages not properly addressed will be returned to the sender, and attempts to call the vendor for the correct name to deliver to will be made if time allows. If not, a call to NHDES Accounting staff can be made to have someone look up the original order to see who submitted it.

- All packages that are of a personal nature, and which are not related to NHDES business, are left at the loading dock for the receiver to pick up on their own.

- All packages with packing slips received by Facility Services will be entered into an Excel spreadsheet to confirm that the items have been received and date stamped. The spreadsheet will contain the following information/data fields: the package sender; the intended recipient; the date received; the package tracking number; the invoice, purchase order or field purchase order; and if Facility Services has received the packing slip back from the person who it was delivered to, the date when it is received at Facility Services.

- Personnel are responsible for opening and inspecting all packages that have invoices or packaging slips that are addressed to them. If a package looks suspicious, staff are to follow the instructions set forth in the "Guidelines for Handling Suspicious Mail/Packages" developed by the NHDES Spill Response and Complaint Investigation Section.

- Once the packages have been inspected by the receiver, the invoices and packing slips, which must be signed and dated by the receiver that it has been received, inspected, and with any discrepancies on the packing slip as to missing or damaged items noted, must be submitted Facility Services for further processing.

- Inspections of received packages must be done in a timely manner - within 48 hours of receipt. If more time is needed to inspect, Facility Services must be notified.

- Once the packing slip is returned to Facility Services signed and dated by the receiving staff, it will be entered into the NH First-Lawson system for confirmation. The packing slips are then put into the NHDES Accounts Payable Section outbox in Facility Services for pickup.

5.2 PROCUREMENT OF SERVICES

It is often necessary, and appropriate, for NHDES to enter into a formal agreement with another organization to provide NHDES environmental data support services. The handling of volunteer organizations is addressed elsewhere in this document. The vehicle for managing such work may be in the form of a grant, loan, contract, or other formal legal arrangement such as an inter-agency Memorandum of Agreement/Understanding (MOA/MOU). While MOA/MOUs and loans are treated a bit differently, grant projects are typically conveyed and funded through state contracting procedures as described below. Most, if not all, outsourced activities and associated transactions, depending on the dollar amounts involved, require final approval and authorization by the Governor and Executive Council.

As an environmental program is designed, and grant projects solicited, specific quality assurance requirements and criteria are developed and communicated as part of the request for proposal (RFP) process, grant and loan application guidance and forms, and any upfront informational materials. Quality assurance requirements and criteria are also used in evaluating and selecting an outside organization to provide the desired support services. A survey of agencies that are performing similar projects may be conducted to generate a potential vendor list which can then be used to screen vendor qualifications and competence. This information can be used to identify vendors which have already been certified by other agencies to perform the kinds of services being sought.

As with equipment and supplies, the process for procuring services is controlled by Federal regulations and by State statute and rules. Major laws and regulations for this are:

- 40 CFR Part 33 - Procurement Under Assistance Agreements
- RSA 21-I:22 - Procurement of Engineering Services
- Department of Administrative Services, Chapter Adm 600 - Plant and Property Management Rules (http://www.gencourt.state.nh.us/rules/state_agencies/adm600.html).

40 CFR Part 33 outlines the general federal regulations for procuring all types of services and material. State laws and regulations give additional requirements.

RSA 21-I:22 deals specifically with the procurement of engineering and surveying services. In summary, this process involves issuing a request for qualifications (RFQ), rating each firm that responds using specific quality-based criteria, selecting a short list of qualified firms, evaluating these potential contractors via project presentations, and conducting final negotiations with the highest-ranked firm. In this manner, NHDES ensures that professional services will be provided with appropriate quality, and at a reasonable cost.

The Department of Administrative Services, Chapter Adm 600 - Plant and Property Management Rules include the processes by which approval of service contracts through the N.H. Department of Administrative Services and the N.H. Governor & Council is obtained.

NHDES program managers initiate the procurement process by following the requirements of the above-referenced procedures, laws, and regulations. It is the program manager's responsibility to write the scope of services for the grant, loan, contract, or MOA/MOU (typically provided with the standard state contract as "Exhibit A – Scope of Services") in order to ensure that the vendor selected will be able to perform the desired services in conformance with specific regulations, methods, technical manuals, or quality assurance procedures applicable to the project. It is also the program manager's responsibility to monitor the contractor throughout the contract period, to make certain that the work is being performed and satisfactory work products are being produced to the standards (quality assurance and otherwise) specified in the scope of work. This is also accomplished by making contract payments contingent upon inspection and review of

expected work products and outputs. If the work products or outputs are deemed satisfactory by the responsible program manager, the contractor invoice is dated and signed, an account number is provided, and the invoice is sent to the appropriate accounting staff.

CHAPTER 6 DOCUMENTS AND RECORDS

6.1 DOCUMENTS AND RECORDS OVERVIEW

Documents and records generated and maintained by NHDES are to provide an accurate reflection on the actual work completed. Each program within NHDES maintains a document and records system to suit its particular circumstances that complies with all applicable requirements. The document and records systems produce unequivocal, accurate records that document all program activities. Records are kept in such a way that they can be retrieved. This applies to both paper and electronic files. If security is an issue, tools such as locks and passwords should be used.

It should be noted that handling of documents used to support enforcement cases are subject to separate requirements. See chapter V of the NHDES *Compliance Assurance Response Policy* (http://des.nh.gov/organization/commissioner/legal/carp/documents/ch-5.pdf).

6.2 RETENTION OF DATA

As specified in this QMP and NHDES Standard Operating Procedure #: 107 - *Paper Records Retention Management Plan*, which is located on the NHDES Intranet, all programs will have a documented data retention schedule. Where a program manager determines that specific data is of extremely high value, a copy should be made and stored in a separate building, as per the Department of State, Division of Archives and Records Management Procedures Manual which is located on the state website at: http://sos.nh.gov/WorkArea/DownloadAsset.aspx?id=47314

6.3 PAPER-BASED RECORD-KEEPING SYSTEM

The record-keeping system shall facilitate the retrieval of all working files and archived records for inspection and verification purposes.

Records shall clearly indicate the date of the field observation, sample collection, sample preparation, equipment calibration or testing, and other related activities. Records shall include the identity of personnel involved in making observations, collecting field data, sampling, preparation, calibration, or testing. All notations in records except those that are generated by automated data collection systems, shall be recorded directly, promptly, and legibly in permanent ink.

All documentation entries shall be signed or initialed by responsible staff. The reason for the signature or initials shall be clearly indicated in the records such as “Sampled by,” “Prepared by,” or “Reviewed by.” Staff shall ensure that an appropriate chain-of-custody is followed for their specific programs.

Entries in records shall not be obliterated by methods such as erasure, overwritten files, or markings. All corrections to record-keeping errors shall be made by one line marked through the error and initialed. These criteria also shall apply to electronically maintained records, as applicable.

6.4 COMPUTER AND ELECTRONIC DATA REQUIREMENTS

All computer software must have documentation associated with it and must be adequate for its intended use. NHDoIT is responsible for cataloging and maintaining proper documentation.

Procedures are established and implemented for protecting the integrity of data; such procedures include, but are not limited to integrity of data entry or capture, data storage, data transmission, and data processing.

Necessary environmental and operating conditions are maintained to ensure that computer and automated equipment functions properly and that the integrity of calibration and test data is not compromised.

Procedures are implemented for maintaining the security of data, including the prevention of unintended deletion and unauthorized access to, and amendment of, computer records.

6.5 RECORD MANAGEMENT AND STORAGE

Records shall be maintained in a safe, secure, and retrievable manner. Records stored only as electronic media must be supported by the hardware and software necessary for retrieval. Those programs maintaining records which are used for evidentiary purposes and/or are identified as confidential shall have procedures to ensure that these documents are handled in an appropriate manner.

Records should be saved to the NHDES network, not to local hard drives, to ensure that the data will be backed up to tape on a daily basis and removed off-site, as per current NHDoIT data back-up protocols. Records that are stored or generated by computers shall have either hard-copy or write-protected back-up copies

Access to archived information shall be documented with an access log.

6.6QUALITY SYSTEM DOCUMENTS & DOCUMENT CONTROL

Controlled documents include the following:

- The NHDES QMP;
- Various QA-related policy and guidance documents;
- All QAPPs; and
- Other monitoring, Sampling and Analysis Plans, Site Specific Plans, and SOPs developed under the QMP at the program level.

The most up-to-date version of the QMP, QA System Status Report, QA Policy, various QA-related guidance, training documents, and QA System-wide SOPs, and select QAPPs (at the discretion of the QA Manager, Assistant Manager, and QA Team), are posted on NHDES' Intranet page under the "Operations - Quality Assurance" folder and on the Internet at: http://des.nh.gov/organization/commissioner/p2au/pis/qap/index.htm.

With the exception of department-wide, QA System-related SOPs, most SOPs and Sampling and Analysis Plans/Site Specific Plans being operated under a Master/Program Plan are primarily reviewed and approved by program managers at the program level. These program-level SAPs, SSPPs, and SOPs may also be reviewed by the NHDES QA Manager or Assistant QA Manager on request.

As circumstances dictate, additional documents or classes of documents or records may be added to the list of controlled documents. Decisions regarding posting documents on the Intranet or Internet are made by the QA Manager.

After drafting by program personnel, with assistance as needed by the QA Team, all controlled documents, with the exception of program-level SOPs, SAPs, and SSPPs, must be approved by the QA Manager or Assistant QA Manager before use.

When a document is updated, following approval of the updated document by the QA Manager, and if necessary, by USEPA Region 1 QA staff, the most recent copy of the document is distributed to program staff. Electronic distribution is encouraged. All previous versions of the document will be discarded, except that the QA Manager and program manager may retain one electronic or hardcopy (for each person) of all obsolete documents for archive purposes.

The reports of programs' annual self-audits are not considered controlled documents, and therefore are not posted on the NHDES Intranet or Internet site.

The Program Manager has the responsibility for distributing updated documents within the program. Appropriate staff distribution lists are documented and maintained. The QA Manager has the responsibility of ensuring that the documents posted on NHDES' Intranet under the "Operations - Quality Assurance" folder and on the internet site (http://des.nh.gov/organization/commissioner/p2au/pis/qap/index.htm) are the most updated versions.

The Program Manager also has the responsibility for ensuring that their staff uses the most recent documents.

