QUALITY ASSURANCE PROJECT PLAN FOR THE STATE OF FLORIDA NATIONAL AIR TOXICS TRENDS STATIONS AND AIR TOXICS MONITORING PROGRAM

Prepared for:

U.S. EPA
REGION 4

November 2021

Florida Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
www.dep.state.fl.us

QUALITY ASSURANCE PROJECT PLAN IDENTIFICATION AND APPROVAL

Title: *Quality Assurance Project Plan for the State of Florida National Air Toxics Trends Stations and Air Toxics Monitoring Program, Revision 2, November 2021.*

The attached Q*uality Assurance Project Plan for the State of Florida National Air Toxics Trends Stations and Air Toxics Monitoring Program* is hereby recommended for approval and commits the State of Florida Department of Environmental Protection to follow the elements described within.

Environmental Protection Commission of Hillsborough County (EPCHC)

1) Signature: Jason Waters, P.E. Digitally signed by Jason Waters, P.E. Date: 2021.11.01 16:58:15 -04'00' Date 11/1/2021
Air Monitoring Manager, Air Management Division

Pinellas County Air Quality Division (PCAQD)

2) Signature: Brennan Farrington 2021.11.02 07:35:03 -04'00' Date 11/2/2021
Air Monitoring Program Manager, Air Quality Division

Broward County Natural Resources Division (NRD)

3) Signature: Digitally signed by ANA SUAREZ Date: 2021.11.01 14:47:34 -04'00' Date 11/1/2021
Natural Resources Administrator, Air Quality Program

Florida Department of Environmental Protection (PQAO)

4) Signature: Kyrstien J. Wessler Date 11/2/2021
Quality Assurance Manager, Office of Air Monitoring

5) Signature: Date 11/2/2021
Program Administrator, Office of Air Monitoring

6) Signature: Date 11/2/2021
Director, Division of Air Resource Management

U.S. Environmental Protection Agency

7) Signature: FLOYD WELLBORN Digitally signed by FLOYD WELLBORN Date: 2021.11.08 15:02:56 -05'00' Date
EPA Region 4, Designated Approving Official

Document History

Revision No.	Date	Responsible Person	Description of Change
0	February 2019	Alain Watson	Initial draft
1	September 2019	Alain Watson	Updated Org charts; addition of EtO in Sec. 3.0 and Table 3-1; updated Appendix A.
2	October 2021	PQAO	Updated Org charts and department names; Sect. 2.2 Corrected PAH sample analysis; Added clarification of Sect. 5.5 reference material.

TABLE OF CONTENTS

List of Tables

List of Figures

1.0 DISTRIBUTION LIST

Table 1-1: Distribution List for NATTS and Air Toxics QAPP

U.S. EPA Region 4 Air and Radiation Division 61 Forsyth Street, SW Atlanta, GA 30303-3104	U.S. EPA Region 4 Science and Ecosystem Support Division 980 College Station Road Athens, GA 30605-2720
Environmental Protection Commission of Hillsborough County 3629 Queen Palm Dr. Tampa, FL 33619	Pinellas County Public Works – Environmental Management Division – Air Quality 509 East Ave. S., Suite 138 Clearwater, FL 33756
Broward County Natural Resources Division Air Quality Program Ambient Air Monitoring Program 3211 College Avenue Davie, FL 33314	
Note: This document will be distributed electronically to all personnel within the Primary Quality Assurance Organization (PQAO) involved in the NATTS and Air Toxics monitoring projects. Additionally, it will be available within the Air Monitoring Validation Program (AirMVP) database.	

2.0 PROJECT AND TASK ORGANIZATION

The Florida Department of Environmental Protection (DEP) is the coordinating agency to oversee the single Primary Quality Assurance Organization (PQAO) in Florida. The quality assurance oversight and air toxics data upload in the US Environmental Protection Agency (EPA), Air Quality System (AQS) is performed by the Florida DEP. Further detail of organizational responsibilities is described in section 2.1, below.

The Florida NATTS monitoring network is wholly contained within the Tampa-St. Petersburg-Clearwater, CBSA. Consequently, the network is operated and maintained by the Environmental Protection Commission of Hillsborough County (EPCHC) and the Pinellas County Department of Parks and Conservation Resources, Air Quality Division (PCAQD); the local air monitoring programs in that area. The air program division director of each local program has the overall responsibility and authority in meeting the commitments to the NATTS monitoring program within their respective counties. Likewise, the direct responsibility for assuring data quality and integrity rests with the air monitoring program managers. Further detail of organizational responsibilities is described in section 2.2, below.

The Florida Air Toxics monitoring network sites (non-NATTS) are operated by the Broward County Natural Resources Division (BCNRD) and the Pinellas County Air Quality Division. The ambient air monitoring program manager/supervisor is responsible for ensuring the data quality and integrity of the program. Further detail of organizational responsibilities is described in the sections below.

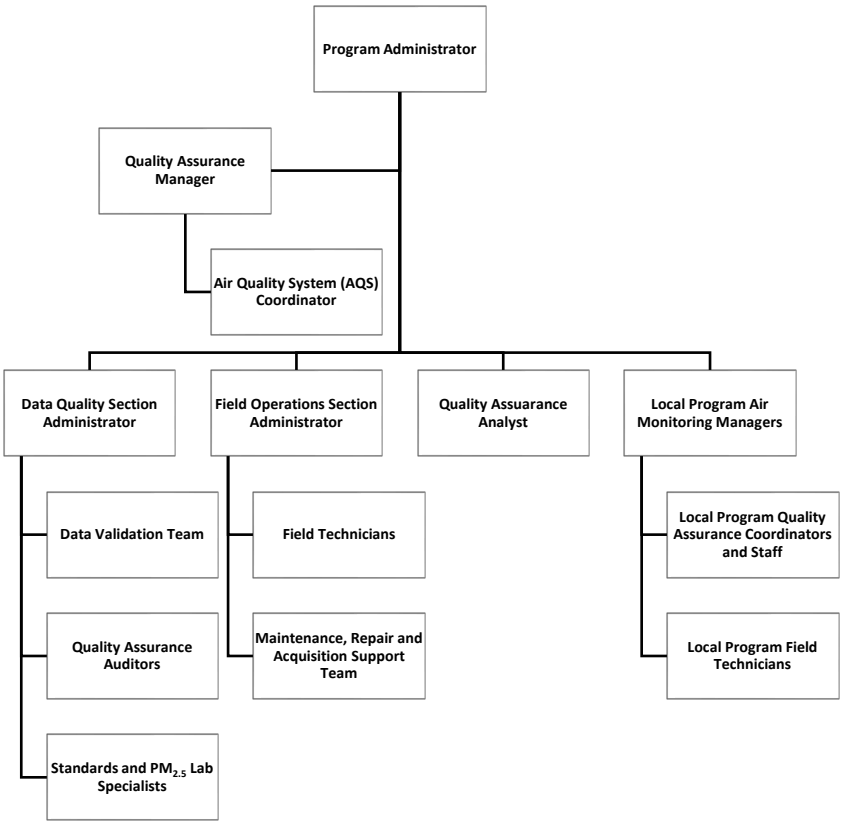
Descriptions of "air toxics monitoring" throughout the remainder of this document refer to both the NATTS and non-NATTS air monitoring network.

2.1 Florida DEP Office of Air Monitoring

The Florida Department of Environmental Protection's (DEP) Division of Air Resource Management (DARM) has the overall responsibility for managing and implementing quality programs and procedures in accordance with the Quality Management Plan. The direct responsibility for assuring air monitoring data quality rests with the Program Administrator of the Office of Air Monitoring (OAM) and reporting quality assurance and data quality managers.

The Florida Department of Environmental Protection's (DEP) Office of Air Monitoring contains the functions of Ambient Monitoring Quality Assurance, Data Quality Management, and Field Operations. It is responsible for coordinating all aspects (quality assurance, data collection, and data processing) of Florida's Ambient Air Quality Monitoring Program. It is represented by the organizational chart in Figure 2-1.

Figure 2-1: Office of Air Monitoring Organizational Chart



OAM Program Administrator. The Program Administrator of the Office of Air Monitoring has direct access to the director on all matters relating to the air monitoring program's operation. The Program Administrator's responsibilities include:

- Maintaining oversight of all NATTS and Air Toxics monitoring program activities related to data reporting,
- Specifying funding for future changes in the NATTS and Air Toxics monitoring network,
- Responding to public inquiries and public records requests relating to NATTS and Air Toxics monitoring.

Quality Assurance Manager. The Quality Assurance Manager (QAM) reports to the Program Administrator of the Office of Air Monitoring and is responsible for the management of quality control and quality assurance activities for the program. The QAM's responsibilities include:

- Interpreting EPA QA policy especially for the purposes of developing, with the direction from management, the policy for the statewide air toxics monitoring organization,
- Reviewing QA documentation to ensure the latest federal and state requirements, policies and procedures are met, as it relates to the NATTS and Air Toxics monitoring network,
- Ensuring timely and appropriate updates and revisions to the air monitoring Quality Management Plan (QMP), Standard Operating Procedures (SOP) for NATTS and Air Toxics monitoring equipment, and the NATTS and Air Toxics Monitoring Quality Assurance Project Plan (QAPP),
- Providing technical advice and assistance regarding data quality issues arising during routine operations for the NATTS and Air Toxics monitoring network,
- Coordinating the reporting of NATTS and Air Toxics monitoring and quality assurance data to the EPA's Air Quality System (AQS), and
- Providing support to the local program and statewide databases and data reporting to the Air Quality System (AQS) database.

Quality Assurance Analyst. The Quality Assurance Analyst reports to the Program Administrator of the Office of Air Monitoring and provides support to quality control and quality assurance activities for the program. The analyst's responsibilities include:

- Interpreting EPA QA policy especially for the purposes of developing, with the direction from management, the audit policy for the statewide monitoring organization, as it relates to the NATTS and Air Toxics monitoring network,
- Reviewing QA documentation to ensure the latest federal and state requirements, policies and procedures are met, and

  Providing technical advice and assistance to the NATTS and Air Toxics monitoring staff regarding data quality issues arising during routine operations.

AQS Coordinator. The AQS coordinator reports to the Quality Assurance Manager and is responsible for coordinating and performing the statewide ambient air data submittal to the EPA AQS. The AQS coordinator's responsibilities include the following:

- Verifying accuracy and completeness of data entry into the AQS database,
- Providing data management and data upload support to statewide databases and data reporting through the Air Quality System (AQS) database, and
- Assisting the QAM with data quality assessments and conducting investigations, when needed.

Data Quality Section Administrator. The section administrator reports to the Program Administrator of Florida DEP's Office of Air Monitoring and is responsible for coordinating the activities of the data validation team, and the standards laboratory staff. The Section Administrator's responsibilities include:

- Supervising section staff and their activities,

- Providing technical advice and assistance to the NATTS and Air Toxics monitoring staff regarding data quality issues arising during routine operations, and
- Ensuring staff training availability and utilization as it relates to the section's functions.

Note: While there are other sections and staff within Florida DEP's Office of Air Monitoring, their roles and responsibilities do not directly impact the NATTS or Air Toxics monitoring programs.

2.2 Environmental Protection Commission of Hillsborough County

The EPC Air Management Division Director has the overall responsibility and authority in meeting the commitments to the NATTS monitoring program. The direct responsibility for assuring data quality and integrity rests with the air monitoring program manager (a.k.a. the Quality Assurance Coordinator). The EPC Air Monitoring Program manager is directly responsible for the field sampling, quality assurance/quality control (QA/QC) activities associated with the NATTS monitoring network, and data reporting to FDEP. Air toxic samples collected by the air monitoring program are delivered to the Water Management Division laboratory (EPC Laboratory) and the Eastern Research Group (ERG) laboratory under national EPA contract. The EPC Laboratory manager is directly responsible for sample analysis by EPA Compendium Methods for PM_{10} metals and polycyclic aromatic hydrocarbons (PAH), QA/QC of the laboratory instrumentation, and data reporting to the Air Monitoring Program manager. The ERG laboratory is responsible for sample analysis by EPA Compendium Method for carbonyl compounds. The project details and organization are described in the ERG QAPP, *Support for the EPA National Monitoring Programs, 2018 (EP-D-14-030)*.

The overall organizational structure of the EPCHC is shown in Figure 2-2, the structure of the Air Management Division is shown in Figure 2-3, and the EPC Laboratory organization is shown in Figure 2-4. The charts are followed by information listing the responsibilities of each position within the Air Management Division, Air Monitoring program and the Water Management Division, EPC Laboratory.

