4.0 Personnel Qualifications and Training

4.1 Personnel Qualifications

Ambient air monitoring personnel may be required to perform a number of functions that are important to the quality of data. Table 4-1 identifies these functions and provides some of the key activities within the functional category. Once the list is completed for a monitoring organization, it can be used in the development of position descriptions for recruitment and training programs.

Not all functions are needed for the entire duration of the project. Monitoring organizations may feel that it can contract some of the functions that are needed. For example, an organization may wish to contract the information technology (IT) function to have the monitoring instruments connected to a data logging system that would transfer data to a local data base and eventually to an external data base like AQS. This part of the process might be considered a "one-time" event needing a particular expertise whose function might not require a full time person. However, it is critical that someone within the program understands this IT function to ensure data collection is operating properly on a day-to-day basis.

Table 4-1 Monitoring Functions that Need Some Level of Staffing or Expertise

Function	Activities
Procurement	- Purchasing capital equipment and consumables - Developing contracts and maintenance agreements - Applying for EPA grants
Technical	- Setting up a monitoring site, electricity, communications - Developing standard operating procedures - Selecting and installing monitoring equipment - Calibrating equipment, performing quality control - Shelter and equipment maintenance
Data Analysis (Statistical)	- Understanding population and measurement uncertainty - Developing sampling designs - Developing networks to achieve objectives - Assessing/interpreting data (data quality assessments)
Quality Assurance	- Developing quality systems, QMPs/QAPPs - Developing data quality objectives - Implementing technical systems audits, performance evaluations - Validating data - QA reporting
Information Technology	- Selecting information technology (data loggers and local data base) - Developing analyzer outputs to data loggers and data transfer to local data base - Transfering data from local data base to external data repositories (AQS, etc.)

Personnel assigned to ambient air monitoring activities are expected to have the educational, work experience, responsibility, personal attributes and training requirements for their positions. In some cases, certain positions may require certification and/or recertification. These requirements should be outlined in the position advertisement and in personal position descriptions. Records on personnel qualifications and training should be maintained and accessible for review during audit activities (unless the records are maintained as part of confidential personnel records). These records should be retained as described in Section 5.

4.2 Training

Adequate education and training are integral to any monitoring program that strives for reliable and comparable data. It is recommended that monitoring organizations maintain some requirements for air personnel qualifications (combination of education and experience). Training is aimed at increasing the effectiveness of employees and their organization. As part of a quality assurance program, EPA QA/G-10, *Guidance for Developing a Training Program for Quality System*[1] suggests the development of operational procedures for training. These procedures should include information on:

- personnel qualifications- general and position specific
- training requirements - by position
- frequency of training

Appropriate training should be available to employees supporting the Ambient Air Quality Monitoring Program, commensurate with their duties. Such training may consist of classroom lectures, workshops, web-based courses, teleconferences, vendor provided, and on-the-job training.

Along with suggested training, there are some EPA programs that require mandatory training and/or certifications. These programs include, but are not limited to, the National Performance Audit Program (NPAP), Performance Evaluation Program (PEP), Interagency Monitoring of Protected Visual Environments (IMPROVE), and $PM_{2.5}$ Speciation Trends Network Audit Program. All personnel performing audits in these projects or programs are required to possess mandatory training or a current certification issued by the EPA Office responsible for the monitoring program.

EPA encourages regional planning organizations and monitoring organizations to develop training programs that require some level of certification.

4.2.1 Suggested Training

Over the years, a number of courses have been developed for personnel involved with ambient air monitoring and quality assurance aspects. Formal QA/QC training is offered through the following organizations:

- Air Pollution Training Institute (APTI) http://www.epa.gov/apti/
- Air & Waste Management Association (AWMA) http://www.awma.org/
- American Society for Quality Control (ASQC) http://www.asq.org/
- EPA Quality Assurance Staff http://www.epa.gov/quality1/
- EPA Regional Offices http://www.epa.gov/epahome/locate2.htm
- EPA Ambient Monitoring Technology Information Center (AMTIC) Technology Transfer Network (*http://www.epa.gov/ttn/amtic/training.html*)

In addition, OAQPS uses contractors and academic institutions to develop and provide training for data collection activities that support regulatory efforts throughout EPA and monitoring organizations. In addition, instrument and data management manufacturers provide training on the equipment they sell. Sometimes this can be added to the purchase cost.

[1] http://www.epa.gov/quality1/qs-docs/g10-final.pdf

Table 4-2 provides a suggested sequence of core QA-related ambient air monitoring courses for ambient air monitoring staff by job position. The suggested course sequences assume little or no experience in QA/QC or air monitoring but some courses may have pre-requisites. Persons having experience in the subject matter described in the courses would select courses according to their appropriate experience level. Courses not included in the core sequence would be selected according to individual responsibilities, preferences, and available resources.

Table 4-2 Suggested Sequence of Core QA-related Ambient Air Training Courses for Ambient Air Monitoring and QA Personnel

Source-Sequence	Course Title (SI = self instructional)	Field	Lab	QC-Supv.	Data Mgt.	Mon Supv.	QA	QA Mgt.
APTI- SI:422	Air Pollution Control Orientation Course	X	X	X		X	X	X
APTI 452	Principles and Practices of Air Pollution Control	X		X		X	X	X
APTI -SI:100	Mathematics Review for Air Pollution Control	X	X					
QS- QA1	Orientation to Quality Assurance Management					X	X	X
APTI-SI:434	Introduction to Ambient Air Monitoring	X	X	X	X	X	X	X
APTI -SI:471	General Quality Assurance Considerations for Ambient Air Monitoring	X	X	X	X	X	X	X
APTI- SI:409	Basic Air Pollution Meteorology	X		X		X	X	X
APTI SI:473A	Beginning Environmental Statistical Techniques (Revised)	X	X	X	X	X	X	X
APTI-470	Quality Assurance for Air Pollution Measurement Systems			X		X	X	X
QS-QA2	Data Quality Objectives Workshop					X	X	X
QS-QA3	Quality Assurance Project Plan			X		X	X	X
APTI-435	Atmospheric Sampling	X	X	X		X	X	
No Source	Basic Electronics	X		X		X		
APTI-SI:476B	Continuous Emission Monitoring Systems - Operation & Maintenance of Gas Monitors	X		X		X	X	
APTI-474	Continuous Emission Monitoring	X		X		X	X	
APTI-SI:433	Network Design and Site Selection for Monitoring $PM_{2.5}$ and PM_{10} in Ambient Air			X		X	X	
APTI-464	Analytical Methods for Air Quality Standards		X	X		X	X	
APTI	Chain Of Custody Procedures for Samples and Data	X	X	X	X	X	X	X
APTI- SI:436	Site Selection for Monitoring SO_2	X		X		X	X	
OAQPS	AQS Training (annual AQS conference)				X	X	X	
QS- QA4	Data Quality Assessment					X	X	X
QS- QA5	Management Systems Review					X	X	X
APTI-SI:473B	Introduction to Environmental Statistics				X	X	X	X
AWMA QA6	Quality Audits for Improved Performance						X	X
ASQC-STAT1	Statistics for Effective Decision Making			X	X	X	X	X