All controlled documents will be marked with a revision date, and revision or version number using a footer at the bottom of each page of the document. See the bottom of this page for an example.

CHAPTER 7 COMPUTER HARDWARE AND SOFTWARE

7.1 INTRODUCTION

The State of New Hampshire Department of Information Technology (NHDoIT) is responsible for all computer hardware and software and related issues, including purchasing, installation, maintenance, technical support, and database development. NHDoIT operates under statewide policies and procedures for computer equipment and use.

NHDoIT provides both centralized and decentralized functions. Administrative and technical service functions are typically operated and located directly within the central NHDoIT infrastructure. However, a number of NHDoIT staff are assigned to provide dedicated technical and database development support to particular user groups at the Division, Bureau, Section, or Program level within the Department, depending on funding.

NHDES maintains an Information Technology Advisory Committee comprised of representatives from the Senior Leadership Team, administrators from each division, and other staff. This committee, along with the NHDoIT Team Lead for NHDES, reviews and approves recommendations for information system changes to support the vision, mission, and guiding principles of the NHDES Strategic Plan.

7.2 HARDWARE AND SOFTWARE ACQUISITION

Hardware and software purchases and contracting for IT services at NHDES must be done in accordance with NHDoIT procedures, as well as those listed in Chapter 5 above. The NHDoIT purchasing procedures, and a list of "Standard Products," can be found on the NHDoIT Agency Intranet website for easy access by State of New Hampshire employees at: http://www.nh.gov/doit/intranet/index.php. Two related IT policies, "Computer Hardware Policy" and "Computer Software Policy" are also located on the NHDES Intranet site. In addition to meeting all the requirements set forth in the State Information Technology Plan, and the computer hardware and software-related policies, all hardware and software purchased by NHDES follow the requirements set forth in current State computer purchasing contracts.

7.3 MEETING DEPARTMENT STANDARDS AND USER DATA REQUIREMENTS FOR HARDWARE AND SOFTWARE

As part of these procurement procedures, requesting staff meet with appropriate NHDoIT staff to discuss, in detail, individual performance and data quality needs. This can be conducted at the onset of a program or as program changes occur, and should be documented by those in the program. This evaluation must assess the roles, responsibilities, and authorities of management and staff for developing, installing, testing, using, maintaining, controlling, and documenting computer software used in environmental programs to ensure it meets the technical and quality requirements and directives from management. Computer software includes, but is not limited to, design, data handling, data analysis, modeling of environmental processes and conditions, operations, or process control of an environmental technology system, and databases containing environmental data. This internal consultation will also take place in those instances where software will not necessarily be purchased, but received from outside organizations such as the USEPA. Regardless of how the hardware or software is procured, the results of this internal consultation are to be documented in order to ensure that specific user needs have been met. With the assistance of NHDoIT, program managers should ensure that the hardware and software purchased or received meets contractual standards and requirements. This documentation may or may not be in the form of a formal IT Business Plan or similar documentation.

7.4 DATA ENTRY FOR NHDES DATABASES

Programs have procedures in place to ensure that errors or inconsistencies are minimized or eliminated during data entry into the many NHDES computerized data systems. Computerized data systems may have built-in mechanisms to screen for valid data and appropriate data relationships. If not, procedures are in place, and staff training provided, to ensure that program staff are able to effectively evaluate the quality of the data being entered and to spot and correct potential errors or inconsistencies.

7.5 PROCURING INFORMATION TECHNOLOGY-RELATED SERVICES

Procuring IT-related services follows the procedures outlined above for "Hardware and Software Acquisition, Section 7.2, in combination with those described in Section 5.2, "Procurement of Services."

7.6 NETWORK MANAGEMENT, DATA BACK UP, DATA RECOVERY PROCEDURES, AND VIRUS PROTECTION

NHDoIT follows specific operating procedures to help minimize the loss of key electronic data across the many important data systems throughout the Department. These procedures include how frequently the back-up functions should be performed and how the back-up tapes and other data retrieval methods are to be handled, labeled, and stored, both on-site and off-site, all in an effort to have, with a worst case scenario, no more than one workday's worth of data loss. NHDoIT has a multi-tiered approach to disaster recovery for data systems, including contingencies for both hardware and software failures due to power interruption and other scenarios. Finally, NHDoIT staff maintain aggressive computer virus and SPAM protection programs in order to keep over 600 units (servers, desktops, and laptops, and peripheral equipment) used by approximately 470 users, operating smoothly and safely and ensuring that key data and systems remain uncorrupted. To further protect the Department's data, NHDoIT instituted a requirement that requires all state agency staff to complete a comprehensive, online cybersecurity training module.

7.7 COMPUTER MODELS

Program Managers are responsible for ensuring all activities involving the development, modification, evaluation, and/or application of mathematical or computerized models of environmental processes and conditions are conducted under an approved QAPP.

CHAPTER 8 PLANNING AND IMPLEMENTING QUALITY PROCESSES

8.1 PLANNING OVERVIEW

Chapter 8 presents an overview of the steps involved in the planning and implementation aspects of NHDES' Quality System (Sections 8.1 and 8.2). It also provides descriptions on how program staff address:

a) When documents such as QAPPs are needed (Section 8.1);
b) Data Quality Objectives (DQOs), including when (Section 8.3);
c) Sampling (Section 8.4);
d) Field testing (Section 8.5);
e) Fixed laboratory testing (Section 8.6);
f) Environmental condition data (Section 8.7);
g) Secondary Data and Modeling (Section 8.8); and
h) Reporting Results (Section 8.9).

There are times where the immediate need for a data operation arises from an unplanned event, emergency situation, or some other cause that imposes a constraint on the amount of time available to meet the requirements of the formal systematic planning process and the development and approval of QAPPs and similar internal documents as described below. Staff use their best judgment, in consultation with their superiors as appropriate, in determining the flexibility needed from the requirements of the following sections in these instances. Such variations from ordinary procedures are documented, at the least by a memo to the file for that data operation.

The overall planning goal is to produce written documentation describing how the data will be acquired, analyzed, evaluated, and assessed against its intended use and the quality performance criteria. The form of this document will be program-specific. In some cases, memos to staff or file will suffice.

However, it may be necessary for the program manager to develop more specific quality assurance documents. One of the most common such documents is the QAPP, which is typically required with USEPA-funded activities. QAPPs will be prepared in accordance with this QMP and other relevant QAPP guidance documents including, but not limited to (depending on the nature of the project):

- *USEPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, March 2001, USEPA/240/B-01/003*[1], or later edition;
- *USEPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002*[2];
- *The Volunteer Monitor's Guide To Quality Assurance Project Plans*[3]; and
- an *Example of a QA Project Plan Review Checklist*[4].

A wide variety of Guidance Documents are available on USEPA's Quality Assurance website: http://www.epa.gov/quality/qa_docs.html.

A QAPP should be considered when:

- A funding agency requires it.

[1] See https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf
[2] See https://www.epa.gov/sites/production/files/2015-06/documents/g5-final.pdf
[3] See https://www.epa.gov/quality/volunteer-monitors-guide-quality-assurance-project-plans
[4] See https://www.epa.gov/sites/production/files/2015-08/qapp-checklist.doc

- There are serious public health and/or environmental impacts.
- A matter is under litigation, enforcement or a court-ordered schedule, and therefore may be highly scrutinized.
- A program is being implemented for the first time;
- A program is subject to high staff turnover and would particularly benefit from documented procedures; or
- The program has a research aspect.

The NHDES QA Manager, in cooperation with the relevant program managers, is responsible for tracking the development of any required Master/Program QAPPs (Table 1). Per NHDES' agreement with USEPA Region 1, the NHDES QA Manager, or the Assistant QA Manager, coordinates with USEPA Region 1 during the review of all Master/Program QAPPs, and certain SSPPs, as described below. This is currently being done on a real-time basis using a QAPP Inventory spreadsheet that is saved on a password-protected EPA Region 1 QA Roundtable SharePoint site and is accessible by the NHDES QA Manager, Assistant QA Manager, and a designated USEPA Region 1 QA staff person.

Table 1 QA Planning Document Types

QA Document Type	Definition
Master / Program QAPP	A planning document, written to EPA specifications, which describes quality assurance procedures for a program or a set of projects. Can be used in conjunction with a SAP, SSPP or SSPP addenda. Sometimes referred to as a generic QAPP.
SAP	A planning document used in conjunction with a Master/Program QAPP, which documents the procedural and analytical requirements for projects involving the collection of water, soil, sediment, air, or other samples taken to characterize areas of potential environmental contamination.
SSPP	A planning document also used in conjunction with a Master/Program QAPP, which describes the quality assurance procedures for a specific program/task that is not covered by the Master/ Program QAPP for the program. This document is similar to a SAP, but is often more involved and can include tasks other than sampling and analysis.
SSPP Addenda	The project plans for the site assessment or cleanup work to be performed at a particular site, which operate under a Master/Program QAPP. These types of planning documents serve the same purpose as a SSPP. They are almost entirely exclusive to the WMD HWRB's Brownfields program.

Under the NHDES QA program, planning documents can be broken down into two different categories: "Parent" / standalone documents (Master / Program) and "child" documents (SAPs, SSPPs and SSPP Addenda).

A Master/Program QAPP, can be useful when a program may be conducting environmental projects repeatedly. This Master/Program QAPP (which can have some other title, such as "Program Operations Manual") can cover the description of the program and its organization; general personnel information indicating the types of positions/titles that will be assigned various tasks; data quality objectives; documentation and record needs; data assessment and corrective action procedures; and monitoring and sampling procedures. All Master/Program QAPPs are reviewed for appropriateness annually by the respective NHDES Program Managers (as required by USEPA and as documented in conjunction with the NHDES QA System Program Self-Audit process).

For those programs operating under a Master/Program QAPP, each individual project (or individual site), only requires a (typically) shorter and less detailed document, which is defined in NHDES' QA System as a Sampling and Analysis Plan (SAP), Site-Specific Project Plan (SSPP) or SS QAPP Addenda (see Table 1). The purpose of these child documents are to provide specifics for the individual projects or sites and to record the information for work or procedures that are not included in the Master/Program QAPP, or which deviate from the work or procedures specified in the Master/Program QAPP.