Figure 2-2: EPC Organizational Chart

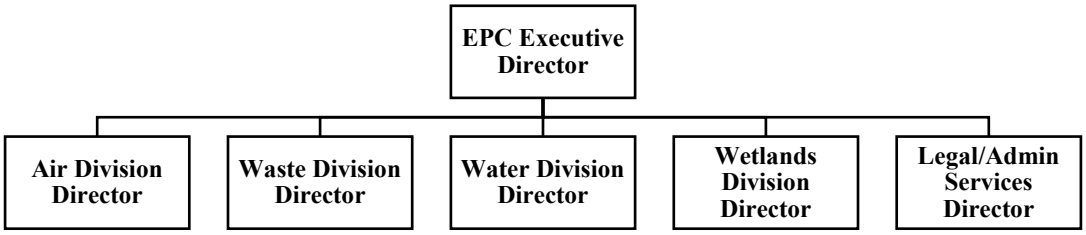


Figure 2-3: EPC Air Division Organizational Chart

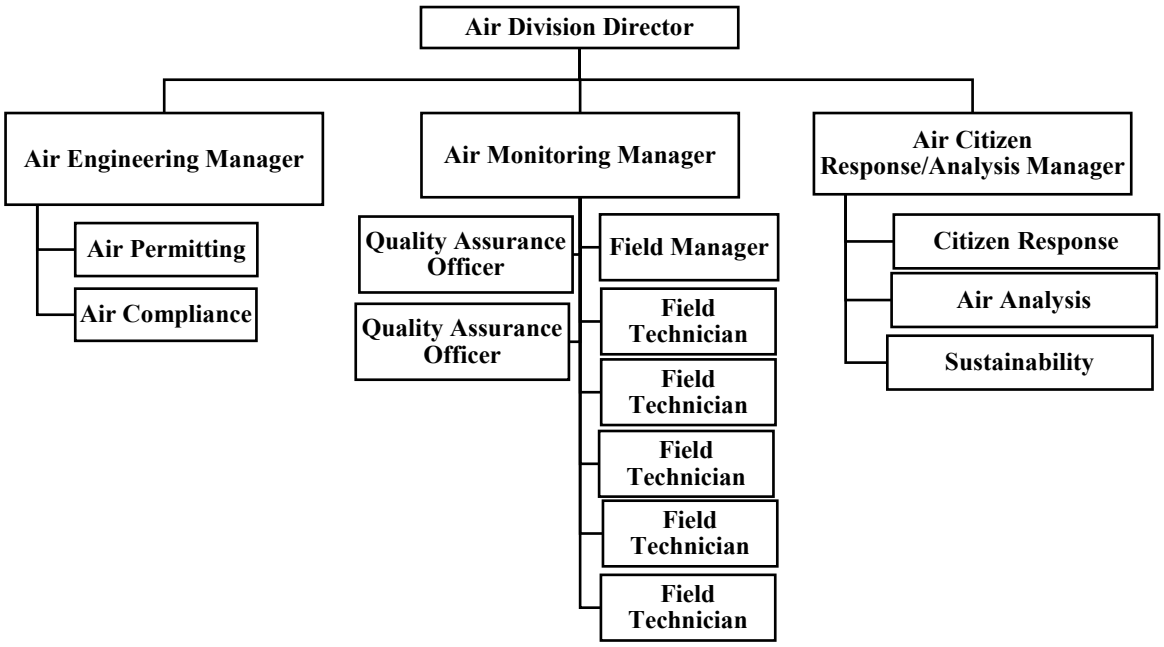
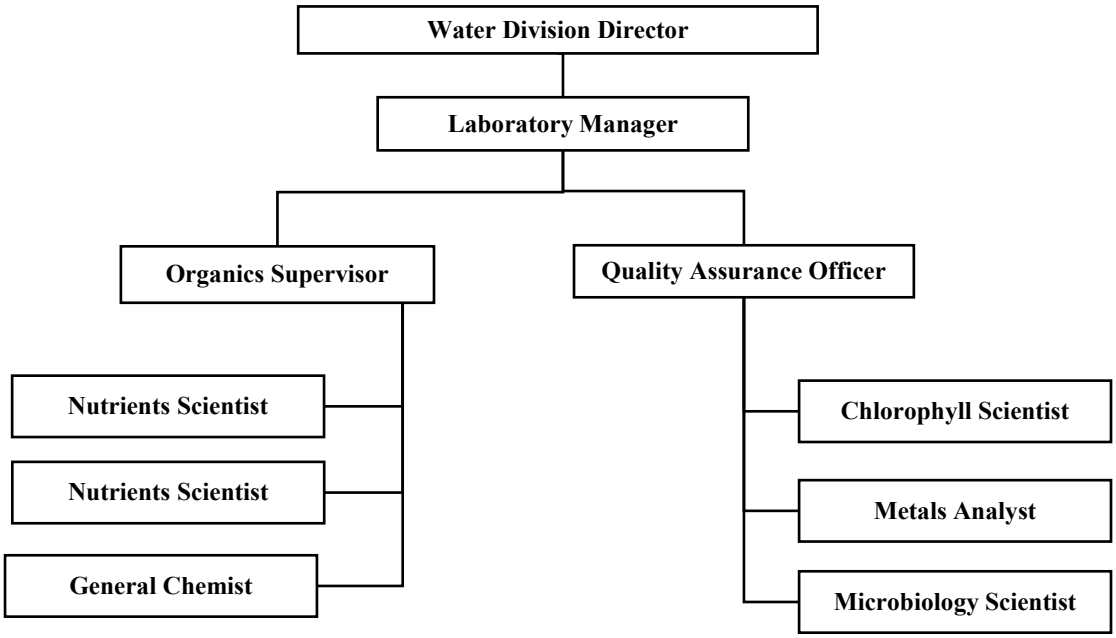


Figure 2-4: EPC Laboratory Organizational Chart



EPCHC Air Division Director. The Air Division Director has direct access to the FDEP DARM Division Director and the OAM Program Administrator on all matters relating to the department's air monitoring program operation. The administrator's duties include:

- Ensuring that department policies and procedures are maintained by the local program office to ensure data quality excellence,
- Assuring that budgets and staff are maintained by the local program office to ensure network operational excellence and ongoing data collection activities,
- Ensuring that sufficient inventory supplies of tools, equipment, and materials are available and usable to ensure impacts to data collection activities are minimized,
- Providing input to the director and program administrator on problems which may be occurring in their areas of concern that may require monitoring program support, and
- Ensuring that agency monitoring staff are properly trained to perform their job functions to ensure data quality objectives are maintained.

EPCHC Air Monitoring Staff. The local program monitoring staff's duties include:

- Ensuring that monitoring programs incorporate QA elements of SOPs and this QAPP, and implementing day-to-day QA/QC activities for the NATTS and Air Toxics monitoring program,
- Reviewing environmental data prior to submittal,
- Assisting with data quality assessments and other internal audits,
- Calculating and/or reviewing precision and bias data generated by the collocated monitors,
- Assisting in the acquisition of resources and maintenance of equipment and inventories to ensure network operational readiness and avoidance of disruptions to data collection activities,
- Collecting, calculating, reporting and reviewing environmental data,
- Participating in training and certification activities,
- Verifying that all required QC activities are performed and that measurement quality objectives are met as prescribed in this QAPP and related SOPs,
- Documenting deviations from established procedures and methods,
- Reporting nonconforming conditions and corrective actions to their managers and QA staff,
- Assessing data quality and flagging suspect data,
- Preparing internal reports for their management, and
- Documenting appropriate responses/corrective actions

EPCHC Quality Assurance Coordinator. The Quality Assurance Coordinator is responsible for data handling, data validation and data verification. They or their designee, serve as members of FAMAC to guide policy for data quality in Florida. Local Program Quality Assurance Coordinators responsibilities related to the NATTS and Air Toxics monitoring program include:

- Ensuring necessary performance audits are completed,
- Ensuring completeness and efficacy of the work,
- Ensuring field and data processing personnel maintain their documentation,
- Assigning response/corrective actions to specific personnel,
- Completing additional narratives on the data such as comments in AirMVP (or subsequent statewide database system),
- Assessing audit findings, issuing appropriate response/corrective actions,
- Disseminating information appearing in audit reports and other quality-related documents to operational personnel, and
- Verifying that all submitted data are correct and complete by applying the verification flag to data.

EPCHC Laboratory Staff. The EPCHC laboratory staff duties include:

- Performs filter preparation for each PAH and PM_{10} metals sample,
- Performs the analytical method, TO-13A, for the analysis of PAH,
- Performs the analytical method, IO-3.1 and 3.5, for the analysis of PM_{10} metals,

- Prepares the data reporting package containing the final analytical results and laboratory QA/QC reports.

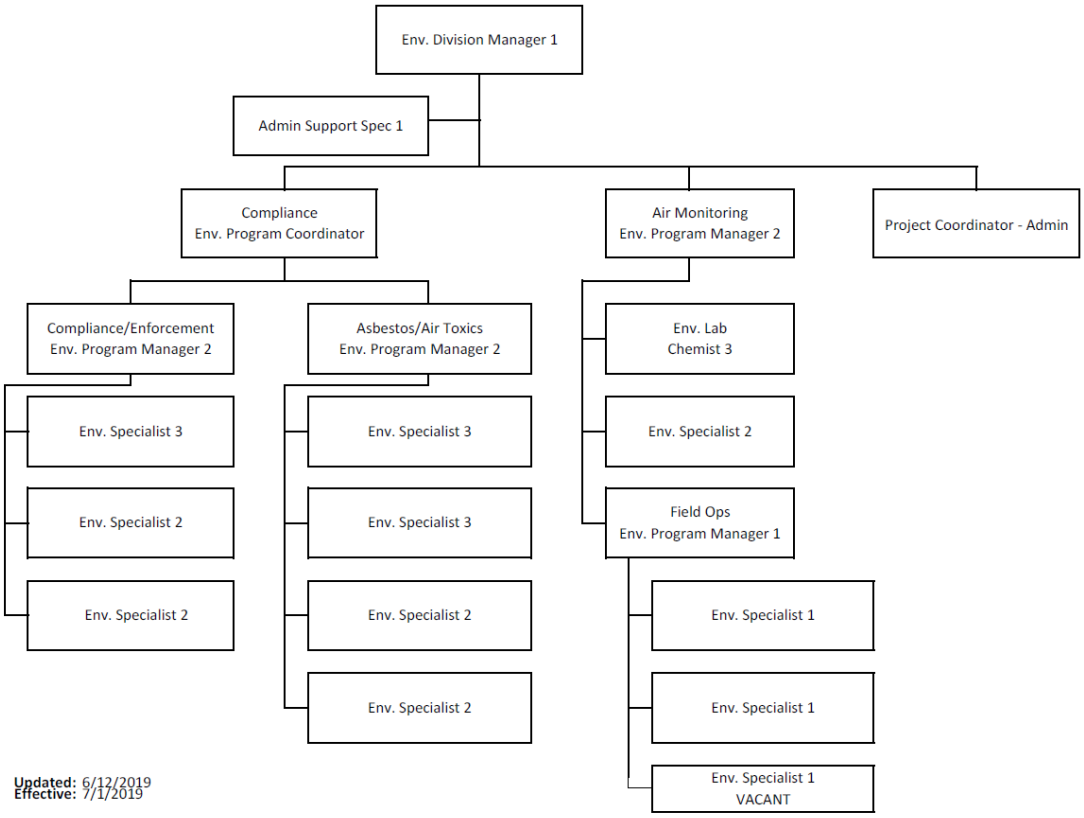
EPCHC Laboratory Manager. The laboratory manager is responsible for data handling and laboratory QA/QC data for the analysis of PM_{10} metals by ICP-MS and Hillsborough County PAH samples by the EPC Compendium Method TO-13A. The laboratory staff duties include:

- Ensuring that the laboratory incorporates QA elements of SOPs and QAPPs, and implements the day-to-day QA/QC activities for the analysis of PM_{10} metals and PAH,
- Maintaining laboratory equipment, supplies, and certifications,
- Calculating and/or reviewing precision and bias data generated by the analytical method.

2.3 Pinellas County Air Quality Division

The PCAQD Air Monitoring Program manager is directly responsible for the field sampling, quality assurance/quality control (QA/QC) activities associated with the NATTS monitoring network, and data reporting to FDEP. Air toxic samples collected by the air monitoring program are processed by the PCAQD laboratory chemist, delivered to the EPC Laboratory, and shipped to the Eastern Research Group (ERG) laboratory under national EPA contract. The PCAQD laboratory chemist is responsible for VOC sample analysis by EPA Compendium Method, QA/QC of the laboratory instrumentation, and data reporting to the Air Monitoring Program manager. The EPC Laboratory manager is directly responsible for PM_{10} metals sample analysis by EPA Compendium Method and data reporting to the Air Monitoring Program manager. The ERG laboratory is responsible for sample analysis by EPA Compendium Methods for carbonyl and PAH compounds. The project details and organization are described in the ERG QAPP, *Support for the EPA National Monitoring Programs, 2018 (EP-D-14-030)*.

Figure 2-5: Pinellas County Public Works, Environmental Management Air Quality



Pinellas County Air Quality Environmental Division Manager. The Air Quality Environmental Division Manager has direct access to the FDEP DARM Division Director and the OAM Program Administrator on all matters relating to the department's air monitoring program operation. The administrator's duties include:

- Ensuring that department policies and procedures are maintained by the local program office to ensure data quality excellence,
- Assuring that budgets and staff are maintained by the local program office to ensure network operational excellence and ongoing data collection activities,
- Ensuring that sufficient inventory supplies of tools, equipment, and materials are available and usable to ensure impacts to data collection activities are minimized,
- Providing input to the director and program administrator on problems which may be occurring in their areas of concern that may require monitoring program support, and
- Ensuring that agency monitoring staff are properly trained to perform their job functions to ensure data quality objectives are maintained.

Pinellas County Air Monitoring Staff. The local program monitoring staff's duties include:

- Ensuring that monitoring programs incorporate QA elements of SOPs and this QAPP, and implementing day-to-day QA/QC activities for the NATTS and Air Toxics monitoring program,
- Reviewing environmental data prior to submittal,
- Assisting with data quality assessments and other internal audits,
- Calculating and/or reviewing precision and bias data generated by the collocated/ duplicate samples,
- Assisting in the acquisition of resources and maintenance of equipment and inventories to ensure network operational readiness and avoidance of disruptions to data collection activities,
- Collecting, calculating, reporting and reviewing environmental data,
- Participating in training and certification activities,
- Verifying that all required QC activities are performed and that measurement quality objectives are met as prescribed in this QAPP and related SOPs,
- Documenting deviations from established procedures and methods,
- Reporting nonconforming conditions and corrective actions to their managers and QA staff,
- Assessing data quality and flagging suspect data,
- Preparing internal reports for their management, and
- Documenting appropriate responses/corrective actions

Pinellas County Quality Assurance Coordinator. The Quality Assurance Coordinator is responsible for data handling, data validation and data verification. They or their designee, serve as members of FAMAC to guide policy for data quality in Florida. Local Program Quality Assurance Coordinators responsibilities related to the NATTS and Air Toxics monitoring program include:

- Ensuring necessary performance audits are completed,
- Ensuring completeness and efficacy of the work,
- Ensuring field and data processing personnel maintain their documentation,
- Assigning response/corrective actions to specific personnel,
- Completing additional narratives on the data such as comments in AirMVP (or subsequent statewide database system),
- Assessing audit findings, issuing appropriate response/corrective actions,
- Disseminating information appearing in audit reports and other quality-related documents to operational personnel, and
- Verifying that all submitted data are correct and complete by applying the verification flag to data.