The NHDES or contracted Project Manager is responsible for communicating the SAP/SSPP and other QA/QC requirements to other field sampling staff that may be working on the project. If applicable, EPA Project Officers receive a copy of the SAP/SSPP, whereas a copy of the approved SAP/SSPP is made available to USEPA Region 1 QA staff upon request. All review and approval information for Master/Program QAPPs as well as SSPPs under the New Hampshire Section 319 Nonpoint Source Grant Program QAPP and the Generic Program QAPP for Fluvial Morphology Data Collection will be tracked on the shared NHDES QAPP Inventory spreadsheet located on EPA Region 1's QA Roundtable SharePoint site. Other planning documents may be tracked via this SharePoint site if they require both NHDES QA Manager and EPA Region 1 approval.

In general, SAPs/SSPPs reference their parent Master/Program QAPP. Deviations from, and stipulations not addressed in the parent QAPP, are incorporated into the SAPs/SSPPs. Additional information is considered and added on a case-by-case. Also, the Project Manager is responsible for locating or producing procedures for any deviations and stipulations, in particular, sampling and testing required for a project that is not described in the Master/Program QAPP. SAPs/SSPPs may include some or all of the following information:

- Site information: Site map, sampling location plan, project description, and schedule;
- Personnel information: Name and/or title of the individuals conducting the work; and
- Site-specific variances: Any issue with the site that requires a variance from the work anticipated and described in the Master/Program QAPP, (*e.g.*, new analytes or media, new equipment, etc.).

QA planning documents which only relate to a specific project, like the Project-Specific QAPP and SAPs/SSPPs, have a life span which is the same as the project to which it applies. These are typically one season or one year in duration. For those project-specific documents that span multiple years, an annual review must be conducted as part of the NHDES Annual QA System Program Self-Audit process. Master/Program QAPPS, which by their very nature tend to be multi-year documents, are reviewed annually in conjunction with the QA System Program Self-Audit process. Master/Program QAPPs are typically valid for as long as they are so updated, but a complete review and re-approval is necessary at the five-year mark, unless outside requirements mandate a shorter review period.

NHDES has numerous USEPA-approved Master/Program QAPPs in the Commissioner's Office, Water Division as well as the Waste Management Division as seen in Table 2.

Table 2 USEPA-approved NHDES QAPPs indicating whether subsequent planning documents (including SAPs, SSPPs, SSQAPPs and SSQAPP Addenda are generated from them).

Division	Bureau	USEPA-approved Program / Master QAPP Name	Produce SAPs/ SSPPs/SSQAPPs/ SSQAPP Addenda?
CO	Geo	Generic QAPP for Fluvial Morphology Data Collection	Y - SSPPs

Division	Bureau	USEPA-approved Program / Master QAPP Name	Produce SAPs/ SSPPs/SSQAPPs/ SSQAPP Addenda?
WD	WRBP	Quality Systems Manual and SOPs For Microbiological and Chemistry Testing	N
WD	WMB	NHDES Beach Program	Y - SAPs
WD	WMB	Jody Connor Limnology Center (JCLC) Laboratory Manual	N
WD	WMB	NHDES Volunteer Lake Assessment Program QAPP	Y - SAPs
WD	WMB	Wetland Assessment and Classification in NH	N
WD	WMB	Wetland Biocriteria in NH	N
WD	WMB	NHDES Volunteer River Assessment Program QAPP	Y - SAPs
WD	WMB	Ambient River Monitoring Program QAPP	Y - SAPs
WD	WMB	Lake Assessment Programs QAPP	N
WD	WMB	New Hampshire Section 319 Nonpoint Source Grant Program QAPP	Y - SSPPs
WD	WMB	McQuesten Brook Watershed Dam Removal and Restoration Project: Impoundment Sediment Collection and Analysis and Hydraulic Analysis QAPP	Y - SSPPs
WD	WMB	QAPP for Shellfish Program Ambient Water Quality Monitoring	N
WD	WMB	QAPP for Shellfish Program Paralytic Shellfish Poison Monitoring	N
WD	WMB	QAPP for Shellfish Program Sanitary Surveys	N
WD	WMB	NHDES Public Bathing Facility Program Inspection Manual	N
WD	WWEB	Sludge Quality Certification Program QAPP	Y -SAPs
WD	WWEB	Sludge Facility/Site Permit Program QAPP	Y -SAPs
WD	WWEB	Septage Facility/Site Permit Program QAPP	Y -SAPs
WD	WWEB	NPDES Compliance Monitoring Program QAPP	Y -SAPs
WD	DWGB	New England Drinking Water Quality Assurance Project Plan QAPP	N
WMD	MtBE	MtBERB Sampling QAPP	N
WMD	HWRB	HWRB Master QAPP	Y – SAPs
WMD	HWRB	Weston Solutions, Inc. Master QAPP*	Y – SSPP Addenda
WMD	HWRB	Ransom Consulting, Inc. Generic QAPP - Brownfields and State Sites Programs*	Y – SSPP Addenda
WMD	HWRB	Credere Associates, LLC Generic QAPP - State of New Hampshire Brownfields Programs*	Y – SSPP Addenda
WMD	HWRB	TRC Environmental Corp's Brownfields Program, Generic QAPP	Y – SSPP Addenda
WMD	HWRB	Sanborn , Head & Associates, Inc. USEPA NE Brownfields Generic QAPP	Y – SSPP Addenda
WMD	HWRB	Nobis Engineering, Inc. Generic QAPP*	Y – SSPP Addenda
WMD	HWRB	GZA GeoEnvironmental, Inc. Master QAPP*	Y – SSPP Addenda
WMD	ORCB	Petroleum Remediation Master QAPP	Y -SAPs
WMD	HWCB	Hazardous Waste Compliance Monitoring Program Master QAPP	Y -SAPs

*Brownfields QAPP

The Generic QAPP for Fluvial Morphology Data Collection is the overarching QAPP for fluvial geomorphology data collection. Under this Program QAPP, SSPPs are written for project-specific work. These SSPPs are written by the project manager (usually a consultant) and are approved by the NHDES Project Manager and NHDES QA Manager, prior to field work. The SSPPs are sent to the EPA Program Coordinator for receipt.

SAP are created under the NHDES Beach Program and NHDES Volunteer Lake Assessment Program for special projects. They are created by program staff, and sent to the NHDES QA Manager for receipt.

SAPs are created under the NHDES Volunteer River Assessment (VRAP) Program. These SAPs are created annually by volunteer groups, (often with the optional VRAP SAP template) submitted to the VRAP staff, and retained at NHDES.

SAPs are created under the NHDES Ambient River Monitoring Program. These SAPs are created by the programmatic staff annually, and retained at NHDES.

Under the Section 319 Watershed Assistance Grants Program, the SSPPs for projects produced under this Master QAPP, are to be reviewed and approved internally by the NHDES Program Manager, NHDES QA Manager and sent, as a courtesy to the EPA Project Officer.

The McQuesten Brook Watershed Dam Removal and Restoration Project: Impoundment Sediment Collection and Analysis and Hydraulic Analysis QAPP is a Master QAPP for a specific project under the Section 319 Watershed Assistance Grants Program and was approved in May 2014. This QAPP was approved by the NHDES Program Coordinator, NHDES QA Manager, USEPA Project Manager and USEPA QA Representative.

The activities of the NHDES Wastewater Bureau, Residuals Management Section, are contained in four Master QAPPs, which are not EPA-funded, and therefore, did not require EPA approval: Septage Data Survey, Sludge Quality Certification, Sludge Facility/Site Permits, and Septage Facility/Site Permits. All four of these QAPPs are under review.

The Septage Data Survey Generic QAPP, approved in June 2014, does not result in the generation of any SAPs, SSPPs or other QA planning documents.

The Septage Facility/Site Permits Generic QAPP, Sludge Facility/Site Permit Program Generic QAPP and Sludge Quality Certification Program Generic QAPP approved in April 2010, June 2010 and July 2012, respectively, indicate, at the end of Section A9, that SAPs are produced for special projects. According to Appendix B of these QAPPs, these SAPs are created by the NHDES Program Manager as well as are viewed and approved by the Program Manager prior to any field work. These QAPPs also indicate that the SAPs are sent to the NHDES QA Manager for his/her receipt. To be consistent with practice, when these Generic QAPPs are updated, they will note that the SAPs are only kept on file within the NHDES Residuals Management section.

Under the Septage Facility/Site Permits Generic QAPP, the NHDES Residuals Management Section uses an internal Septage Sampling Plan and internal QA Plan for the Monitoring and Testing of Biosolids and Septage.

The Sludge/Biosolids Sampling and Analysis Plan for Annual Testing SAP, revised in June 2014, is a supplement to the Sludge Quality Certification Program Generic QAPP. This SAP speaks to the recurring activities described in the Sludge Quality Certification Program Generic QAPP, and provides guidance on the annual testing requirements of the Sludge Quality Certification Program Generic QAPP. This SAP does not speak to the special projects, which can be planned, via a separate SAP, under this Master QAPP.

Under the NPDES Compliance Monitoring Program QAPP, SAPs can be produced as a result of any deviation or stipulation. These SAPs are prepared by the NHDES Program QA Officer, reviewed and approved by the NHDES Program prior to field work. A copy of the SAP would be sent to the NHDES QA Manager, for receipt.

For SSPP Addenda produced under USEPA-funded Hazardous Waste Remediation Bureau (HWRB) Brownfields Master QAPPs or HWRB Superfund SAPs, neither the NHDES QA Manager nor the Assistant QA Manager is required to approve or sign. However, the HWRB Program Manager is required to review and approve all QA planning documents. The NHDES QA Manager or Assistant QA Manager's approval and signature on these documents are optional measures as determined by the NHDES Project Manager, NHDES QA Manager, Assistant QA Manager, or USEPA Region 1 QA staff.

USEPA Region 1 QA staff are not typically involved in the review and approval of SAPs or SSPPs, with the exception of Brownfields Projects (within the HWRB), where USEPA Region 1 QA staff must review and approve all QA documents, following all NHDES Project Manager approval. Approval of the planning document is required before the work described in the plan can be initiated.

Under the Petroleum Remediation Master QAPP, SAPs are created by the NHDES QA Coordinator or contractor. The SAPs are approved by the NHDES project manager and USEPA, if a petroleum brownfields SAP, and a copy is sent to the NHDES QA Manager. However, at the discretion of the project manager and QA Coordinator, sampling efforts may proceed without a formal SAP in cases where timeliness is paramount in protecting human health and the environment.

Under the Hazardous Waste Compliance Monitoring Program Master QAPP, SAPs are either written in advance of sampling or upon completion of sampling. Because this master QAPP focuses on the unannounced inspections conducted by this program, program staff may be unable to anticipate whether samples would be required to be taken in advance of their inspections. As a result, SAPs would need to be created after the sampling and analysis have been conducted or are underway. These SAPs will typically be written by the inspector and Program QA Manager, reviewed and approved by the Program Manager prior to field work (if possible), and a copy retained at NHDES. A copy of the approved plan is sent to the NHDES QA Manager.

Whatever form of documentation is used, the quality planning steps listed below apply:

1. After establishing that a project is necessary, and the goals of the project are agreed upon, identify (and involve) an individual project manager.

2. Identify and involve other parties as appropriate. The intent is to identify all customers for the data and all suppliers of the data. The program manager is responsible for this step.

3. Describe the project goal, objectives, and questions and issues to be addressed in writing and communicate them to all parties identified in step 1 & 2. Consider the potential uses of the data. The project manager is responsible for this step; the program manager reviews and approves it.

4. Identify the project schedule, required resources (including budget), milestones, and any applicable requirements (*e.g.*, regulatory and contractual requirements). The project manager prepares this for the program manager's approval.

5. Identify the type, quality, and quantity of data needed and how the data will be used to support the project's objectives, and communicate this to relevant parties. This is the program manager's responsibility. The data must meet the needs of the intended audience. Also, this step can identify when

work is not necessary – if there are no customers for the data, then the program manager should consider putting the resources to other uses.

6. Identify the performance criteria for measuring data quality, including any statistical methods proposed, and ensure that the criteria are understood by relevant parties. This is the program manager's responsibility.

7. Identify the QA/QC activities necessary to assess the quality performance criteria (*e.g.,* QC samples for the field and laboratory, audits, technical assessments, performance evaluations, etc.) and ensure that they are understood by relevant parties. This is the project manager's responsibility, although he/she is encouraged to consult with other parties as needed.

8. Determine how, when, and where the data will be obtained (including existing data, whether the data originates from NHDES or elsewhere, and information derived from environmental models) and identify any constraints on data collection, and document this. This is the project manager's responsibility. The use of existing data is strongly encouraged, provided its quality is known and is appropriate for the project; new data should be used to fill gaps in existing data or to determine if the situation described by the existing data has changed. When new data is to be generated, the sampling and analysis procedures must be documented.

9. Consider whether it is appropriate to evaluate and qualify data from non-NHDES sources, especially data gathered or analyzed by contractors, volunteers or other organizations such as universities or other research organizations. The project and program managers share this responsibility and should document their decisions. This issue must receive special attention from the project and program managers to ensure that this class of data is usable and defensible.

8.2 IMPLEMENTATION OVERVIEW

The NHDES Senior Leadership Team is ultimately responsible for assuring that all work NHDES undertakes is done to appropriate standards. That responsibility is delegated to various program managers through the structure of NHDES. The QA Manager is ultimately responsible for ensuring that all NHDES staff managing environmental data operations understand the NHDES quality system. The QA Manager, Assistant QA Manager, and the QA Team provide assistance to the program managers to implement the NHDES quality system, and reviews and approves the various required documents.

In the absence of directions otherwise in a program or project-specific document, the following structure applies:

1. Program managers are responsible for ensuring that written procedures are prepared for all operations requiring them and that staff are adequately trained in their use.

2. Project managers are generally responsible for ensuring that the work is carried out properly, according to approved written procedures, and for alerting their chain-of-command of problems as they arise. The project manager is responsible for communicating changes to relevant staff and to remove obsolete procedures.

3. Program managers are responsible for annually reviewing the quality system within their programs, including the revision and withdrawal of procedures, as necessary. Program managers are also responsible for reporting the results of that review to the QA Manager or Assistant QA Manager, *i.e.*, the annual QA System Program Self-Audit. Annual QAPP reviews are an USEPA requirement, which is

fully integrated into NHDES Self-Audit "Form A," which is to be completed by all programs operating under USEPA-approved, multi-year program or project QAPPs (or other program manuals) and submitted to the NHDES QA Manager - See Section 9.0.

4. Program managers are responsible for ensuring that their project managers and other staff have the information and resources necessary to do their work in accordance with all NHDES regulations, policies and guidance that apply to technical issues and to QA/QC issues.

5. NHDES staff are individually responsible for carrying out the tasks assigned to them in accordance with NHDES policy and their supervisor's instructions; and

6. In the case of volunteers or data gathered by others, the project manager is responsible for reviewing the data and flagging or removing data of questionable or unusable quality. All such instances are annotated so that persons reviewing the data understand what happened and what the data limitations were. Any such instance not deemed to be isolated must be addressed through the Assessment and Corrective Action processes outlined in Chapter 9.

8.3 DATA QUALITY OBJECTIVES

Before any sampling, monitoring, or testing is conducted, the program manager must determine how data will be judged to see if it is "good enough." The program manager documents and communicates these DQOs to the relevant program staff, participating organizations and laboratory staff[5]. Quite often, standards listed in regulations form an important part of a project's DQO's, but these may not be sufficient for all circumstances.

All sampling, testing, and recording of environmental data is done for a purpose; data is not gathered for its own sake. The procedures used for the effort must be appropriate for the use of the data. The purpose of the sampling or testing must be recorded.

In order to determine DQOs, program managers must consider and document decisions regarding the following:

1) What decisions will be made using this data?
2) What is to be communicated by using this data?
3) Is comparability with data generated in the past necessary?
4) Will a prospective decision remain the same regardless of what the data shows? and
5) If there is nothing to be communicated by this data, is it necessary to gather the particular data?

As specified in USEPA's Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4, February 2006[5], "each step of the DQO Process defines criteria that will be used to establish the final data collection design. The formal DQO Process steps are:

1) State the problem;
2) Identify the goal of the study;
3) Identify information inputs;
4) Define the boundaries of the study;
5) Develop the analytic approach;
6) Specify performance or acceptance criteria; and

[5] See USEPA Guidance on Systematic Planning Using the Data Quality Objective Process, EPA QA/G-4, February 2006 - located at: http://www.epa.gov/quality/qs-docs/g4-final.pdf.

7) Develop the plan for obtaining data.

In summary, the first five steps are primarily focused on identifying qualitative criteria, such as: 1) the nature of the problem that has initiated the study and a conceptual model of the environmental hazard to be investigated; 2) the decisions or estimates that need to be made and the order of priority for resolving them; 3) the type of data needed; and an analytic approach or decision rule that defines the logic for how the data will be used to draw conclusions from the study findings. The sixth step establishes acceptable quantitative criteria on the quality and quantity of the data to be collected, relative to the ultimate use of the data. Finally, in the seventh step in the formal DQO process, a data collection design is developed that will generate data meeting the quantitative and qualitative criteria specified at the end of step 6. A data collection design specifies the type, number, location, and physical quantity of samples and data, as well as the QA and QC activities that will ensure that sampling design and measurement errors are managed sufficiently to meet the performance or acceptance criteria specified in the DQOs. The outputs of the DQO Process are used to develop a QA Project Plan and for performing Data Quality Assessment."

8.4 SAMPLING

Sampling is the collection of material to be tested or examined (refer to Section 8.7 – "Environmental Condition Descriptions and Data" for considerations more specific to taking measurements such as water levels in the field). The object of any NHDES sample collection effort is to generate data that can be communicated and used to support NHDES decisions and actions.

Each program manager is responsible for ensuring that sampling activities are defined, controlled to the extent required, verified, and documented. Written sampling procedures must be followed in all instances. Wherever feasible, sampling procedures written by others, such as *Standard Methods for the Examination of Water and Wastewater*, or various USEPA guidance documents, should be included or reference in the procedures. The most up-to-date, approved edition of such a document is used.

Where sampling procedures written by others are not available, the program manager must ensure that a program-specific procedure is produced and made available to staff. Existing procedures for similar testing should be used as models whenever possible. The program manager prepares and has responsibility for updating the procedure.

The sampling procedure to be used must be reviewed before leaving for the sampling trip. If other agencies or organizations will be taking split samples, appropriate arrangements must be made. NHDES will give these other entities its full cooperation, within its legal responsibilities.

If NHDES intends to make use of the data generated by other organizations, it is the program or project manager's responsibility to ensure and verify that these non-NHDES entities are using appropriate written procedures. This may include review and approval of the other entity's procedure.

Sampling procedures, training records and other documents described in this section, are subject to the requirements in Chapter 6 of this QMP, "Documents and Records."

As part of annual program assessments, program managers review their sampling procedures, and the results of that review (with recommendations for improvements or other changes) are forwarded to the QA Manager as part of the annual Self-Audit report.

8.5 FIELD TESTING

Samples may be tested or examined in the field, that is, in close proximity to the location where the sample was taken. The decision as to whether field or fixed laboratory testing is appropriate is the responsibility of the program manager.

Where samples are examined or tested in the field, documentation takes place immediately upon testing, following established guidance for documentation. Field testing equipment is calibrated per the manufacturer's recommendations, and calibration records are kept. If calibration is done in the field, staff keeps this information with the field notes and puts a copy of these calibration records in the file.

The personnel doing the testing have the proper training to run the testing equipment in question. Training records are kept in accordance with RSA 5:37, SOP #107 "Paper Records Retention Management Plan" and the specific program QAPP.

When field testing is done by others, either by private parties (including volunteers) who are reporting results to NHDES, or by contractors working as NHDES proxies, the same procedures apply. The program manager ensures that these non-NHDES entities are using appropriate written procedures. This may include review and approval of non-NHDES authored procedures.

Field testing procedures include information on the choice of equipment, calibration of the equipment and calibration records, other QA/QC needed to ensure that DQOs are met, decontamination requirements, personal protective clothing or equipment needed, containers and preservation needed, and any requirements related to transportation to the testing location.

As part of the QA Self-Audit process, the program manager reviews field testing procedures generated within NHDES annually, and sends the results of that review, with recommendations for improvements or other changes, to the QA Manager.

8.6 FIXED LABORATORY TESTING

In many or most cases, samples will be tested or examined in an office or laboratory remote from the sampling location. As noted above, the decision as to whether field or fixed laboratory testing is appropriate is the responsibility of the program manager.

This section applies primarily to analysis conducted by the State of NH laboratory or contract laboratories, but is also relevant to other NHDES units conducting laboratory testing or otherwise examining samples in the office.