Pinellas County Air Quality Division Laboratory Chemist. The laboratory chemist is responsible for data handling and laboratory QA/QC data for the analysis

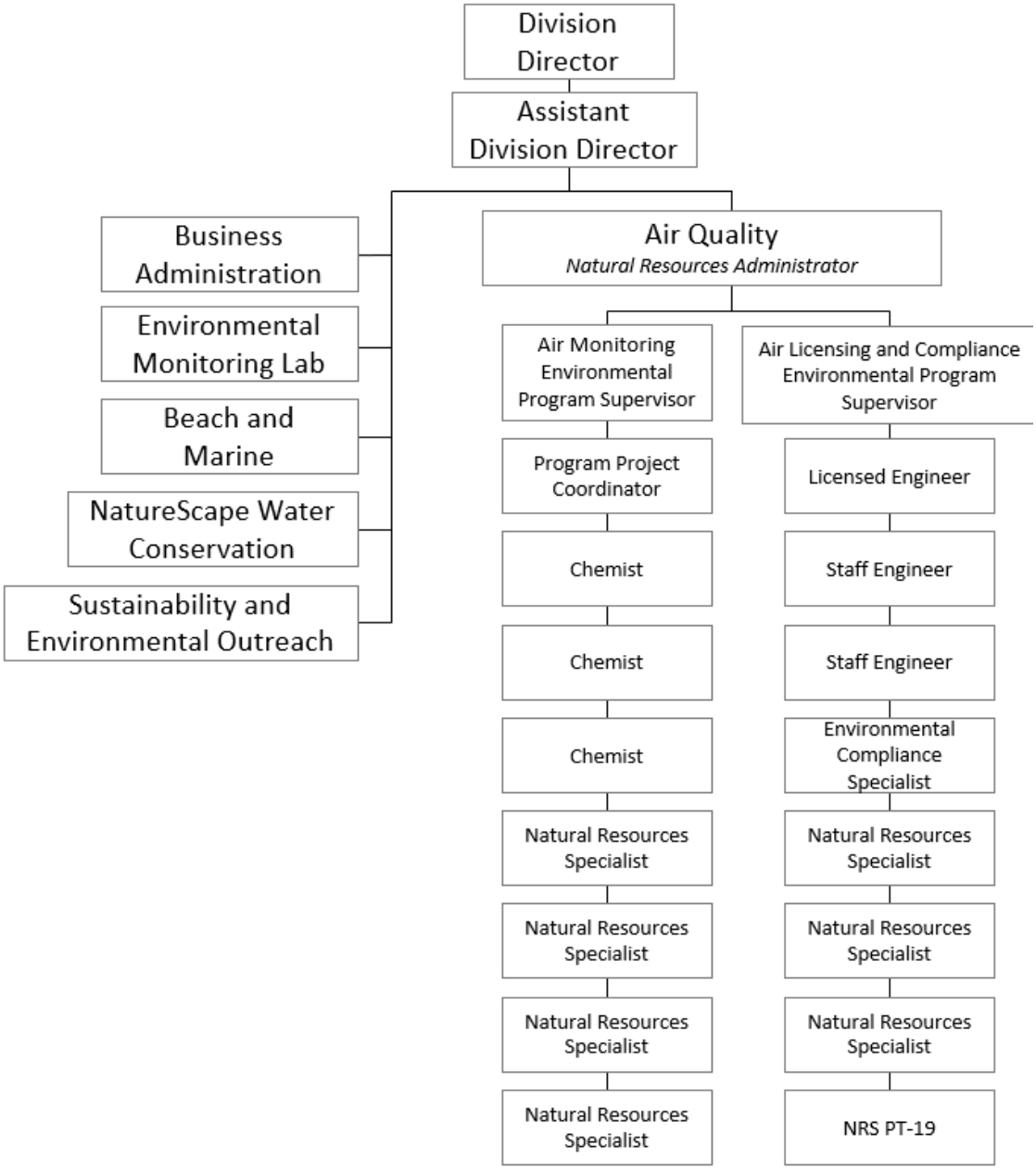
of VOC by the EPA Compendium Method TO-15. The laboratory staff duties include:

- Ensuring that the laboratory incorporates QA elements of SOPs and QAPPs, and implements the day-to-day QA/QC activities for the analysis of VOCs in ambient air,
- Maintaining laboratory equipment, supplies, and certifications,
- Calculating and/or reviewing precision and bias data generated by the analytical method, and
- Performing filter preparation for each PM10 metals sample.

2.4 Broward County Natural Resources Division

The BCNRD Natural Resources Administrator is directly responsible for the field sampling, quality assurance/quality control (QA/QC) activities associated with the non-NATTS Air Toxics monitoring network, and data reporting to FDEP. Air toxic samples collected by the air monitoring program are processed by the BCNRD laboratory chemist.

Figure 2-6: Broward County Natural Resources Division



Broward County Natural Resources Administrator. The Natural Resources Administrator has direct access to the FDEP DARM Division Director and the OAM Program Administrator on all matters relating to the department's air monitoring program operation. The administrator's duties include:

- Ensuring that department policies and procedures are maintained by the local program office to ensure data quality excellence,
- Assuring that budgets and staff are maintained by the local program office to ensure network operational excellence and ongoing data collection activities,
- Ensuring that sufficient inventory supplies of tools, equipment, and materials are available and usable to ensure impacts to data collection activities are minimized,
- Providing input to the director and assistant director on problems which may be occurring in their areas of concern that may require monitoring program support, and
- Ensuring that agency monitoring staff are properly trained to perform their job functions to ensure data quality objectives are maintained.

Broward County Air Monitoring Staff. The local program monitoring staff's duties include:

- Ensuring that monitoring programs incorporate QA elements of SOPs and this QAPP, and implementing day-to-day QA/QC activities for the non-NATTS Air Toxics monitoring program,
- Assisting with data quality assessments and other internal audits,
- Calculating and/or reviewing precision and bias data generated by the collocated monitors,
- Assisting in the acquisition of resources and maintenance of equipment and inventories to ensure network operational readiness and avoidance of disruptions to data collection activities,
- Collecting, calculating, reporting and reviewing environmental data,
- Participating in training and certification activities,
- Verifying that all required QC activities are performed and that measurement quality objectives are met as prescribed in this QAPP and related SOPs,
- Documenting deviations from established procedures and methods,
- Reporting nonconforming conditions and corrective actions to their managers and QA staff,
- Assessing data quality and flagging suspect data,
- Preparing internal reports for their management, and
- Documenting appropriate responses/corrective actions

Broward County Quality Assurance Coordinator. The Quality Assurance Coordinator is responsible for data handling, data validation and data verification. They or their designee, serve as members of FAMAC to guide policy for data quality in Florida. Local Program Quality Assurance Coordinators responsibilities related to the non-NATTS Air Toxics monitoring program include:

- Ensuring necessary performance audits are completed,
- Ensuring completeness and efficacy of the work,
- Ensuring field and data processing personnel maintain their documentation,
- Assigning response/corrective actions to specific personnel,
- Completing additional narratives on the data such as comments in AirMVP (or subsequent statewide database system) and exceedance reports,
- Assessing audit findings, issuing appropriate response/corrective actions,
- Disseminating information appearing in audit reports and other quality-related documents to operational personnel, and
- Verifying that all submitted data are correct and complete by applying the verification flag to data.

Broward County Air Monitoring Laboratory Chemist. The laboratory chemist is responsible for data handling and laboratory QA/QC data for the analysis of VOC by the EPA Compendium Method TO-15. The laboratory staff duties include:

- Ensuring that the laboratory incorporates QA elements of SOPs and QAPPs, and implements the day-to-day QA/QC activities for the analysis of VOCs in ambient air,
- Maintaining laboratory equipment, supplies, and certifications,
- Calculating and/or reviewing precision and bias data generated by the analytical method, and
- Reviewing environmental data prior to submittal.

2.5 Florida DEP Office of Technology and Information Services

The Office of Technology and Information Services (OTIS) is responsible for the management and security of the systems that provide the agency with information technology (IT) solutions to promote mission success. OTIS responsibilities include:

- Providing support for the department's databases and data reporting to the Air Quality System (AQS) database, and
- Identifying quality problems and initiating actions which result in solutions.
- Maintaining backup-systems and ensuring data recovery is adequate in the event of a significant loss of data.

3.0 PROBLEM DEFINITION AND BACKGROUND

Hazardous Air Pollutants (HAPs), or air toxics, are regulated under the Clean Air Act (CAA) as amended in 1990 and include a list of 189 toxic pollutants associated with adverse health effects. Such HAPs are emitted by numerous stationary and mobile sources. The U.S. Environmental Protection Agency (EPA) Government Performance Results Act (GPRA) commitments specify a goal of reducing air toxics emissions by 75% from 1993 levels to significantly reduce the potential for human health risk.

The National Air Toxics Trends Station (NATTS) Program was developed to fulfill the need for long-term ambient air toxics monitoring data required to assess attainment of GPRA commitments. The NATTS network was designed to generate data of a known, consistent, and standardized quality sufficient to enable the identification of spatial, and, more importantly, long-term temporal trends in the concentrations of air toxics.

Due to limited resources, scientific information, sampling methodologies, etc. it is not possible to collect data on all the HAPs listed Section 112 of the CAA. Therefore, the EPA developed a subset of toxic air pollutants that have the greatest impact on the public and the environment in urban areas. The resulting subset consisted of 33 HAPs which are identified in the Integrated Urban Air Toxics Strategy (UATS), commonly referred to as the Urban HAP List.

Several compounds on the UATS list are difficult to characterize or sampling/analytical methods have not yet been developed. The final list of compounds, selected through a consultative process between EPA, the National Steering Committee, and State/Local agencies, are identified as core HAPs for the NATTS program. The list is based on:

- The EPA's Concept Paper,
- The portion of the Unified Air Toxics Strategy (UATS) HAPs that can be measured with available field and lab systems, and
- The limitations of the State-of-the-Science with respect to instruments.

EPA is requiring that data for eighteen (18) core NATTS compounds are reported to the national Air Quality System (AQS). During the summer of 2019, the EPA added Ethylene Oxide (EtO) to the list of core NATTS compounds, bring the total to nineteen (19). Since the collection and analysis of samples by the EPA analytical methods for each class of compounds will provide data for 87 pollutants, the Florida NATTS monitoring program will report the concentrations of the Tier I and UATS Tier II compounds, as well as other selected compounds included in the analytical method to AQS. The analytes listed in Table 3-1, below, are a subset of the "Target Analytes" identified in Table 1.2-1 of the NATTS TAD Rev. 3, October 2016 with the addition of EtO. At a minimum, these core analytes will be reported to AQS. In addition, as characterization and data issues are resolved for other compounds of concern, they will be included in the Florida NATTS and Air Toxics monitoring program.

On January 1, 2015, the U.S. Environmental Protection Agency (US EPA) designated the state of Florida as one Primary Quality Assurance Organization responsible for monitoring air pollution. 40 CFR Part 58, Appendix A defines each PQAO such that measurement

uncertainty among all stations in the organization can be expected to be reasonably homogeneous as a result of common factors. These factors include:

a) Operation by a common team of field operators according to a common set of procedures,
b) Use of a common quality assurance project plan (QAPP) or standard operating procedures,
c) Common calibration facilities and standards,
d) Oversight by a common quality assurance organization, and
e) Support by a common management organization (i.e., state agency) or laboratory.

Florida's PQAO consists of Florida DEP as the lead agency, and 9 local air monitoring organizations throughout the state. This statewide program includes the operation of the ambient air monitoring network (including the gaseous monitors discussed within this QAPP), laboratory analysis, data reporting, and quality assurance activities to ensure the quality of the data generated by the PQAO. Florida also developed the Florida Air Monitoring Advisory Committee (FAMAC), which is an internal committee consisting of Florida DEP and local program representatives to aid in coordinating quality assurance (QA) and quality control (QC) policies and guidance. This committee identifies practices that strengthen data quality objectives, promote innovative and efficient operations, and sets the minimum QA and QC requirements by which all agencies within the PQAO shall operate their air monitoring quality assurance programs. FAMAC communicates on a as needed basis, in order to ensure a continuous flow of information, team building, and problem solving within the PQAO.

The Quality Assurance Project Plan (QAPP) is a compilation of QA/QC requirements, procedures, and guidelines that are designed to achieve a high percentage of valid data samples, while maintaining integrity and accuracy. The US EPA regulations require that all projects involving the generation, acquisition, and use of environmental data are planned, documented, and have an approved QAPP. Adherence to the requirements set forth in this QAPP will ensure consistent, repeatable results, and improve the reliability and comparability of all data collected. This QAPP will be used by all of Florida's monitoring staff as a reference document, providing the framework for the monitoring network's QA program. Additional details and technical specifications are set forth in individual SOPs utilized by the air monitoring staff for each aspect of the monitoring program, such as instrument operations, data handling and certification, and will be referenced in later sections of this QAPP. It is the responsibility of all air monitoring staff to ensure that all procedures and guidelines in this QAPP are properly implemented.

This QAPP focuses on the Quality Assurance (QA) and Quality Control (QC) that will be used by DEP, PCAQD and EPCHC to fulfill their obligation to the NATTS network which includes reporting of results to EPA's Air Quality System (AQS) database. Broward County EEPD is not a part of the NATTS network but will follow this QAPP as it pertains to non-NATTS air toxic monitoring to ensure the air toxics data it provides to AQS is comparable to that provided by NATTS agencies.