Whenever feasible, testing procedures written by others, such as *Standard Methods for the Examination of Water and Wastewater* or various USEPA analytical methods are used. In these instances, the most up-to-date, approved edition is used.

Where testing procedures written by others are not available, the program manager must ensure that a program-specific procedure, which meets the program's data quality needs, is produced and made available to staff. The program manager reviews and approves the procedure.

Because laboratory testing has been standardized to a great extent, NHDES program managers will often have fewer choices to make than in sampling or field testing efforts. When in doubt, program managers should

consult with the Administrator of the State Laboratory Services Unit, the Laboratory Services Unit QA Manager or the NH Environmental Laboratory Accreditation Program (NH ELAP) Program Manager.

When deciding what procedure to use for any testing effort, the following factors are considered:

a) What compounds are being tested for, in what medium, and what detection limit is needed to produce meaningful results (or to compare with a regulatory standard).
b) What has been done in the past to test for these compounds in this medium?
c) What other compounds or conditions could be present that would interfere with detecting the compounds being tested for.

It is the program manager's responsibility to ensure that both NHDES staff and other parties are using appropriate written procedures. This may include review and approval of non-NHDES generated procedures. In general, NHDES accepts that NH ELAP-accreditation is sufficient evidence that a laboratory's procedures and controls are sufficient, particularly for those analytes and media covered by the accreditation.

Personnel conducting testing must have the training needed to operate the testing equipment in question. The method manual or the reference method used should contain instructions for personnel training requirements. Training records must be kept in accordance with RSA 5:37, SOP #107 "Paper Records Retention Management Plan" and the specific program QAPP.

Testing procedures should include information on choice of equipment, calibration of the equipment and calibration records, QA/QC measures needed to ensure that the DQOs are met, decontamination requirements, personal protective clothing or equipment needed, containers and preservation needed, any requirements related to transportation to the testing location, and field documentation requirements.

This section of the QMP also applies to some activities done in the office that cannot be described adequately as laboratory testing – some examples would be examination of geological samples or examination of amphibians for deformities. In cases where an item or sample is examined, the observations should be recorded immediately. The purpose of the examination should be included in the record, along with standard items such as date, time, and name of staff person doing the examination. Basically, the same principals apply as for testing, but simplified to meet the situation.

As part of the annual QA Self-Audit process, the program manager reviews program-specific testing procedures being used by the program annually, and the results of that review, with recommendations for improvements or other changes, must be sent to the QA Manager.

8.7 ENVIRONMENTAL CONDITION DESCRIPTIONS AND DATA

Many NHDES programs do not deal with environmental data in the form of traditional laboratory test results measuring, for example, in parts-per-million of a particular contaminant. For example, NHDES Wetlands Bureau staff gather information about environmental conditions – does a particular location meet the definition of a wetland?; has it been filled or dredged?; how do conditions now compare to earlier conditions?; and who and what is present? Other programs that conduct sampling in the more typical sense will also gather this environmental condition data as an adjunct.

This information is very important to NHDES, and can be especially important for enforcement purposes. NHDES staff should refer to Chapter IV of the NHDES *Compliance Assurance and Response Policy (https://www.des.nh.gov/organization/commissioner/legal/carp/documents/ch-4.pdf)* for guidance.

The purpose of the site visit or inspection must be understood in advance. Program managers are responsible for ensuring that the field personnel, when taking measurements, know how to use the measuring tool in question. This can be quite simple, as in the case of a measuring tape, or equipment-specific training may be needed. If the latter is the case, records of the training are to be kept. Manufacturer's recommendations regarding use of the equipment are followed.

For any field visit to inspect a site or to take samples or conduct field testing, the visit is recorded in a field book or on a form specific to the program. Field documentation includes the following:

The date, time, weather conditions (temperature can be estimated), and the identity of persons present;

The purpose of the visit is recorded. This note-taking must be completed before leaving the site area. Notes added after leaving the site area should be marked as such;

When mistakes are made in the field book or form, the erroneous information is struck through with a single line so that it can still be read. The change is to be dated and initialed. Also, all unused lines or pages (if between other entries) in the field book should be struck through and initialed;

Other events or conditions should be noted. Personnel should be liberal in applying this principle. An example would be: "While sampling groundwater at a contaminated site, staff note that children are riding bicycles across the back lot." This might not normally be noted, since it has nothing to do with the sampling. However, this is important information to site managers and risk assessors as it is evidence that children may be at risk, which may not have otherwise been obvious. Contacts with people working at the site, the site owner, neighbors, local officials, representatives of utilities or other government agencies, or other interested parties must always be recorded;

NHDES encourages the use of photographs and video to record field conditions. As with the field notes, these visual records are public documents unless they become protected as confidential business information or for enforcement purposes (See Chapter IV of the NHDES *Compliance Assurance and Response Policy*, linked above*)*. Prints and copies of videos or electronic photographs may be sent to members of the public or other agencies, but the original of the video or digital photograph must remain with NHDES unless specifically authorized by the program manager, or in some cases, by the NHDES Legal Unit, to be released;

Prints of photographs, the outside of any physical media containing recorded videos or photos are marked identifying the date the picture/video was taken, the site or case, and the name of the person who took the pictures. For videos, the person taking the pictures should start the shot by introducing him/herself, date/time and the location being shot;

Field notes or other field documentation are almost always in the public record. When requested, copies of the field documentation must be provided. The program manager and the NHDES Legal Unit will make the decision as to whether a particular record is to be treated as confidential;

A professional standard is kept in note taking. Snide, angry or sarcastic notes are not recorded. Comments on any person's character are not made. A strictly factual style is followed. If necessary, record "He/She/I became agitated…"

Handwritten notes taken in the field are legible to persons other than the note-taker. If legibility may be an issue, a typed transcript should be prepared and placed in the relevant site/case file. Typed transcripts should show the date of the field visit, the date of the transcription, and the name of the person who did the typing; and

Field books remain in the possession of staff. Copies of the field book pages are placed in site/case files as needed. Program-specific field forms are placed in the site/case file. Photographic and/or video documentation is also placed in the site/case file.

8.8 SECONDARY DATA AND MODELING

"Secondary Data" is data which NHDES staff may use to make decisions or understand a given situation, or communicate to a particular audience. The QA-related concern with this data is that there must be an effective review before the data is used to assure that it meets the need. Criteria for review include:

a) Reasonableness - for instance, reported ambient air temperatures of 90°F in January (in NH) could be data to reject;
b) Agreement with historical data for the site and/or its surroundings; and
c) Professional standards for the given field of knowledge.

This is a "data usability assessment" as described in Section 9.3 of this QMP.

Otherwise, the same general approach applies to data and its use as for data generated by NHDES. For example: A project manager should check if a laboratory's detection limit is less than the regulatory standard against which one is judging. This is the same regardless of what organization employs the sampler or the laboratory technician. Data generated by others but used by NHDES will be properly attributed. As noted above, NHDES encourages the use of secondary data. Many NHDES programs use secondary data almost exclusively.

"Environmental Data" covered by this QMP includes information generated from models.[6] Models used by NHDES staff need to be chosen, used, and their results assessed, following documented procedures. EPA Region 1 has developed useful guidance for use in this field - see *USEPA Design and Implementation of New Tools for Quality Assurance in Modeling*[7] and https://www.epa.gov/quality/design-and-implementation-new-tools-quality-assurance-modeling.

The results of modeling used by NHDES programs will be checked against real-world results whenever possible. Where feasible, the model should be built using existing real-world data as its base as opposed to using only theoretical considerations – that is to say, models should be as empirically-based as possible.

8.9 REPORTING RESULTS

When reporting the results of a measurement, test, or environmental condition, the object of the report is to clearly communicate the result to a specific audience. The following are considered when reporting results:

a) Information is included so that the person receiving the report will know that the data is of appropriate quality. QA/QC information must not obscure the data being reported;

b) Data is not obscured by technical jargon, the audience for the report is considered;

c) Dates and sampling/test methods are included or referenced. Raw data should be included or appended as necessary;

[6] See the definition of Environmental Data on page 8 of this QMP.
[7] See https://www.epa.gov/sites/production/files/2015-07/modelqapptemplate2009.doc

d) The source of the data is made clear, whether the data originated from NHDES, an outside party, or from a mathematical or electronic model application produced by another (always identified) entity.

e) To allow for clear communication, tables and graphs are encouraged. Where past results are part of that summary table or graph, the report should include enough information (*i.e.,* metadata) to allow interested parties to locate and understand the limitations of that past data;

f) Where samples are collected on private property, the property owner receives the results unless enforcement considerations dictate otherwise or the property owner has stated that he/she does not want the data. If a municipality has requested specific data, or entire classes of data, it receives the results unless enforcement considerations indicate otherwise. In this case, the municipality is to be informed, confidentially if necessary, that this information is enforcement-confidential; and

g) Data is shared with USEPA and other government agencies freely. All NHDES staff are be guided by the knowledge that, in general, all NHDES data is public information.

CHAPTER 9 ASSESSMENT AND CORRECTIVE ACTION

9.1 OVERVIEW

The NHDES Quality Management System is based on annual program self-audits. The results of the self-audits and any other audits that may be held from time to time feed the annual Quality Assurance System Status Report described in greater detail in Chapter 10. Other assessment and corrective action work may arise from:

- Review and validation of data;
- Quality Management System reviews (based on program reviews and audits).

Each NHDES program involved in environmental data operations has procedures to be followed in determining when departures from documented policies, procedures, and quality control have occurred, and to correct the problems that led to the departure. Non-conformances and corrective actions may be identified through program reviews/self-audit or other audits. At a minimum, programs document procedures regarding:

- The individual(s) responsible for assessing each quality assurance/control procedure;
- How staff should treat data or reports affected by unacceptable quality control;
- Within a program, who has authority to suspend or stop work upon detection and identification of an immediate adverse condition affecting quality or health and safety;
- How corrective actions are to be documented; and
- Procedures for program review and implementation of corrective action documents.

9.2 INTERNAL PROJECT AND PROGRAM REVIEWS/SELF-AUDITS

Each program within NHDES that is involved in environmental data operations conducts an annual self-audit to verify that operations continue to comply with the requirements of the NHDES QMP, any required QAPPs or similar quality documents, SOPs, technical or professional standards, or other requirements set prior to work being performed. As part of the self-audit report package, program managers provide a copy of the QAPP (or QA Manual) cover page, along with a summary of any needed or recommended changes to the QAPP. The entire submittal is to be forwarded to the QA Manager by January 31 of each year (or by an alternate date as set by the QA Manager).