Table 3-1: Florida NATTS Monitoring Program HAP List

HAP	Analyte Class/Method	UATS	NATTS Core
1,1,2,2-tetrachloroethane	VOC Compounds by TO-15	X	
1,1,2-trichloroethane			
1,2,4-trichlorobenzene			
1,3-butadiene		X	X
acrolein		X	X
acrylonitrile		X	
benzene		X	X
carbon tetrachloride		X	X
chlorobenzene			
chloroform		X	X
cis-1,3-dichloropropene		X	
ethyl benzene			
ethylene oxide			X
hexachloro-1,3-butadiene			
m&p-xylenes			
methylene chloride			
o-xylene			
p-dichlorobenzene			
tetrachloroethylene		X	X
trans-1,3-dichloropropene		X	
trichloroethylene		X	X
vinyl chloride		X	X
acetaldehyde	carbonyls by TO-11A	X	X
formaldehyde		X	X
antimony	metals by IO-3.1 and IO 3.5		
arsenic		X	X
beryllium		X	X
cadmium		X	X
chromium		X	
cobalt			
lead		X	X
manganese		X	X
nickel		X	X

HAP	Analyte Class/Method	UATS	NATTS Core
selenium			
acenaphthene	PAH by TO-13A	X	
acenaphthylene		X	
anthracene		X	
benz(a)anthracene		X	
benzo(a)pyrene		X	X
benzo(b)fluoranthene		X	
benzo(e)pyrene		X	
benzo(k)fluoranthene		X	
chrysene		X	
dibenz(a,h)anthracene		X	
fluoranthene		X	
fluorene		X	
indeno(1,2,3-cd)pyrene		X	
naphthalene		X	X
phenanthrene		X	
pyrene		X	

4.0 PROJECT AND TASK DESCRIPTION

4.1 Description of Work to be Performed

This QAPP was developed to ensure that Florida's NATTS and Air Toxics monitoring network collects ambient air quality data that meet or exceed EPA quality assurance requirements. These data are entered into the EPA AQS database and are available for trends assessment. Other purposes of the data include determining effects on air quality from adjustments to source emissions, developing algorithms based on historical air quality and other conditions which will forecast air quality, and verifying air quality modeling programs.

The Florida NATTS monitoring program was developed for generating long-term HAP monitoring data of consistent quality for determining trends and characterizing ambient levels of air toxic pollutants. The data is reported to AQS in accordance with the current U.S. EPA Technical Assistance Document (TAD) for the NATTS program and annual workplan requirements.

Florida's air toxics monitoring network, which includes both NATTS and non-NATTS sites, will operate and collect data in accordance with the EPA national sampling schedule for every six (6) days and collocated sampling on the 12-day schedule. The types of data collected by Florida's air toxics monitoring network will include:

- Precision measurements,
- Bias measurements, and,
- Geographic measurements (e.g. locational, demographic, topographical).

The work required to collect, document, and report this data includes, but is not limited to, the following:

- Establishing a monitoring network that is:
    - Located and designed according to the NATTS TAD for NATTS monitors, and
    - Operated with accurate and reliable monitors, data recording equipment, and software.
- Developing encompassing documentation for:
    - Data and report format, content, and schedules,
    - Quality objectives and criteria.
- Establishing standard operating procedures, which provide activities and schedules for:
    - Equipment operation and preventative maintenance,
    - Instrument calibrations, precision checks, and accuracy evaluations,

- Establishing assessment criteria and schedules, and,
- Verifying and validating the data produced by network monitors in accordance with the criteria and schedules established herein.

Towards this end, Florida's work products also include a series of assessments and reports in order to ensure the network and resulting data continuously meet or exceed regulatory requirements. Similarly, the Florida PQAO maintains this QAPP and its associated SOPs, reviewing and revising them as needed, to ensure they continuously reflect the requirements of the PQAO and EPA.

4.2 Field Activities

All monitoring personnel will perform those activities that support the continued successful operation and expansion of the Florida air toxics monitoring network. Personnel will perform field activities according to the NATTS TAD and instrument SOPs. These activities include, but are not necessarily limited to, conducting periodic preventative maintenance and servicing equipment. Operational servicing activities may include, but are not limited to, collecting samples, recording pertinent field data, and restocking consumables at the monitoring sites. Additional field activities include relocating sites and/or locating suitable monitoring sites for possible expansion of the non-NATTS network.

4.3 FDEP Standards Laboratory Activities

For the Florida air toxics network samplers, the standards laboratory specialist will assure completion of those activities that support continued successful operation of the Florida air toxics monitoring network through instrument certification activities. These include, but are not limited to, comparing equipment to standards for certification, maintaining consumable inventories, shipping and receiving activities, and performing instrument audits.

4.4 Laboratory Activities

The EPCHC laboratory personnel will assure completion of those activities that support continued successful operation of the PM_{10} metals sample analysis by EPA Compendium Method IO-3.5, and those activities that support continued successful operation of the ambient PAH/SVOC sample analysis by EPA Compendium Method TO-13 for samples collected at the Sydney NATTS site (AQS# 12-057-3002). Additionally, the laboratory personnel perform duties according to the laboratory SOPs related to the preparation and analysis of PM_{10} metals and PAH/SVOCs, such that the data quality provided meets or exceeds the QA requirements recommended by the NATTS TAD. This may include, but is not limited to, comparing equipment to standards for certification, maintaining consumable inventories, shipping and receiving activities, and performing instrument audits.

The PCAQD laboratory personnel will assure completion of those activities that support continued successful operation of the VOC sample analysis by EPA Compendium Method TO-15 for samples collected at the Florida NATTS sites (AQS# 12-057-3002 and 12-103-0026) and other Air Toxics monitoring sites. Additionally, the laboratory personnel perform duties according to the laboratory SOPs related to the preparation and analysis of VOCs, such that the data quality provided meets or exceeds the QA requirements recommended by the NATTS TAD. This may include, but is not limited to, comparing equipment to standards for certification, maintaining consumable inventories, shipping and receiving activities, and performing instrument audits.

The BCNRD laboratory personnel will assure completion of activities that support the successful operation of the VOC sample analysis by EPA Compendium Method TO-15 for samples collected at Broward County non-NATTS site (AQS# 12-011-0034). The laboratory will serve, if needed, as a back-up lab to the PCAQD laboratory. Laboratory personnel perform duties according to the Florida State-wide NATTS and non-NATTS QAPP and SOPs related to the collection and analysis of VOC samples such that data meet or exceed EPA NATTS program QA requirements as recommended in the most current edition of the EPA NATTS TAD. This may include, but is not limited to, comparing equipment to standards for certification, maintaining consumable inventories, shipping and receiving activities, and performing instrument audits.

4.5 Project Assessment Techniques

An assessment is an evaluation process used to measure the performance or effectiveness of a system and its elements. As used here “assessment” is an all-inclusive term used to denote any of the following: audit, performance evaluation, management systems review (MSR), peer review, inspection, or surveillance. Section 12 will discuss the details of assessments. Information on the parties implementing assessments and their frequency is provided in Table 4-1.

Table 4-1: Assessment Schedule

Assessment Type	Assessment Agency	Frequency
Technical System Audit	EPA Region 4 and/or State	Every 3 to 5 Years
Network Plan Review/Assessment	State	Annually [Network Assessment on a 5-year cycle]
Performance Evaluations	State	Annually
Data Quality Review	State	Monthly & Quarterly
Standard Operating Procedures Reviews	State	Annually
QAPP Review	State	Annually
Lab Proficiency Testing	EPA	Twice per year

4.6 Project Records

Each program within the PQAO, including Florida DEP, has its own internal procedures for the timely preparation, review, approval, issuance, use, control, revision, and maintenance of documents and records. However, for the Florida air toxics monitoring network described by this QAPP, these records are compiled and stored annually by the data management system within the participating local programs. The categories and types of records and documents are presented in Table 4-2 below.

Table 4-2: Critical Documents and Records

Categories	Record/Document Type
Site Information	▪ Network Descriptions ▪ Site Files ▪ Site Maps ▪ Site Pictures
Environmental Data Operations	▪ Quality Assurance Project Plans ▪ Standard Operating Procedures ▪ Field and Laboratory Notebooks ▪ Sample Handling/Custody Records ▪ Inspection/Maintenance Records
Raw Data	▪ Any Original Data (routine and quality control) including data entry forms
Data Reporting	▪ Data/Summary Reports
Data Management	▪ Data Algorithms ▪ Data Management Plans/Flowcharts ▪ Data Management Systems ▪ Pollutant Data ▪ Meteorological Data
Quality Assurance	▪ Good Laboratory Practices ▪ Network Reviews ▪ Technical System Audits ▪ Response/Corrective Action Reports ▪ Site Audits ▪ Performance Evaluations

4.7 Site Locations

The Florida air toxics monitoring network consists of two (2) NATTS sites and one (1) non-NATTS VOC sampling site in the Tampa-St. Petersburg-Clearwater, CBSA and one (1) non-NATTS VOC sampling site in the Miami-Ft. Lauderdale-West Palm Beach, MSA. Figure 4-1 illustrates the site locations of the NATTS and Air Toxics network sites.

Figure 4-1: Florida NATTS and Air Toxics Monitoring Network Map

Table 4-3: Florida NATTS and Air Toxics Network Monitoring Stations

AQS#	Site Name	Sampler	Method	Parameter Group
12-057-3002	Sydney	Mechanical System ERG: C Sampler[2] Tisch TE-1000 PUF[1] Tisch TE-6xxx[1]	6-liter Canister DNPH Cartridge PUF Hi-Volume PM_{10} Hi-Volume	VOCs Carbonyls PAHs PM_{10} Metals
12-103-0026	Skyview	ATEC Model 2200[2] ERG: C Sampler[2] Tisch TE-1000 PUF GMW UV16H	6-liter Canister DNPH Cartridge PUF Hi-Volume PM_{10} Hi-Volume	VOCs Carbonyls PAHs PM_{10} Metals
12-103-0018	Azalea Park	ATEC Model 2200	6-liter Canister	VOCs
12-011-0034	Daniela Banu	ATEC Model 2200	Automated Canister	VOCs

1. x2 for a collocated sampler for QA purposes.
2. Duplicate sampling unit.

5.0 DATA AND MEASUREMENT QUALITY OBJECTIVES AND CRITERIA

Florida operates under an EPA-approved Quality Management Plan (QMP) that describes the system for communicating and implementing quality within the PQAO.

A quality system is a structured and documented set of management activities in which an organization applies sufficient quality control practices to ensure that the data produced by an operation will be of the type and quality needed and expected by the data user. Quality control defines the procedures implemented to assure that acceptability is obtained and maintained in the generated dataset. Quality control procedures, when properly executed, provide data that meet or exceed the minimally acceptable quality criteria established to assist management in making confident decisions. Florida's policy is to implement a QA program to assure that data of known and acceptable precision, bias, completeness, comparability, and representativeness are collected within its Ambient Air Quality Monitoring Program.

Precision, bias, completeness, comparability, and representativeness are the principle Data Quality Indicators (DQI) that provide qualitative and quantitative descriptions used in interpreting the degree of acceptability of data. Establishing acceptance criteria for these DQIs sets quantitative goals for the quality of data generated in the measurement process. Of the five principal DQIs, precision and bias are the quantitative measures, representativeness and comparability are qualitative measures, and completeness is a combination of both qualitative and quantitative measures. The specific requirements of these five DQIs are established before data collection commences. The goal is to locate and eliminate (or minimize) bias, so the data collected show the true conditions of the area being sampled. This includes consideration of siting criteria, spatial scales, monitoring objectives, climatic change, source configurations, and the duration of the study.

The written procedures and methodologies in this QAPP for operating air monitoring instrumentation and handling data must be adhered to by all individuals to assure quality data for purposes of meeting the commitments to EPA's NATTS ambient air toxics monitoring program.

5.1 Data Quality Objectives

This section provides a description of the data quality objectives (DQOs) for the Florida NATTS and Air Toxic Monitoring Program. The data quality objectives are qualitative and quantitative statements defined in the US EPA *Quality Management Plan for the National Air Toxics Trends Stations (EPA 4554/R-02-006)*:

- Detect trends between two consecutive 3-year annual mean concentrations,
- Measure concentration of NATTS Tier I core analytes and Tier II analytes of interest in the ambient air, and

- Collect sufficient data to represent the annual average ambient concentrations of air toxics at each NATTS site.

5.2 Intended Use of Data

In addition to the NATTS DQOs, data collected from the Florida NATTS and Air Toxics monitoring network will be used to:

- Provide long-term ambient air toxics data for the assessment of trends,
- Establish the urban background concentration of natural and anthropogenic air toxic pollutants,
- Characterize the ambient air toxic profile representative of the monitoring scale, and
- Provide a database for researching and evaluating effects of toxic air pollutants.

5.3 Type of Data Needed

The type of data needed is determined by its intended use and be of such quality to satisfy commitment to the US EPA Government Performance Results Act (GPRA) with confidence and certainty. The GPRA commitments specify a goal of reducing air toxic emissions by 75% from 1993 levels to significantly reduce the potential for human health risk. Consequently, the primary Data Quality Objective (DQO) for the NATTS program is stated as:

> "To be able to detect a 15% difference (trend) between two successive 3-year annual mean concentrations (rolling averages) within acceptable levels of decision error."

In addition, the data needed for the Florida air toxics monitoring program will meet the following principle quality objectives:

- All data should be traceable to a National Institute of Science and Technology (NIST) primary standard.
- All data shall be of a known and documented quality. As noted above, two key quantitative indicators for assessing data quality are precision and bias. Precision and bias requirements are established herein.
- All data shall be comparable. This means all data shall be produced in a similar and scientific manner. The use of the standard methodologies for sampling, calibration, auditing, etc. found in the QAPP should achieve this goal.
- All data shall be representative of the parameters being measured with respect to time, location, and the conditions from which the data are obtained. The use of the standard methodologies contained in the QAPP should ensure that the data generated are representative.
- The QAPP and its associated SOPs must be dynamic to continue to achieve its stated goals as techniques, systems, concepts, and technology change.

5.4 Tolerable Error Limits

The Data Quality Objective (DQO) process defines tolerable limits on the probability of making a decision error due to uncertainty in the data. That is, limits on the probability of measuring a false positive or false negative error. With regards to air quality data, a false positive error occurs when data indicates that an emissions limit has been exceeded when in fact, due to random deviations in the data, it has not been exceeded. Alternatively, a false negative error occurs when data indicate that no emissions limit has been exceeded when in fact, due to random deviations in the data, it has been exceeded.

Utilizing the formal DQO process, EPA established the tolerable error limits for NATTS monitoring precision and bias data in order to reduce the probability of decision errors.

5.5 Measurement Quality Objectives

The DQO process functions to identify the allowable measurement uncertainty for a given objective. Once a DQO is established, the quality of the data must be evaluated and controlled to ensure that it is maintained within the established acceptance criteria. Measurement quality objectives (MQOs) are designed to evaluate and control various phases (sampling, preparation, analysis) of the measurement process to ensure that total measurement uncertainty is within the range prescribed by the DQOs. MQOs are derived from the DQOs, and can be established to evaluate overall measurement uncertainty, as well as be established for an individual phase of a measurement process.

The MQOs for Florida's air toxics monitoring network are defined in terms of the following data quality indicators (DQI):

- ***Precision*** **-** Precision is a measure of agreement between two replicate measurements of the same property, under prescribed similar conditions. This agreement is calculated as either the range or as the standard deviation. This calculation represents the random component of error. The Coefficient of Variation (CV) must be no more than 15%.
- ***Bias*** **-** Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. Bias is determined by estimating the positive and negative deviation from the true value as a percentage of the true value. The bias measurement error must be no more than 25%.
- ***Sensitivity*** **-** Sensitivity is the qualitative term that expresses the confidence that as concentrations decrease, and become increasingly difficult to measure, measurement methods must become increasingly sensitive. Therefore, MDLs must meet the network requirements.
- ***Representativeness*** **-** Representativeness is a measure of the degree to which data accurately and precisely represent a characteristic of a population parameter at a sampling point or for a process condition or environmental

condition. Representativeness is a qualitative term that should be evaluated to determine whether in situ or other measurements are made and physical samples collected in such a manner that the resulting data appropriately reflect the media and phenomenon measured or studied. Sampling must occur on a one-in-six-day frequency, from midnight to midnight local time, over 24 ± 1 hours.

- ***Completeness -*** Completeness is a metric quantifying the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions. Completeness can be expressed as a ratio or a percentage. Data completeness requirements are that at least 85% of all data available in a given year must be reported.

For each of these attributes, acceptance criteria have been developed according to the NATTS TAD. Specifically, the MQOs for each group of air toxic compounds and sampling methods have been compiled into "validation templates" found in the NATTS TAD and included as Table 5-1 through 5-4, below.

The validation templates are a distillation of the general quality control guidance and requirements for the individual sampling methods. More information on each data validation parameter can be located within the text identified in the reference column. Each parameter is assigned a category of importance. The categories in order of decreasing importance are:

1. **Critical** – Criteria must be met for reported results to be valid – Samples for which these criteria are not met are invalidated.
2. **MQO** – Required NATTS Measurement Quality Objective which must be attained – Failure to meet these criteria does not necessarily invalidate data but may compromise data and result in exclusion from trends analysis.
3. **Operational** – Failure to meet criteria does not invalidate reported results; the results are compromised and, on a case-by-case basis may require qualification – refer to Table 3.3-2 of the NATTS TAD for the list of AQS qualifiers.
4. **Practical** – Failure to meet criteria does not invalidate reported results; results may be compromised but do not require qualification.

5.6 Data Quality Indicators

The data quality indicators, for each group of air toxic compounds, are specified in Tables 5-1 through 5-4, below. The "Acceptance Criteria" describes the DQI (precision, bias, sensitivity, representativeness, completeness) and the tolerable limits of acceptance.

Table 5-1: VOC Sampling Validation Template

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Readiness Checks and Collection Activities				
Canister Cleaning Batch Blank	Minimally one canister selected for analysis from a given batch of clean canisters to ensure acceptable background levels in the batch of cleaned canisters - must represent no more than 10 canisters	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower	Section 4.2.4.2.4 TO-15 Section 8.4.1.6	Critical
Canister Starting Pressure Determination	Each canister prior to collection of a field sample or preparation of a calibration standard or laboratory QC sample	Vacuum > 28" Hg as determined with calibrated pressure gauge or transducer	Section 4.2.3.2.1	Critical
Sample Setup Leak Check	Each canister prior to collection - draw vacuum on canister connection	Leak rate must be < 0.2 psi over 5 minutes	Section 4.2.3.2.1	Critical
Sampling Frequency	One sample every six days according to the EPA National Monitoring Schedule	Sample must be valid, or a make-up sample should be scheduled (refer to Section 2.1.2.1)	Section 4.2.3.3	Critical and MQO
Sampling Period	All field-collected samples	1380-1500 minutes (24 ± 1 hr) starting and ending at midnight	Section 4.2.3.3	Critical and MQO
Canister Viability	All canisters	Canister must be used within 30 days from final evacuation	Section 4.2.4.2 TO-15 Section 1.3	Operational
Sampling Unit Clock/Timer Check	Verified with each sample collection event	Clock/timer accurate to ±5 minute of reference for digital timers, ±15 minutes for mechanical timers, set to local standard time Sample collection period verified to be midnight to midnight	Section 4.2.3.3 and Table 3.3-1	Operational
Field-collected Sample Final Pressure	All field-collected samples	Must be determined with a calibrated pressure gauge or transducer per agency quality system specification	Section 4.2.5.2.4	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Pre-Sample Collection Purge	Each sampling event	Minimum of ten air changes just prior to sample collection	Section 4.2.5.4	Practical
Sample Receipt				
Chain-of-custody	All field-collected samples including field QC samples	Each canister must be uniquely identified and accompanied by a valid and legible COC with complete sample documentation	Sections 3.3.1.3.7 and 4.2.5.2.4	Critical
Canister Receipt Pressure Check	All field-collected samples upon receipt at the laboratory – measured with calibrated pressure gauge or transducer	Pressure change of ≤ 0.5 psi from the final pressure at retrieval	Section 4.2.8	Critical for subambient sample collection, operational for pressurized sample collection
Sample Holding Time	All field-collected samples, laboratory QC samples, and standards	Analysis within 30 days of end of collection (field-collected samples) or preparation (QC samples or standards)	Section 4.2.1 TO-15 Sections 1.3, 2.3, and 9.2.8.1	Operational
GC/MS Analysis				
BFB Tune Check	50 ng injection of BFB for tune verification of MS detector analyzed prior to initial calibration and every 24 hours of analysis thereafter (for quadrupole MS only)	Must meet abundance criteria listed in Table 4.2-2	Section 4.2.10.5.1 TO-15 Section 10.4.2	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
GC/MS Multi-Point Initial Calibration (ICAL)	Analysis of a minimum of five calibration levels covering approximately 0.1 to 5 ppb Initially and minimally every three months thereafter, following failed BFB tune check, failed CCV, or when changes to the instrument affect calibration response	Average RRF ≤ 30% RSD and each calibration level must be within ± 30% of nominal For linear regression (with either a linear or quadratic fit), r ≥ 0.995 and each calibration level must be within ± 30% of nominal	Section 4.2.10.5.2.2 TO-15 Section 10.5.5.1	Critical
Secondary Source Calibration Verification (SSCV)	Analysis of a secondary source standard at the mid-range of the calibration curve to verify ICAL accuracy immediately after each ICAL	Recovery within ± 30% of nominal	Section 4.2.10.5.2.3	Critical
Continuing Calibration Verification (CCV)	Analysis of a known standard at the mid-range of the calibration curve to verify ongoing instrument calibration; following each daily BFB tune check and at the conclusion of each analytical sequence	Each target VOC must recover within 70-130% of the nominal spiked amount or the RRF must be within 30% of the mean ICAL RRF	Section 4.2.10.5.2.4 TO-15 Section 10.6.5	Critical
Internal Standards (IS)	Deuterated or non-naturally occurring compounds co-analyzed with all calibration standards, laboratory QC samples, and field-collected samples so as to monitor instrument response and assess matrix effects	Area response for each IS compound within ± 40% of the average response of the ICAL	Section 4.2.10.5.4 TO-15 Section 10.7.5	Critical
Retention Time (RT)	RT of each target compound and internal standard for all qualitatively identified compounds and internal standards	Each target VOC's RRT must be within ± 0.06 RRT units of its mean ICAL RRT Each IS RT must be within ± 0.33 minutes of its mean ICAL RT	Sections 4.2.10.5.2.2 and 4.2.10.5.4 TO-15 Sections 10.5.5.2, 10.5.5.3, and 10.5.5.4	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Compound Identification	Qualitative identification of each target VOC in each standard, blank, QC sample, and field-collected sample (including field QC samples)	Signal-to-noise ≥ 3:1 RT within prescribed window Ion abundances of at least one qualifier ion within 30% of ICAL mean Peak apexes co-maximized (within one scan for quadrupole MS) for quantitation and qualifier ions	Section 4.2.10.5.3	Critical
Instrument Blank (IB)	Analysis of swept carrier gas through the preconcentrator to demonstrate the instrument is sufficiently clean prior to analysis of ICAL or daily beginning CCV	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower	Section 4.2.10.5.2.2	Operational
Preconcentrator Leak Check	Pressurizing or evacuating each canister connection to the preconcentrator to verify as leak-free prior to analysis	< 0.2 psi change/minute or manufacturer specifications	Section 4.2.10.5.2.1	Operational
Method Blank (MB)	Canister filled with clean humidified diluent gas (gas employed for dilution of standards and /or samples) One with every analysis batch of 20 or fewer field-collected samples	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower	Section 4.2.10.4.3 TO-15 Section 10.7.5	Operational
Laboratory Control Sample (LCS)	Canister spiked with known amount of target analyte at approximately the lower third of the calibration curve Recommended: One with every analysis batch of 20 or fewer field-collected samples	Each target VOC's recovery must be 70 to 130% of its nominal spiked amount	Section 4.2.10.5.2.5	Operational
Replicate Analysis	A single additional analysis of a field-collected canister Once with every analysis sequence (as prescribed in workplan)	Precision ≤ 25% RPD for target VOCs with concentrations ≥ 5x MDL	Section 4.2.10.5.2.5 TO-15 Section 11.1.1	Operational
Duplicate Sample	Field sample collected through the same inlet probe as the primary sample	Precision ≤ 25% RPD of primary sample for concentrations ≥ 5x MDL	Sections 4.2.4; 4.2.4.1	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
	10% of primary samples for sites performing duplicate sample collection (as prescribed in workplan)			
Collocated Sample	Field sample collected through a separate inlet probe as the primary sample 10% of primary samples for sites performing duplicate sample collection (as prescribed in workplan)	Precision ≤ 25% RPD of primary sample for concentrations ≥ 5x MDL	Sections 4.2.4 and 4.2.4.1	Operational
Laboratory Readiness and Proficiency				
Stock Standard Gases	Purchased stock standard gases for each target VOC	Certified and accompanied by certificate of analysis Recertified or replaced annually unless a longer expiration is specified by the supplier	Section 4.2.10.3.1	Critical
Method Detection Limit	Determined initially and minimally annually thereafter and when method changes alter instrument sensitivity	MDL determined via 4.1 must be: Acrolein ≤ 0.09 µg/m^3 Benzene ≤ 0.13 µg/m^3 1,3-Butadiene ≤ 0.10 µg/m^3 Carbon Tetrachloride ≤ 0.017 µg/m^3 Chloroform ≤ 0.50 µg/m^3 Tetrachloroethylene ≤ 0.17 µg/m^3 Trichloroethylene ≤ 0.20 µg/m^3 Vinyl Chloride ≤ 0.11 µg/m^3 These MDL MQOs current as of October 2015. Refer to current workplan template for up-to-date MQOs.	Sections 4.1 and 4.2.7	MQO

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Proficiency Testing	Blind sample submitted to each laboratory to evaluate laboratory bias Two per calendar year[1]	Each target compound within ± 25% of the assigned target value Failure of one PT must prompt corrective action. Failure of two consecutive PTs (for a specific core analyte) must prompt qualification of the analyte in field collected samples until return to conformance.	Section 2.1.4.1	Operational and MQO
Canister and Sampling Unit Testing and Maintenance				
Canister Leak Test	Testing of the leak tightness of each canister in the agency fleet Annually, may be performed simultaneously with canister zero air check	Leak rate must be ≤ 0.1 psi/day	Section 4.2.6.1.1.1	Operational
Canister Zero Check	Verification that a canister does not contribute to positive bias over an approximate 30-day period Strongly Recommended: Each canister in the agency fleet once annually (or as defined by agency policy) or after major maintenance such as replacement of valve	All Tier I core target compounds must be < 0.2 ppb or < 3x MDL, whichever is lower	Section 4.2.6.1.1.1 TO-15 Section 8.4.3	Operational
Canister Known Standard Gas Check	Verification that a canister does not contribute to bias over an approximate 30-day period Strongly Recommended: Each canister in the agency fleet once annually (or as defined by agency policy) or after major maintenance such as replacement of valve	All Tier I core target compounds must be within ± 30% of nominal	Section 4.2.6.1.1.2	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sampling Unit Non-biasing Certification	Verification that the sampling unit does not contribute to bias Prior to field deployment and annually thereafter, or when flow path components are repaired or replaced Sampling units must be subject to a Zero Check and Known Standard Challenge	Zero Check – All Tier I core target analytes < 0.2 ppb or < 3x MDL, whichever is lower Known Standard Challenge – All Tier I core target analytes within ±15% of the reference sample	Section 4.2.5.5	Operational
Sampling Unit Flow Calibration	Calibration of sampling unit flow controller Initially and when calibration checks demonstrate flows are out of tolerance, or when components affecting flow are adjusted or replaced	Flow set to match the certified flow primary or transfer standard	Table 3.3-1 TO-15 Section 8.3.5	Practical
Sampling Unit Flow Calibration Check or Audit	Verification of sampling unit flow rate Minimally quarterly, monthly recommended	Flow within ±10% of certified primary or transfer standard flow and design flow	Table 3.3-1	Practical
Site Specifications and Maintenance				
Sampling Unit Siting	Verify conformance to requirements Annually	270° unobstructed probe inlet Inlet 2-15 meters above-ground level ≥ 10 meters from drip line of nearest tree Collocated sampling inlets spaced within 4 meters of primary sampling unit inlet	Section 2.4	Operational
Sample Probe and Inlet	Sample probe and inlet materials composition Annually	Chromatographic grade stainless steel or borosilicate glass	Section 4.2.3.2	Operational
Sample Inlet Filter	Particulate filter maintenance Minimally annually	Clean or replace the 2-µm sintered stainless steel filter	Section 4.2.3.3 TO-15 Section 7.1.1.5	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sampling Inlet and Inlet Line Cleaning	Sample inlet and inlet line cleaning or replacement Minimally annually - More often in areas with high airborne particulate levels	Cleaned with distilled water or replaced	Section 4.2.3.1	Operational
Data Reporting				
AQS Reporting Units	Units must be as specified with each submission to AQS	ppbv	Section 3.3.1.3.15	Critical
Data Completeness	Valid samples compared to scheduled samples Annually	≥ 85% of scheduled samples	Section 3.2	MQO
Data Reporting to AQS	Reporting of all results a given calendar quarter Quarterly, within 180 days of end of calendar quarter	All field-collected sample concentrations reported including data less than MDL. Field QC sample and laboratory replicates must also be reported (as required by workplan).	Section 3.3.1.3.15	Operational