There is an important exception to the above scenario: Starting in January 2014 (for the Calendar Year 2013 reporting year), where a given program has effectively submitted its QA Self-Audit Reports for four consecutive years, and where there are no instances of non-reporting for any two consecutive years (both conditions being met during the preceding six years), the NHDES QA Manager, with the concurrence of the NHDES Assistant QA Manager, has the authority to allow such programs to submit their QA Self-Audit reports every other year, until such time that the aforementioned criteria are no longer met. In all cases and for whatever reason, the minimum program reporting rate is every two years.

Note: Every year, whether a program is required to file a NHDES QA Self-audit or not, all Master Program QAPPs, QA Manuals, and multi-year project QAPPs must be reviewed and updated, as necessary. This usually entails submitting to the NHDES QA Manager or Assistant QA Manager, a copy of the cover and signature pages of the QAPP/QA Manual, as well as a bulleted list of suggested changes to the documents. The results of such reviews are available to EPA QA staff upon request. Any programs that prefer to continue to complete and submit their QA Self-Audit Forms annually if not required due to the NHDES QA Manager/Assistant Manager releasing them for the year, are encouraged to do so.

The results of all reviews associated with formal, USEPA-approved QAPPs, (along with any substantially revised QAPPs) are forwarded to USEPA Region 1 QA staff by the NHDES QA Manager for their records. Internal reviews may be undertaken at the data (see Section 9.3), project, or the program level.

It is the responsibility of the program manager to plan for and organize the self-audit reviews. For consistency, the review follows guidance in this QMP (in particular, Chapters 8 and 9), and uses the forms provided in the "Guidance on Annual Program Self-Audits," which is updated annually and distributed to staff electronically. The program manager records the scope, procedures and results of the review in the self-audit report form and sends that to the NHDES QA Manager in a timely fashion. The report package includes deficiencies or non-conformances (and areas for improvement) found, reasons for the deficiency or non-conformance, and either a schedule for implementing corrective action, or documentation of the corrective actions taken (See Section 9.6). The program manager ensures that these corrective actions are completed within the stated timeframe. An electronic or hardcopy of the report package should also be kept on file with the originating program.

The QA Manager is typically responsible for overseeing the department's QA System Program Self-Audit process, including updating guidance documents and forms, tracking program responses, reviewing submitted self-audit forms, and providing response documents to programs managing environmental data. The procedures followed in conducting the Program Self-Audit Reviews are documented in an SOP titled, "NHDES Quality Assurance System Standard Operating Procedure for Review of NHDES QA System Program Self-Audits," and found in its current version on the NHDES intranet under "Operations - Quality Assurance."

Staff should not directly review their own activities. Wherever possible, colleagues or supervisors within a specific program, or in a related program, should make cooperative arrangements to conduct all audits in such a way to avoid the biases associated with evaluating one's own work. The intent is to maintain some separation between the activity/program under review and the assessor, while not discouraging ongoing, more informal program evaluation (*i.e.,* continuous improvement).

The QA Manager, Assistant QA Manager, and members of the QA Team are available to assist program managers with assessments and with identifying corrective actions.

In addition to the program reviews/self-audits, NHDES may on occasion carry out formal second-party audits of NHDES programs to assess conformance to each element of the quality management system and to individual QAPPs (See Section 8.2), SOPs, department rules, or other department policies or requirements. The number and frequency of these audits will be determined and documented by the QA Manager, Assistant QA Manager and QA Team. The QA Team and/or other qualified individuals who are independent of the area being audited will conduct the audits. The audits are done in a systematic manner, using objective evidence to make findings regarding non-conformance to requirements and the need for any corrective action. Such audits will follow guidance in this QMP (Chapters 8 and 9), and will be conducted using the most updated version of an approved NHDES quality management system audit checklist. After the audit, program managers will receive an audit report, outlining non-conformances found and recommendations intended to provide guidance for improvements. Proposed corrective actions are evaluated and tracked, and the effective implementation of corrective actions is verified before the audit is closed.

9.3 REVIEW AND VALIDATION OF DATA

All data or information must be checked before it is released to the public, including posting it on the NHDES website, or used for making decisions. As with any QA/QC effort, this check should not be done by the same person who generated the data, but rather, someone who is trained, experienced, and has an appropriate level of technical competence.

Data checks can take place at different levels; these are referred to (in order of decreasing rigor and complexity) as “Data Validation,” “Data Verification,” and “Data Usability Assessment.”

NHDES expects that in most cases, reviews that can be classified as “Data Usability Assessments” will be sufficient. When the program manager finds that formal data validation and/or verification is necessary, relevant USEPA guidance should be followed.

As a minimum, data review should cover:

a) QA/QC samples and activities associated with the data (including blanks, duplicate and spike sample analyses, performances evaluation samples, calibrations, and reporting limits) should be evaluated to determine the accuracy, precision, representativeness and sensitivity of the data. At the minimum, one should be checking for consistency and range issues. For instance, a pH of 0.5 in a fresh water sample should be flagged. Also, the result in question should be checked for consistency with past results at this location or, as appropriate, with similar locations or to the calibration and/or operating range of the equipment.

b) Checking the completeness and appropriateness of the sampling and testing. Were the right locations/samples tested for the right parameters?

c) Checking that correct methods were used.

d) Checking for transcription errors.

e) Checking that the work was done in accordance with written work plans, QAPPs, and/or SOPS, or if changes were necessary, that the changes were adequately documented.

f) Check for analyst notes or qualifiers related to quality control parameter failures.

Many factors can cause a data point or set to be invalid. The program manager should work with her/his supervisors and staff and the QA Manager and QA Team to resolve the issue. The goals of the review are to determine how, or indeed if, this particular data is incorrect; to obtain correct data; to record the decision, and ultimately, to ensure that the issue does not recur.

9.4 QUALITY MANAGEMENT SYSTEM REVIEWS

On or about March 1 of each year, the NHDES QA Manager, Assistant QA Manager and QA Team prepare a Quality Assurance System Status Report for the NHDES Senior Leadership Team based upon the results of program reviews/self-audits and any other audits conducted by the QA Team. This report briefly describes the results of the internal program self-audits (as described in Sections 9.1 and 9.2) and any other audits conducted by the QA Team and other qualified staff and evaluate the systems continuing suitability and effectiveness, and introduces any recommended changes or improvements at the system level.

Detailed information on the extent of the quality management system review and the contents of the Quality Assurance System Status Report is presented in Chapter 10.

The NHDES QA Manager provides a briefing in conjunction with the Status Report to the NHDES Senior Leadership Team and identifies any areas requiring improvement. The Commissioner and Assistant Commissioner have final review and approval authority for the Status Report. The report will be maintained on

file with the QA Manager, placed on the NHDES Intranet under the “Operations - Quality Assurance” folder, and will be made available to USEPA Region 1 QA staff upon request.

9.5 DEFICIENCIES AND NON-CONFORMANCES

Significant deficiencies and non-conformances to QAPPs, SOPs, or department requirements observed outside of the self-audit or formal audit processes are reported by staff to the project or program manager, as appropriate. They ensure that the deficiency or non-conformance is recorded and included in that year’s Self-Audit report, and forward written communications to the appropriate staff, both up and down the organizational chart and to NHDES and USEPA Region 1 QA staff, as needed.

9.6 CORRECTIVE ACTIONS

When deficiencies or non-conformances have been identified, program managers consult with staff to determine and document the following:

a. The nature and scope of the problem;
b. Where possible, the root cause(s) of the problem;
c. The programmatic impact;
d. Required corrective action(s);
e. The individual(s) responsible for initiating and/or recommending corrective actions;
f. Action(s) needed to prevent recurrence;
g. The time frame for corrective actions to be implemented/completed; and
h. The method of assessing and verifying the effectiveness of the corrective action.

The corrective actions should be taken as quickly as possible, but all corrective actions are recorded and reported through the Self-Audit process. The program manager ensures that these actions are completed within the agreed time frame.

CHAPTER 10 CONTINUOUS IMPROVEMENT

The final part of the quality management cycle is assuring that the actions taken to assess and correct deficiencies in the system are continuously fed back in to the planning process to change and improve the system and its outputs. Continuous process improvement is a core practice at NHDES, and the regular process outlined below represents the minimum steps necessary to allow such continuous improvement to occur.

Each year, the QA Manager and Assistant QA Manager, in consultation with the QA Team, evaluate the results of the annual reviews/self-audits and any other audits of each program's quality system, and especially the causes for deficiencies and corrective actions taken.

With assistance from the QA Team, the QA Manager prepares a Quality Assurance System Status Report for the NHDES Senior Leadership Team. The process used for developing the annual QA System Status Report is documented in an SOP. This annual Quality Assurance System Status Report forms the main vehicle for communicating issues to NHDES management. A copy of the QA System Status Report is typically shared with USEPA Region 1 QA staff, along with a copy of the annual QMP review results, and copies of the Annual QA System Program Self-Audits, upon request. The QAPP Inventory, which used to be shared manually with USEPA Region 1, is currently managed as a password-protected, on-line document on EPA Region 1's QA Roundtable SharePoint site.

The NHDES Senior Leadership Team reviews the annual Quality Assurance System Status Report, is briefed by the QA Manager, and authorizes changes as they find necessary.

The QA Manager tracks the progress of the program managers in implementing the changes authorized by the Senior Leadership Team, as well as providing assistance where necessary. Changes made are documented in the next year's Quality Assurance System Status Report.

USEPA Region 1, as part of their responsibility, conducts periodic evaluations of the programs it funds, reviews the quality systems for many NHDES programs, or for NHDES in general[8]. The results of USEPA Region 1's reviews are communicated to the NHDES QA Manager, and ultimately, to the affected programs, as well as to the NHDES Senior Leadership Team. The QA Manager will communicate the results to the affected program managers, who will implement appropriate recommended changes. These changes are reported in the program manager's annual QA System Program Self-Audit reports.

The QMP is reviewed annually to ensure that all information contained within it is relevant and up-to-date. Any necessary QMP revisions are made, and the revised document is submitted to USEPA Region 1 for information. Five years from the date of approval of this QMP, the QA Manager, Assistant QA Manager, and QA Team will undertake a complete review of the document and submit a revised QMP to USEPA Region 1 for approval.