Table 5-2: Carbonyl Sampling Validation Template

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Readiness Checks and Collection Activities				
Collection Media	All field-collected samples and matrix quality control samples	Cartridge containing silica gel solid sorbent coated with DNPH	Section 4.3.5 TO-11A Section 8.2	Critical
Media Handling	All field-collected samples and all quality control samples	Sample retrieval as soon as possible, not to exceed 72 hours post-sampling. Retrieved sample shipped and stored at ≤ 4°C, protected from light until extraction. Damaged cartridges (water damage or cracked) must be voided.	Sections 4.3.5.2, 4.3.5.3, and 4.3.8.1.2 TO-11A Sections 6.5 and 10.12	Critical
Cartridge Lot Blank Check	Analysis of a minimum of 3 cartridges or 1% of the total lot, whichever is greater, for each new lot	Formaldehyde < 0.15 µg/cartridge, Acetaldehyde < 0.10 µg/cartridge, Acetone < 0.30 µg/cartridge, all others < 0.10 µg/cartridge	Section 4.3.5.1 and Table 4.3-4 TO-11A Section 9.2.5.17	Critical
Sampling Frequency	One sample every six days according to the EPA National Monitoring Schedule	Sample must be valid or a make-up sample should be scheduled (refer to Section 2.1.2.1)	Section 4.3.8.1.3	Critical and MQO
Sampling Period	All field-collected samples	1380-1500 minutes (24 ± 1 hr) starting and ending at midnight	Section 4.3.8.1.3	Critical and MQO

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sampling Unit Clock/Timer Check	Verified with each sample collection event	Clock/timer accurate to ±5 minute of reference for digital timers and ±15 minutes for mechanical timers, set to local standard time Sample collection period verified to be midnight to midnight	Table 3.3-1	Operational
Sampling Unit Leak Check	Pressurization or evacuation of internal sampler flow paths to demonstrate as leak-free Prior to each sample collection	Must show no indicated flow	Section 4.3.8.1.1	Operational
Pre-Sample Collection Purge	Each sampling event	Minimum of ten air changes just prior to sample collection	Section 4.3.7.2	Practical
Sample Receipt				
Chain-of-custody	All field-collected samples	Each cartridge must be uniquely identified and accompanied by a valid and legible COC with complete sample documentation	Section 3.3.1.3.7	Critical
Sample Holding Time	All field-collected samples, laboratory QC samples, and standards	Extraction: 14 days from sample collection (cartridge storage ≤ 4 °C) Analysis: 30 days from extraction (extract storage ≤ 4 °C)	Section 4.3.9.3 TO-11A Sections 11.1.2 and 11.2.5	Operational
Sample Receipt Temperature Check	All field-collected samples upon receipt at the laboratory	Must be ≤ 4°C	Section 4.3.8.1.2 TO-11A Section 10.12	Operational
HPLC Analysis				

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
HPLC Initial Multi-Point Calibration (ICAL)	Initially, following failed CCV, or when changes to the instrument affect calibration response Injection of a minimum of 5 points covering approximately 0.01 to 3.0 µg/mL	Correlation coefficient (r) ≥ 0.999; relative error for each level against calibration curve ≤ 20%. Absolute value of intercept divided by slope must not exceed MDL_{sp} (MDLs determined by Section 4.1.3.1) or $s \cdot K$ (MDLs determined by Section 4.1.3.2)	Section 4.3.9.5.2 TO-11A Section 11.4.3	Critical
Secondary Source Calibration Verification (SSCV)	Secondary source standard prepared at the mid-range of the calibration curve, analyzed immediately after each ICAL	85 to 115% recovery	Section 4.3.9.5.3 TO-11A Section 11.4.4	Critical
Continuing Calibration Verification (CCV)	Prior to sample analysis on days when an ICAL is not performed and minimally every 12 hours of analysis; recommended following analysis of every 10 field-collected samples and at the conclusion of each analytical sequence	85 to 115% recovery	Section 4.3.9.5.4 TO-11A Section 11.4.5	Critical
Retention Time (RT)	Every injection	Each target carbonyl's RT within ± 3*s* or ± 2% of its mean ICAL RT	Section 4.3.9.5.2	Critical
DNPH Chromatography Evaluation	All cartridges	DNPH peak must be present	Section 4.3.9.5.7	Critical
DNPH Chromatography Evaluation	For all field-collected cartridges	DNPH must be ≥ 50% of the DNPH area in the laboratory QC samples	Section 4.3.9.5.7	Critical
Solvent Blank (SB)	Prior to ICAL and daily beginning CCV	All target compounds < MDL_{sp} (refer to Section 4.1.3.1) or $s \cdot K$ (refer to Section 4.1.3.2)	Section 4.3.9.5.2	Operational
Extraction Solvent Method Blank (ESMB)	An aliquot of extraction solvent delivered to a volumetric flask. One with each extraction batch of 20 or fewer field-collected samples.	Each target carbonyl's concentration < MDLsp (refer to Section 4.1.3.1) or s·K (refer to Section 4.1.3.2)	Section 4.3.9.4.1	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Method Blank (MB)	Unexposed DNPH cartridge extracted as a sample One with every extraction batch of 20 or fewer field-collected samples	Formaldehyde < 0.15 µg/cartridge, Acetaldehyde < 0.10 µg/cartridge, Acetone < 0.30 µg/cartridge, all others < 0.10 µg/cartridge	Section 4.3.9.4.1	Operational
Laboratory Control Sample (LCS)	DNPH cartridge spiked with known amount of target analyte at approximately the lower third of the calibration curve, minimally quarterly, one recommended with every extraction batch of 20 or fewer field-collected samples	Formaldehyde recovery 80-120% of nominal spike All others recovery 70-130% of nominal spike	Section 4.3.9.4.1	Operational
Laboratory Control Sample Duplicate (LCSD)	Duplicate LCS to evaluate precision through extraction and analysis, minimally quarterly, one recommended with every extraction batch of 20 or fewer samples	Formaldehyde recovery 80-120% of nominal spike All others recovery 70-130% of nominal spike Precision ≤ 20% RPD of LCS	Section 4.3.9.4.1	Operational
Replicate Analysis	A single additional analysis of a field-collected sample extract Once with every analysis sequence of 20 or fewer samples	Precision ≤ 10% RPD for concentrations ≥ 0.5 µg/cartridge	Section 4.3.9.5.5 TO-11A Section 13.2.3	Operational
Field Blank	Minimally monthly, sample cartridge installed in primary sampling position and exposed to field conditions for minimally 5 minutes	Formaldehyde < 0.30 µg/cartridge, Acetaldehyde < 0.40 µg/cartridge, Acetone < 0.75 µg/cartridge, Sum of all other target compounds < 7.0 µg/cartridge	Section 4.3.8.2.1 TO-11A Section 13.3.1	Operational
Collocated Sample Collection	Field sample collected through a separate inlet probe from the primary sample 10% of primary samples for sites performing collocated sample collection (as prescribed in workplan)	Precision ≤ 20% RPD of primary sample for concentrations ≥ 0.5 µg/cartridge	Section 4.3.8.2.3 TO-11A Section 13.4.1	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Duplicate Sample Collection	Field sample collected through the same inlet probe as the primary sample 10% of primary samples for sites performing collocated sample collection (as prescribed in workplan)	Precision ≤ 20% RPD of primary sample for concentrations ≥ 0.5 µg/cartridge	Section 4.3.8.2.4 TO-11A Section 13.4.1	Operational
Laboratory Readiness and Proficiency				
Stock Standard Solutions	Purchased stock materials for each target carbonyl All standards	Certified and accompanied by certificate of analysis	Section 4.3.9.2.2	Critical
Working Standard Solutions	Storage of all working standards	Stored at ≤ 4°C, protected from light	Section 4.3.9.2.4 TO-11A Section 9.4.3	Critical
Method Detection Limit	Determined initially and minimally annually thereafter, and when method changes alter instrument sensitivity	MDL must be: Formaldehyde ≤ 0.08 µg/m^3 Acetaldehyde ≤ 0.45 µg/m^3 These MDL MQOs current as of October 2015. Refer to current workplan template for up-to-date MQOs.	Sections 4.1 and 4.3.6	MQO
Proficiency Testing	Blind sample submitted to each laboratory to evaluate laboratory bias Two per calendar year[1]	Each target compound within ± 25% of the assigned target value Failure of one PT must prompt corrective action. Failure of two consecutive PTs (for a specific core analyte) must prompt qualification of the analyte in field collected samples until return to conformance.	Section 2.1.4.1	Operational and MQO
Sampling Unit Testing and Maintenance				

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Sampler Flow Rate Calibration	Calibration of sampling unit flow controller Initially and following failure of flow verification checks	Flow set to match a certified flow transfer standard	Table 3.3-1 and 4.3.7.1.2	Critical
Ozone Scrubber Recharge	Recharge ozone scrubber with KI Minimally annually	Scrubber capacity sufficient to be effective (ozone removal > 95%) for 12 months of 24-hour sampling every sixth day	Section 4.3.4.1 TO-11A Section 10.1	Critical
Sampling Unit Flow Calibration Check or Audit	Verification of sampling unit flow rate Minimally quarterly, monthly recommended	Flow within ± 10% of certified primary or transfer standard flow and design flow	Table 3.3-1	Critical
Sampling Unit Non-biasing Certification	Verification with humidified zero air or nitrogen that the sampling unit does not contribute to positive bias Prior to field deployment and annually thereafter, or when flow path components are repaired or replaced	Difference between challenge and reference cartridge < 0.2 ppbv for each target carbonyl	Section 4.3.7.1.1	Operational
Site Specifications and Maintenance				
Sample Probe and Inlet	Sample probe and inlet materials composition Annually	Chromatographic grade stainless steel, PTFE Teflon, or borosilicate glass	Section 4.3.7.2	Critical
Sampling Unit Siting	Verify conformance to requirements Annually	270° unobstructed probe inlet Inlet 2-15 meters above-ground level ≥ 10 meters from drip line of nearest tree Collocated sampling inlets spaced no more than 4 meters from primary sampling unit inlet	Section 2.4	Operational
Sample Inlet Filter	Particulate filter maintenance Minimally annually, if equipped	Clean or replace the inline particulate filter (if equipped)	Section 4.3.7.3	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sampling Inlet and Inlet Line Cleaning	Sample inlet and inlet line cleaning or replacement Minimally annually - More often in areas with high airborne particulate levels	Cleaned with distilled water or replaced	Section 4.3.7.3	Operational
Data Reporting				
AQS Reporting Units	Units must be as specified with each quarterly submission to AQS	mass/volume (ng/m^3 or $\mu g/m^3$)	Section 3.3.1.3.15	Critical
Data Completeness	Valid samples compared to scheduled samples Annually	≥ 85% of scheduled samples	Section 3.2	MQO
Data Reporting to AQS	Reporting of all results a given calendar quarter Quarterly, within 180 days of end of calendar quarter	All field-collected sample concentrations reported including data less than MDL. All data must be in standard conditions. Field QC sample and laboratory replicates must also be reported.	Section 3.3.1.3.15	Operational