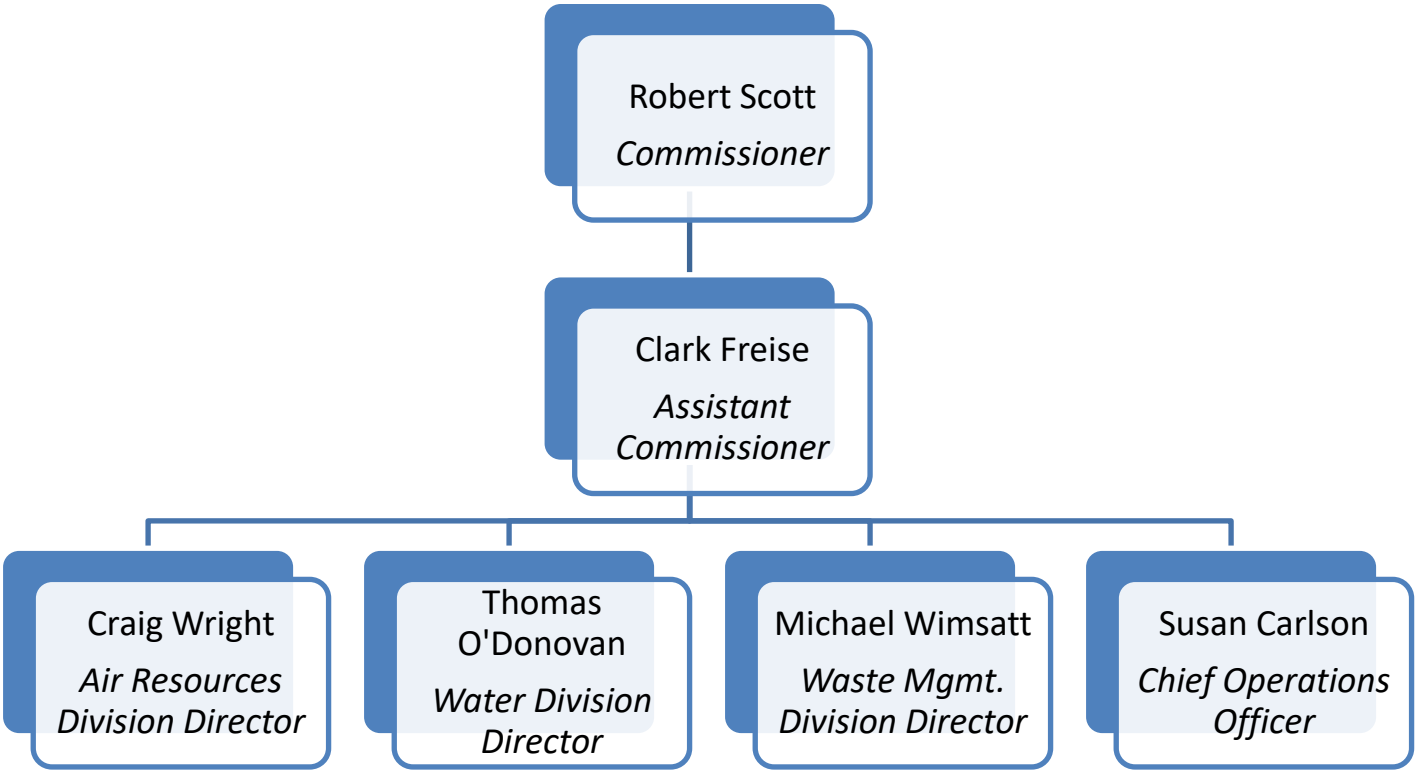
The approved QMP is posted on the NHDES Intranet under the "Operations - Quality Assurance" folder for ease of access by program managers and others. Other quality documents are also posted on the NHDES intranet for staff use. Implementation of the NHDES QA system will be incorporated into the appropriate Performance Partnership Agreement and comprehensive NHDES annual work plans.

[8] As of February 2017, there have been three such EPA evaluations of NHDES's Quality Management System.

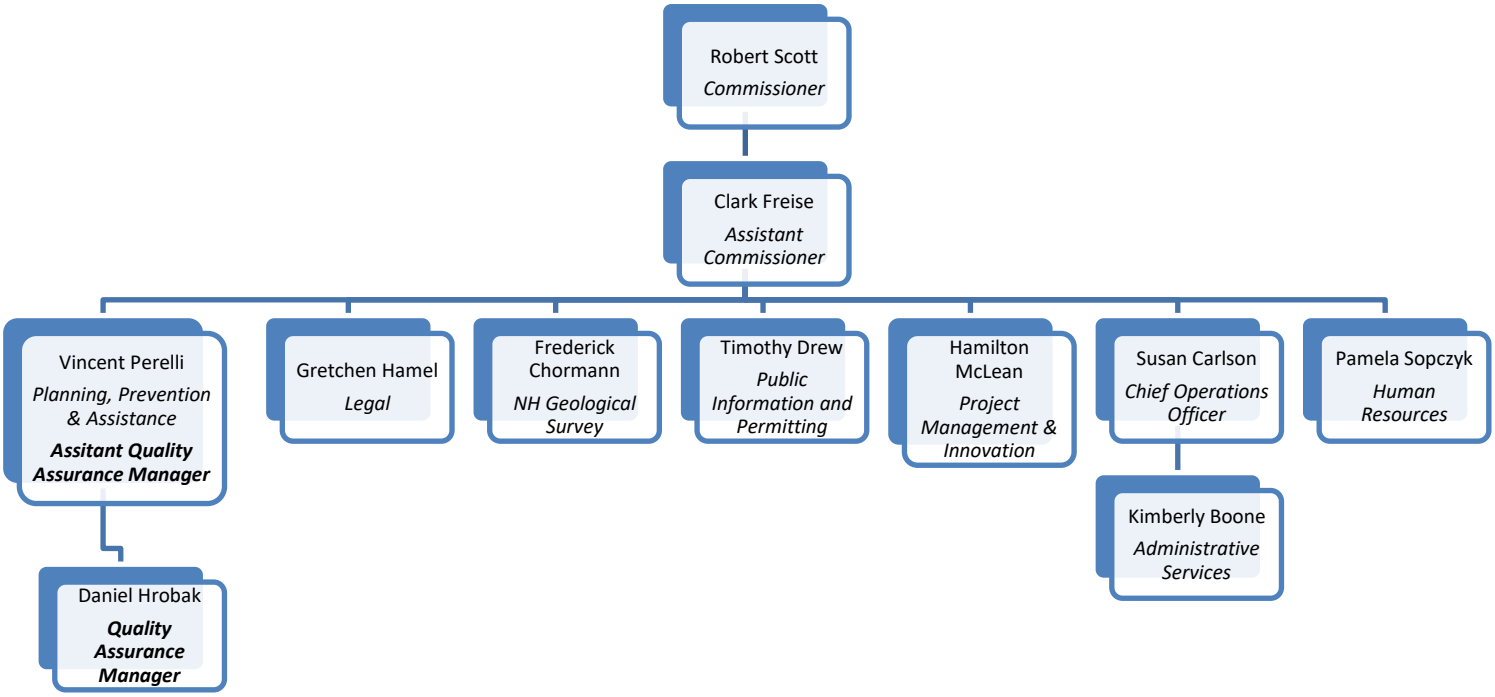
APPENDICES

APPENDIX A: NHDES ORGANIZATIONAL CHARTS

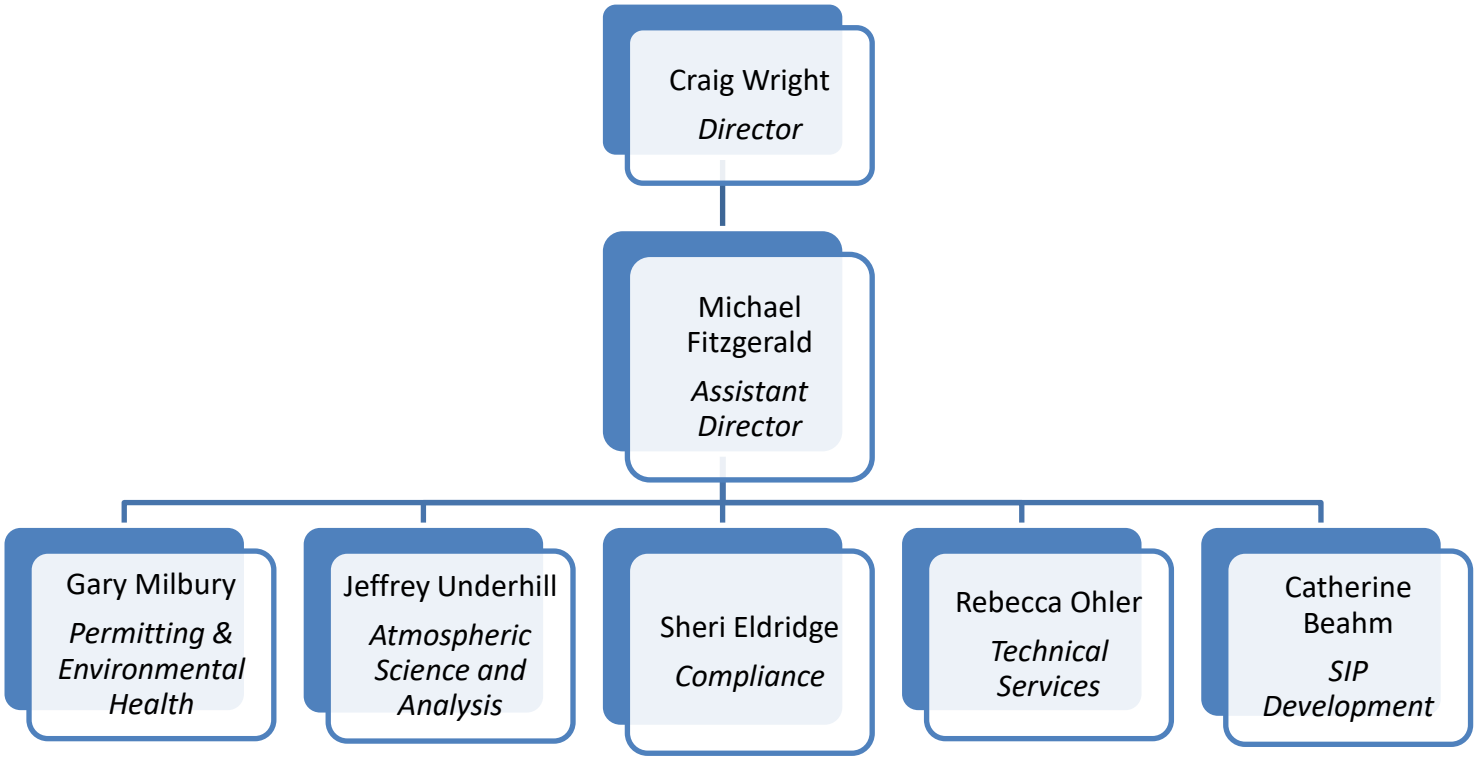
N.H. Department of Environmental Services