Table 5-3: PM_{10} Metals Sampling Validation Template

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Readiness Checks and Collection Activities				
Collection Media	All field-collected samples and matrix quality control samples	Low volume collection: 47-mm Teflon filters with polypropylene support ring and 2-µm pore size	Section 4.4.9.3 40CFR Part 50 Appendix Q Section 6.2.3	Critical
		High volume collection: 8”x10” quartz fiber filter (QFF) filters with 2 µm pore size	Section 4.4.10.3 IO3.1 Section 4.1.6	Critical
Media Inspection	Filters inspected for pinholes, tears, or other imperfections unsuitable for sample collection All filters	Filters with defects must be discarded	Section 4.4.3.3 IO3.1 Section 4.2 IO2.3 Section 7.2	Critical
Sampling Frequency	One sample every six days according to the EPA National Monitoring Schedule	Sample must be valid or a make-up sample should be scheduled (refer to Section 2.1.2.1)	Sections 4.4.9.4.1 and 4.4.10.4.1	Critical and MQO
Sampling Period	All field-collected samples	1380-1500 minutes (24 ± 1 hr) starting and ending at midnight	Sections 4.4.9.4.1 and 4.4.10.4.1	Critical and MQO
Sampling Unit Clock/Timer Check	Verified with each sample collection event	Clock/timer accurate to ±5 minute of reference for digital timers and within ±15 minutes for mechanical timers, set to local standard time Sample collection period verified to be midnight to midnight	Section 4.4.10.4.1 and DEP 23-03, Section 12.1 caveat.	Operational
Pre-Sample Collection Warm-up	Only for high volume sampling units without computer controlled flow	Minimum of five minutes (ten minutes recommended) after filter installation but before sample collection	Section 4.4.10.4 IO2.1 Section 7.4.2.9	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Post-Sample Collection Warm-up	Only for high volume sampling units without computer controlled flow	Minimum of five minutes (ten minutes recommended) before filter retrieval	Section 4.4.10.4 IO2.1 Section 7.4.2.9	Operational
Media Handling	All field-collected samples and quality control samples	Low volume: Plastic or Teflon coated forceps or powder-free gloves	Section 4.4.3.2 IO3.1 Section 5.2.1.1 IO2.3 Section 7.2	Practical
		High volume: Plastic or Teflon coated forceps or powder-free gloves	Section 4.4.3.2 IO3.1 Section 5.2.1.1 IO2.3 Section 7.2	Practical
Lot Background Determination	For each new lot of media: • As part of the MDL process when determining MDLs via Section 4.1.3.1 or • Five separate filters digested and analyzed	Low volume: No acceptance criterion Lot blank subtraction is not permitted	Section 4.4.9.3.1	Practical
		High volume: No acceptance criterion Lot blank subtraction is not permitted	Section 4.4.10.3.1 IO3.1 Table 9	Practical
Sampling Unit Leak Check	Verification that sampling train is leak tight Every five sample collection events Verification that sampling train is leak tight Every five sample collection events	Low volume: Leak rate of ≤ 25 mmHg over 30 seconds or 80 mL/min	Section 4.4.9.4 EPA QA Handbook Vol II Appendix D	Practical
		High volume: absence of a whistle	Section 4.4.10.4 IO2.1 Section 7.3.1.6	Practical
Sample Receipt				
Chain-of-custody	All field-collected samples	Each filter must be uniquely identified and accompanied by a valid and legible COC with complete sample documentation	Section 3.3.1.3.7	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sample Holding Time	All field-collected samples and laboratory QC samples	Digestion: within 180 days from sample collection or preparation Analysis: within 180 days from sample collection	Section 4.4.1 IO3.1 Section 6.1.2	Operational
Acid Digestion and ICP/MS Analysis				
ICP/MS Tuning	Analysis of tuning solution containing low (e.g. Li), and medium (e.g. Mg), and high (e.g. Pb) mass elements Each day of analysis during or immediately following warm up	• Minimum resolution of 0.75 amu at 5% peak height • Mass calibration within 0.1 amu of unit mass • Five replicates of tuning solution with %RSD ≤ 5% • Manufacturer specifications may be followed	Section 4.4.11.6 IO3.5 Section 10.1.1	Critical
Initial Calibration Blank (ICB)	Analysis of undigested reagent blank Each day of analysis prior to initial calibration (ICAL) and immediately following the initial calibration verification (ICV)	ICB following ICV: each target element's concentration < MDLsp (refer to Section 4.1.3.1) or s·K (refer to Section 4.1.3.2)	Sections 4.4.11.7.1 and 4.4.11.7.3 IO3.5 Section 11.3.3	Critical
ICP/MS Initial Multi-Point Calibration (ICAL)	Minimum of three standard concentration levels plus ICB covering approximately 0.1 to 250 µg/L Each day of analysis, following failed CCV, or retuning of the MS	Linear regression correlation coefficient (r) ≥ 0.995 Replicate integrations RSD ≤ 10%	Section 4.4.11.7.1	Critical
Initial Calibration Verification (ICV)	Analysis of second source calibration verification Each day of analysis immediately following ICAL	Within ± 10% of nominal	Section 4.4.11.7.2 IO3.5 Section 11.3.2	Critical
Continuing Calibration Verification (CCV)	Each day of analysis immediately following the ICS, following every 10 sample injections, and at the conclusion of each analytical sequence	90 to 110% recovery	Section 4.4.11.7.5 IO3.5 Section 11.3.6	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Continuing Calibration Blank (CCB)	Each day of analysis immediately after each CCV	all target elements < MDL_{sp} (refer to Section 4.1.3.1) or $s \cdot K$ (refer to Section 4.1.3.2)	Section 4.4.11.7.6 IO3.5 Section 11.3.7	Critical
Internal Standards (IS)	Non-target elements added to each analyzed solution at the same concentration	60 to 125% recovery	Section 4.4.11.4 IO3.5 Section 11.5	Critical
Microwave Calibration	Standardization of microwave power output Output calibration not to exceed six months; monthly recommended	Level of output should differ by no more than 10% across batches	Section 4.4.9.5.2.2	Operational
Hot Block Temperature Verification	Reagent water blank with thermometer to ensure digestion temperature consistent for all wells Initially and annually thereafter for each well in the hot block digester	Within ± 5°C of desired temperature	Section 4.4.9.5.2.1	Operational
Hot Block Temperature Check	Reagent water blank with thermometer to monitor digestion temperature Each digestion batch	Within ± 5°C of desired temperature	Section 4.4.9.5.2.1	Operational
Interference Check Standard (ICS)	Each day of analysis following the second ICB and every 8 hours of analysis thereafter. Once daily for ICP-MS with collision reaction cells Analysis of two solutions which contain interferants (ICS A) and target elements with known interferences (ICS B)	ICS A: all target elements < 3x MDLsp (refer to Section 4.1.3.1) or 3x s·K (refer to Section 4.1.3.2) – may be subtracted for background indicated on certificate of analysis ICS B: 80 to 120% recovery	Section 4.4.11.7.4 IO3.5 Section 11.3.5	Operational
Reagent Blank (RB)	Digested reagent blank Once with each extraction batch of 20 or fewer samples	Low volume: All target elements < MDLsp (refer to Section 4.1.3.1) or s·K (refer to Section 4.1.3.2)	Sections 4.4.9.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
Reagent Blank (RB)	Digested reagent blank Once with each extraction batch of 20 or fewer samples	High volume: All target elements < MDLsp (refer to Section 4.1.3.1) or s·K (refer to Section 4.1.3.2)	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Method Blank (MB)	Low volume: Digested blank filter Once with each extraction batch of 20 or fewer samples High volume: Digested blank filter Once with each extraction batch of 20 or fewer samples	Low volume: All target elements < MDL	Sections 4.4.9.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
		High volume: All target elements < MDL	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3 IO3.5 Section 11.3.8	Operational
Reagent Blank Spike (RBS)	Spiked digested reagent blank (no filter) Once with each digestion batch of 20 or fewer field-collected samples	Low volume: Recovery within 80-120% of nominal for all target elements	Sections 4.4.9.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
		High volume: Recovery within 80-120% of nominal for all target elements	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
Laboratory Control Sample (LCS)	Low volume: Digested spiked filter Once with each extraction batch of 20 or fewer field-collected samples High volume: Digested spiked filter strip Once with each extraction batch of 20 or fewer field-collected samples	Low volume: Recovery within 80-120% of nominal for all target elements	Sections 4.4.9.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
		High volume: Recovery within 80-120% of nominal for all target elements	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3 IO3.5 Section 11.3.9	Operational
Laboratory Control Sample Duplicate (LCSD)	Low volume: Duplicate digested spiked filter Once with each extraction batch of 20 or fewer field-collected samples High volume: Duplicate digested spiked filter strip Once with each extraction batch of 20 or fewer field-collected samples	Low volume: Recovery within 80-120% of nominal for all target elements and precision ≤ 20% RPD of LCS	Sections 4.4.9.5.1, 4.4.11.7.7, and Table 4.4-3	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Laboratory Control Sample Duplicate (LCSD)	Low volume: Duplicate digested spiked filter Once with each extraction batch of 20 or fewer field-collected samples High volume: Duplicate digested spiked filter strip Once with each extraction batch of 20 or fewer field-collected samples	High volume: Recovery within 80-120% of nominal for all target elements and precision ≤ 20% RPD of LCS – Not required if batch contains MSD	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3	Operational
Duplicate Digested Filter Strip	High volume only Digested duplicate field-collected filter strip Once with each extraction batch of 20 or fewer field-collected samples	Precision ≤ 20% RPD for elements ≥ 5x MDL	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3 IO3.5 Section 11.3.11	Operational
Matrix Spike (MS)	High volume only Digested spiked field-collected filter strip Once with each extraction batch of 20 or fewer field-collected samples	Recovery within 80-120% of the nominal spiked amount for all target elements – 75-125% for Sb	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3 IO3.5 Section 11.3.10	Operational
Matrix Spike Duplicate (MSD)	High volume only Duplicate digested spiked field-collected filter strip Once with each extraction batch of 20 or fewer field-collected samples	Recovery within 80-120% of the nominal spiked amount for all target elements - 75-125% for Sb and precision ≤ 20% RPD of MS	Sections 4.4.10.5.1, 4.4.11.7.7, and Table 4.4-3 IO3.5 Section 11.3.11	Operational
Serial Dilution	Five-fold dilution of a field-collected sample digestate Once with every analysis sequence of 20 or fewer field-collected samples	Recovery of 90-110% of undiluted sample for elements ≥ 25x MDL	Section 4.4.11.7.8 IO3.5 Section 11.3.12	Operational
Replicate Analysis	A single additional analysis of a field-collected sample digestate Once with every analysis sequence of 20 or fewer field-collected samples	Precision ≤ 10% RPD for concentrations ≥ 5x MDL	Section 4.4.11.7.9	Operational
Field Blank	Sample filter installed in primary sampling unit for minimally 5 minutes Minimally monthly for primary sampling units, as 18% (approximately 1 out of 5) of collocated samples	All target elements < MDL	Section 4.4.5	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Collocated Sample Collection	Field sample collected with a separate sampling unit between 2 and 4 meters from primary sampling unit 10% of primary samples for sites performing collocated sample collection (as prescribed in workplan)	Precision ≤ 20% RPD of primary sample for concentrations ≥ 5x MDL	Section 4.4.4.1	Operational
ICP/MS Warm Up	Analysis of tuning solution containing low (e.g. Li), and medium (e.g. Mg), and high (e.g. Pb) mass elements Each day of analysis during or immediately following warm up	Minimum of 30 minutes (or according to manufacturer specifications) prior to performing initial calibration	Section 4.4.11.6 IO3.5 Section 10.1.1	Practical
Laboratory Readiness and Proficiency				
Stock Standard Solutions	Purchased stock materials for each target element All standards	Certified and accompanied by certificate of analysis	Section 4.4.7	Critical
Method Detection Limit	Determined initially and minimally annually thereafter, with each new lot of filter media, and when method changes alter instrument sensitivity	MDL must be: Arsenic ≤ 0.00023 µg/m^3 Beryllium ≤ 0.00042 µg/m^3 Cadmium ≤ 0.00056 µg/m^3 Lead ≤ 0.15 µg/m^3 Manganese ≤ 0.005 µg/m^3 Nickel ≤ 0.0021 µg/m^3 These MDL MQOs current as of October 2015. Refer to current workplan template for up-to-date MQOs.	Sections 4.1 and 4.4.8	MQO

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Proficiency Testing	Blind sample submitted to each laboratory to evaluate laboratory bias Two per calendar year[1]	Each target compound element within ± 25% of the assigned target value Failure of one PT must prompt corrective action. Failure of two consecutive PTs (for a specific core analyte) must prompt qualification of the analyte in field collected samples until return to conformance.	Section 2.1.4.1	Operational and MQO
Working Standard Solutions	Storage of all working standards	Stored in Teflon or suitable plastic bottles	Section 4.4.7 IO3.5 Section 7.2.4	Practical
Sampling Unit Testing and Maintenance				
Field Sampler Flow Rate Calibration	Calibration of sampling unit flow controller Initially and when flow verification checks fail criteria	Flow set to match a certified transfer flow standard	Table 3.3-1 and 4.4.9.2 and 4.4.10.2	Critical
Sampling Unit Flow Calibration Check	Verification of sampling unit flow rate Minimally quarterly, monthly recommended	Low volume: Within ± 4% of certified transfer standard flow and within ± 5% of design flow	Table 3.3-1 and 40 CFR 58 Appendix A Section 3.3.3 – EPA QA Guidance Document 2.12	Operational
		High volume: Within ± 7% of certified transfer standard flow and within ± 10% of design flow	Table 3.3-1 and 40 CFR 58 Appendix A Section 3.3.3 EPA QA Handbook Section 2.11.7	Operational
Site Specifications and Maintenance				

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Sampling Unit Siting	Verify conformance to requirements Annually	270° unobstructed probe inlet Inlet 2-15 meters above-ground level ≥ 10 meters from drip line of nearest tree Low volume collocated sampling inlets spaced 1-4 meters from primary sampling unit inlet High volume collocated sampling inlets spaced 2-4 meters from primary sampling unit inlet	Section 2.4 40 CFR Part 58 Appendix E	Operational
Data Reporting				
AQS Reporting Units	Units must be as specified With each quarterly submission to AQS	mass/volume (ng/m^3 or $\mu g/m^3$)	Section 3.3.1.3.15	Critical
Data Completeness	Valid samples compared to scheduled samples Annually	≥ 85% of scheduled samples	Section 3.2	MQO
Data Reporting to AQS	Reporting of all results a given calendar quarter Quarterly, within 180 days of end of calendar quarter	All field-collected sample concentrations reported including data less than MDL. All data must be in local conditions and may additionally be reported in standard conditions Field QC sample and laboratory replicates must also be reported (as prescribed in workplan)	Section 3.3.1.3.15	Operational

Table 5-4: PAH Sampling Validation Template

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Readiness Checks and Collection Activities				
Collection Media	All field-collected samples and matrix quality control samples	Glass cartridge containing two PUF plugs totaling 3" in height, 15 g styrene-divinyl polymer resin, 104-mm quartz fiber filter with 2-µm pore size	Section 4.5.3 TO-13A Section 9.1	Critical
Cartridge Lot Blank Check	Analysis of a cartridge from each lot to demonstrate appropriate media cleanliness Minimum of 1 cartridge for each new lot	All target PAHs ≤ 10 ng/cartridge	Section 4.5.3 TO-13A Section 14.2.1	Critical
Sample Flow Rate	All field-collected samples	0.140 to 0.245 m^3/minute for total collection volume of 200 to 350 m^3 (at standard conditions of P = 1 atm and T = 25°C)	Section 4.5.1	Critical
Sampling Frequency	One sample every six days according to the EPA National Monitoring Schedule	Sample must be valid or a make-up sample scheduled (refer to Section 2.1.2.1)	Section 4.5.4.1	Critical and MQO
Sampling Period	All field-collected samples	1380-1500 minutes (24 ± 1 hr) starting and ending at midnight	Section 4.5.4.1	Critical and MQO