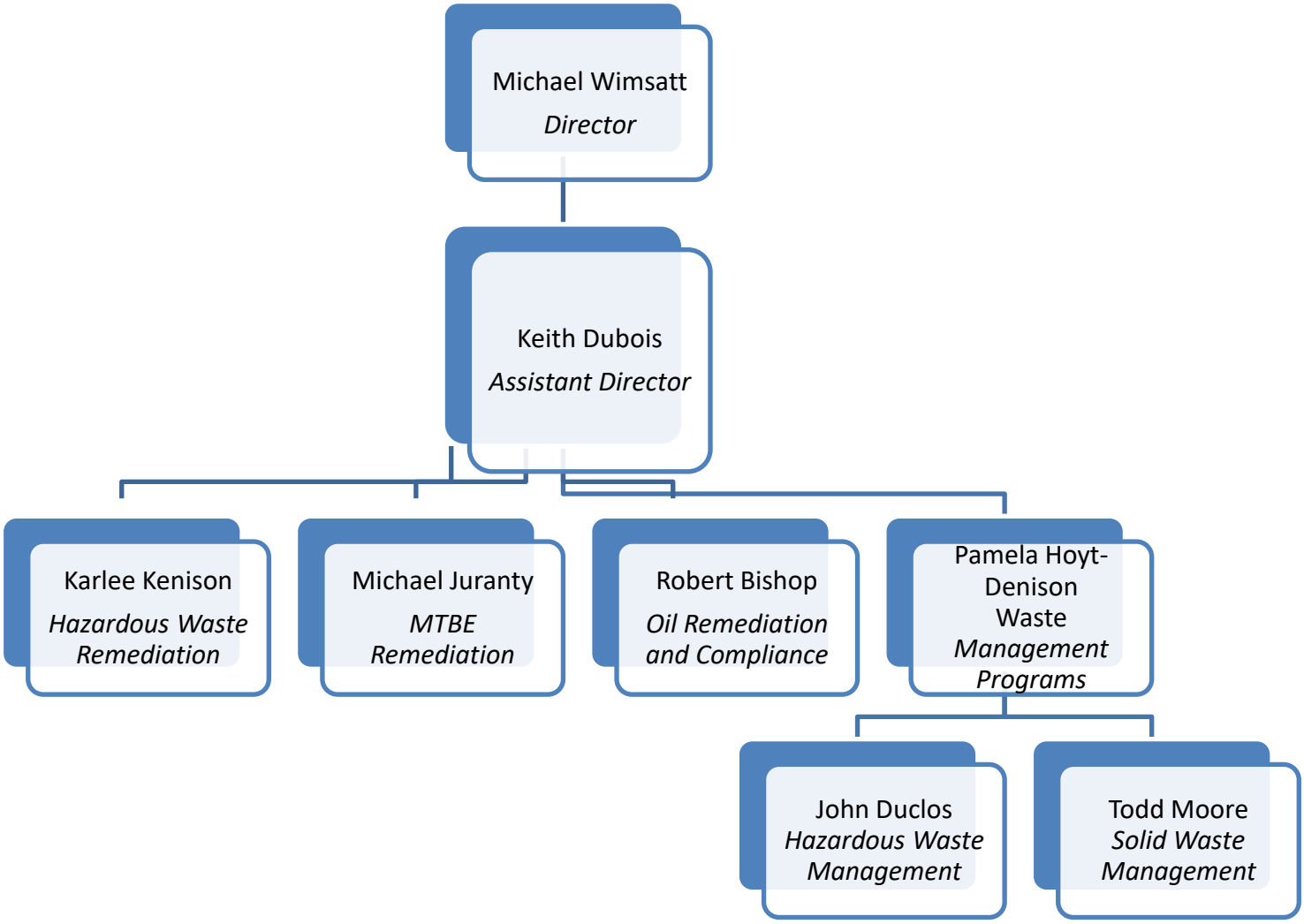
N.H. Department of Environmental Services
Office of the Commissioner



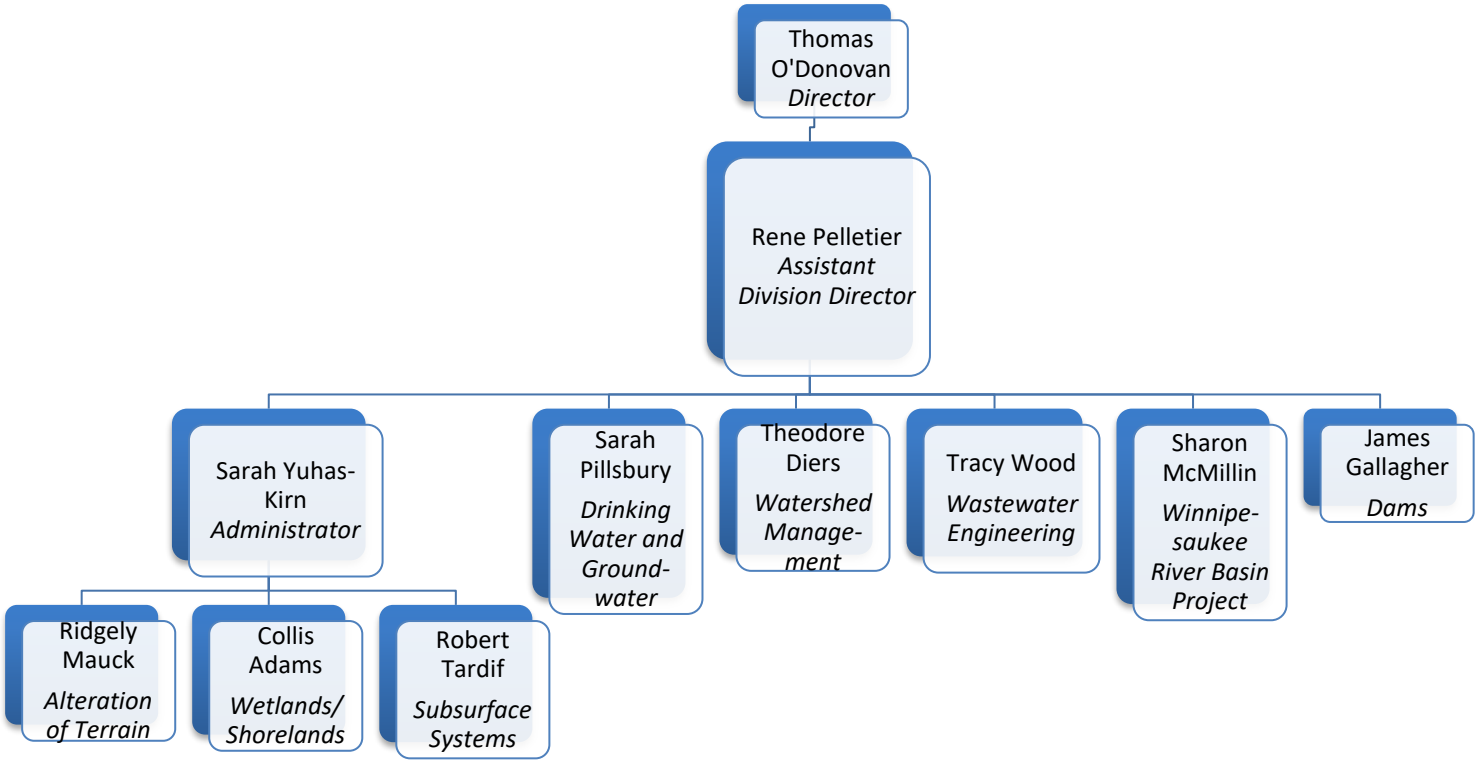
N.H. Department of Environmental Services
Air Resources Division



N.H. Department of Environmental Services
Waste Management Division



N.H. Department of Environmental Services
Water Division



APPENDIX B – NHDES QUALITY ASSURANCE TEAM

Main Contact Information (unless otherwise noted):

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Phone: (603) 271-3503
Fax: (603) 271-2867
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Web: http://des.nh.gov/organization/commissioner/p2au/pis/qap/index.htm

Franklin Wastewater Treatment Facility (WWTF)
528 River Street, P.O. Box 68
Franklin, NH 03235
Phone: (603) 934-2809
Fax: (603) 934-4831

Bureau/Program Represented	Title	Staff Currently Holding Position
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Department-wide/Office of the Commissioner	Chief of Planning & Policy/Admin. III Assistant NHDES QA Manager	Vincent Perelli (603) 271-8989 Vincent.perelli@des.nh.gov
Water Division – Wastewater Engineering Bureau	Chief Environmental Inspector Program QA Officer	Nancy Lesieur (603) 271-2985 Nancy.lesieur@des.nh.gov
Air Resources Division – Compliance Bureau	Compliance Measurement and Data Programs Manager	Raymond Walters (603) 271-6288 Raymond.Walters@des.nh.gov
Water Division – Drinking and Groundwater Bureau	NHDES Environmental Laboratory Accreditation Program Manager	George (Bill) Hall (603) 271-2998 George.Hall@des.nh.gov
Waste Management Division – Site Remediation Programs	Hazardous Waste Remediation Project Manager	Andrew Fuller (603) 271-6805 Andrew.Fuller@des.nh.gov
Water Division – Watershed Management Bureau	Watershed Assistance Section Supervisor	Stephen Landry (603) 271-2969 Stephen.Landry@des.nh.gov

APPENDIX C – REVISIONS

The following provides a general overview of incorporated revisions from Revision 14c (February 2019) to current revision (14d)

- Changed QA Manager role to Daniel Hrobak.
- Changed Assistant QA Manager role to Vincent Perelli
- Added in requirement to update QA training to every three years
- Staff contacts updated throughout including distribution list, organizational chart etc.
- Editorial, clarifying and grammatical modifications