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Media Handling	All field-collected samples and laboratory quality control samples	Sample retrieval as soon as possible recommended, preferably within 24 hours, not to exceed 72 hours post-sampling Retrieved sample shipped and stored at ≤ 4°C, protected from light until extraction Damaged cartridges (leaking resin) must be voided.	Section 4.5.4.1 TO-13A Section 11.3.4.10	Operational
Sampling Unit Clock/Timer Check	Verified with each sample collection event	Clock/timer accurate to ± 5 minutes of reference for digital timers, within ± 15 minutes for mechanical timers, set to local standard time Sample collection period verified to be midnight to midnight	Section 4.5.4.1a and DEP 23-06, Section 12.1 caveat.	Operational
Pre-Sample Collection Warm-up	Only for sampling units without computer controlled flow	Minimum of five minutes (ten minutes are recommended) after sampling head installation but before sample collection	Section 4.5.4 TO-13A Section 11.3.3.3	Practical
Post-Sample Collection Warm-up	Only for sampling units without computer controlled flow	Minimum of five minutes (ten minutes are recommended) before sampling head retrieval	Section 4.5.4.1	Practical
Sample Receipt				

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Chain-of-custody	All field-collected samples including field QC samples	Each cartridge/QFF must be uniquely identified and accompanied by a valid and legible COC with complete sample documentation	Section 3.3.1.3.7	Critical
Sample Holding Time	All field-collected samples and laboratory QC samples	Extraction: 14 days from sample collection (cartridge storage ≤ 4 °C) Analysis: 40 days from extraction (extract storage ≤ 4 °C)	Section 4.5.5.2 TO-13A Section 11.3.4.10	Operational
Sample Receipt Temperature Check	Verification of proper shipping temperature for all field-collected samples upon receipt at the laboratory	Must be ≤ 4°C unless delivery time from field site is ≤ 4 hours	Section 4.5.4.1	Operational
Extraction and GC/MS Analysis				
DFTPP Tuning	5-50 ng injected to tune MS prior to ICAL and every 12 hours of analysis thereafter	For GC/MS operated in full scan or SIM/full scan must meet criteria listed in Table 4.5-2 GC/MS operated in SIM mode must tune to meet criteria in Section 4.5.5.5.2	Section 4.5.5.5.2 TO-13A Section 13.3.3	Critical
Solvent Blank (SB)	Aliquot of solvent analyzed to demonstrate the instrument is sufficiently clean to begin analysis Prior to ICAL and daily beginning CCV	All target, surrogate, and IS compounds not qualitatively detected	Section 4.5.5.5.3 TO-13A Section 14.1.2	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
GC/MS Initial Multi-Point Calibration (ICAL)	Minimum of 5 points covering approximately 0.1 to 2.0 µg/mL Initially, following failed CCV, following failed DFTPP tune check, or when changes to the instrument affect calibration response	Average RRF ≤ 30% and each calibration level must be within ± 30% of nominal For linear regression (with either a linear or quadratic fit) correlation coefficient (r) ≥ 0.995 and each calibration level within ± 30% of nominal	Section 4.5.5.5.3 TO-13A Section 13.3.4.5	Critical
Secondary Source Calibration Verification (SSCV)	Secondary source standard prepared at the mid-range of the calibration curve, analyzed immediately after each ICAL	70 to 130% recovery of nominal or RRF within ±30% of ICAL average RRF	Section 4.5.5.5.4	Critical
Continuing Calibration Verification (CCV)	Mid-range standard analyzed prior to sample analysis on days when an ICAL is not performed, every 12 hours of analysis following the DFTPP check, and at the conclusion of each analytical sequence	70 to 130% recovery of nominal or RRF within ±30% of ICAL average RRF	Section 4.5.5.5.5 TO-13A Section 13.3.5.5	Critical
Internal Standards	Deuterated homologues of target PAHs added to every injection except beginning SB	50-200% of the area response of the mid-level ICAL standard from ICAL	Section 4.5.5.5.8 TO-13A Section 13.4.7	Critical
Retention Time (RT)	Every injection	Target and surrogate compound RT within ± 0.06 relative retention time units (RRT) of mean ICAL RRT Internal standard RT within ± 0.33 minute of the most recent CCV	Section 4.5.5.5.3 TO-13A Sections 13.4.6.3 and 13.3.4.5	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Compound Identification	Qualitative identification of each target PAH in each standard, blank, QC sample, and field-collected sample (including field QC samples)	Signal-to-noise ≥ 3:1 RT within prescribed window At least one qualifier ion abundance within 15% of ICAL mean Peak apexes co-maximized (within one scan for quadrupole MS) for quantitation and qualifier ions	Section 4.5.5.5.7 TO-13A Section 13.4.3	Critical
Method Blank (MB)	Unexposed PUF/resin cartridge and QFF extracted as a sample One with every extraction batch of 20 or fewer field-collected samples	All target PAHs < 2x MDL	Section 4.5.5.5.6 TO-13A Section 13.3.6	Operational
Laboratory Control Sample (LCS)	PUF/resin cartridge and QFF spiked with known amount of target analyte at approximately the lower third of the calibration curve Minimally quarterly; recommended one with every extraction batch of 20 or fewer field-collected samples	All target PAHs 60-120% recovery of nominal spike	Section 4.5.5.5.6 TO-13A Section 13.3.7	Operational
Laboratory Control Sample Duplicate (LCSD)	Duplicate LCS to evaluate precision through extraction and analysis Minimally quarterly, recommended one with every extraction batch of 20 or fewer field-collected samples	All target PAHs 60-120% recovery of nominal spike Precision ≤ 20% RPD of LCS	Section 4.5.5.5.6	Operational
Field Surrogate Compounds	Deuterated homologues of target PAHs added to each cartridge before field deployment, also added to cartridges for laboratory and field QC	Recovery 60-120%	Sections 4.5.3.3 and 4.5.5.5.9 TO-13A Section 13.4.6.3	Operational
Extraction Surrogate Compounds	Deuterated homologues of target PAHs added to each extracted field sample, field QC sample, and laboratory QC sample	Recovery 60-120%	Sections 4.5.5.1.4.2 and 4.5.5.5.9 TO-13A Section 13.4.6.3	Operational
Replicate Analysis	A single additional analysis of a field-collected sample extract Once with every analysis sequence of 20 or fewer field-collected samples (as required by workplan)	Precision ≤ 10% RPD for concentrations ≥ 0.5 µg/mL	Section 4.5.5.5.6	Operational

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Field Blank	Blank sample cartridge installed in sampling unit for minimally five minutes Minimally monthly	All target PAHs ≤ 5x MDL	Section 4.5.4.2 TO-13A Section 11.3.4.9	Operational
Collocated Sample Collection	Field sample collected with a separate sampling unit between 2 and 4 meters from primary sampling unit 10% of primary samples for sites performing collocated sample collection (as required by workplan)	Precision ≤ 20% RPD of primary sample for concentrations ≥ 0.5 µg/mL	Section 4.5.4.3	Operational
Laboratory Readiness and Proficiency				
Stock Standard Materials	Purchased stock materials for each target PAH All standards	Certified and accompanied by certificate of analysis	Section 4.5.5.1.2	Critical
Working Standard Solutions	Storage of all working standards	Stored at ≤ -10°C, protected from light	Section 4.5.5.2	Critical
Method Detection Limit	Determined initially and minimally annually thereafter and when method changes alter instrument sensitivity	MDL must be: Benzo(a)pyrene ≤ 0.00091 µg/m^3 Naphthalene ≤ 0.029 µg/m^3 These MDL MQOs current as of October 2015. Refer to current workplan template for up-to-date MQOs.	Sections 4.1 and 4.5.5.4	MQO
Proficiency Testing	Blind sample submitted to each laboratory to evaluate laboratory bias Two per calendar year[1]	Each target compound within ± 25% of the assigned target value Failure of one PT must prompt corrective action. Failure of two consecutive PTs (for a specific core analyte) must prompt qualification of the analyte in field collected	Section 2.1.4.1	Operational and MQO

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
		samples until return to conformance.		
Sampling Unit Testing and Maintenance				
Field Sampler Flow Rate Calibration	Calibration of sampling unit flow controller Initially, when flow verification checks fail criteria, or when instrument maintenance changes flow characteristics of the sampling unit	Flow set to match a certified flow transfer standard	Table 3.3-1 and 4.5.2.1	Critical
Sampling Unit Flow Calibration Check or Audit	Verification of sampling unit flow rate Minimally quarterly, monthly recommended	Flow within ± 10% of certified primary or transfer standard flow and design flow	Table 3.3-1	Critical
Site Specifications and Maintenance				
Sampling Unit Siting	Verify conformance to requirements Annually	270° unobstructed probe inlet Inlet 2-15 meters above-ground level ≥ 10 meters from drip line of nearest tree Collocated sampling inlets spaced 2-4 meters from primary sampling unit inlet	Section 2.4	Operational
Data Reporting				
AQS Reporting Units	Units must be as specified With each quarterly submission to AQS	mass/volume (ng/m^3 or $\mu g/m^3$)	Section 3.3.1.3.15	Critical

Parameter	Description and Required Frequency	Acceptance Criteria	TAD Reference	Category
Data Completeness	Valid samples compared to scheduled samples Annually	≥ 85% of scheduled samples	Section 3.2	MQO
Data Reporting to AQS	Reporting of all results a given calendar quarter Quarterly, within 180 days of end of calendar quarter	All field-collected sample concentrations reported including data less than MDL. All field-collected sample concentrations reported including data less than MDL. All data must be in standard conditions. Field QC sample and laboratory replicates must also be reported.	Section 3.3.1.3.15	Operational

5.7 Network Scale

Representativeness is defined as a measure of the degree to which data accurately and precisely represent a selected characteristic of a monitored system. Support in achieving representativeness is provided through adhering to the requirements provided in:

- 40 CFR Part 58, Appendix D (Network Design for State and Local Air Monitoring Stations [SLAMS], National Core Monitoring Stations [N-Core], and
- 40 CFR Part 58, Appendix E (Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring).

Each monitor operated is assigned a scale of representativeness based on the definitions of 40 CFR Part 58, Appendix D.

- ***Microscale -*** describes the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters (m).
- ***Middle Scale -*** describes the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 to 500 meters.
- ***Neighborhood Scale -*** describes concentrations within some extended area of the city that has relatively uniform land use with dimensions in the range of 500 to 4000 meters.
- ***Urban Scale -*** describes concentrations within an area of city-like dimensions, on the order of 4000 to 50,000 meters. This scale will usually require more than one site to represent air quality on an urban scale.
- ***Regional Scale -*** describes usually a rural area of reasonably homogeneous geography without large sources and extends from tens to hundreds of kilometers.

As described, the air toxics monitoring sites are established for Neighborhood Scale monitoring to reflect typical population exposures.

6.0 TRAINING REQUIREMENTS

Adequate education and training are essential to any monitoring program that strives for reliable and comparable data. Personnel within the PQAO will meet the educational requirements, accountability standards, and training requirements for their positions. All staff are required to take specific, mandatory governmental training courses, such as safety training, operation of government vehicles, and EEO courses, among others. Records on personnel qualifications and training may be maintained in several locations, dependent upon the applicability of the information. For example, staff may maintain copies of certificates received from classes or workshops, whereas the Local Program Administrators/Managers will keep records of personnel qualifications and in-house training.

Ambient air toxics monitoring training consists of a combination of required reading, active cross-training amongst staff, completion of EPA-lead training classes (when available), and attendance at Florida DEP and/or EPA workshops and conferences. Observations made during internal systems audits may result in the need for specific refresher training to be provided to PQAO staff. Completion of additional training – such as self-instructional air monitoring courses (e.g., online APTI) and EPA-provided webinars (e.g., AQS) – is encouraged for all air monitoring field and QA staff.

A large component of Florida's air toxics monitoring training program is centered around equipment and quality assurance cross-training, to build and ensure staff redundancy. Training occurs when back-up roles are needed to maintain coverage for a site or QA procedure. With that in mind, individuals within each program are assigned as "back-ups" for various roles in order to ensure redundancy in staff and to prevent downtime or significant data loss associated with absence or turnover.

The following describes the base-training (minimum) that is required for Florida's NATTS and Air Toxics Monitoring Program staff. For detailed training and qualifications, refer to the local air monitoring program and laboratory position-specific job training plans.

Air Monitoring Quality Assurance Staff - The foundation of the ambient air toxics monitoring program is an understanding of basic quality assurance and the overall ambient air toxics monitoring program goals. To achieve this understanding, the following activities are required:

- Reading and understanding the QAPP for the State of Florida NATTS and Air Toxics Monitoring Program. All Air Monitoring QA staff are required to read this QAPP and sign/date their training plans upon completion,
- Reading and understanding of the Technical Assistance Document (TAD) for NATTS, and
- Review and understanding of 40 CFR Part 58, Appendix A, C, D, and E.

Air Monitoring Field Technicians - The NATTS and Air Toxics monitoring program involves operation, maintenance, calibration, and troubleshooting of sampling equipment. Field technicians are trained on the procedures involved for proper installation of equipment, sampler operation, required QA/QC check procedures, preventative

maintenance, and troubleshooting. Proper implementation of this QAPP requires the following specific training regimen for all air monitoring field technicians:

- Reading and understanding the instrument-specific SOP(s) associated with the air toxics monitor(s) for which the trainee is responsible to operate and maintain. Staff will sign and date their training plans, upon completion.
- General and background knowledge of installation, operation, and maintenance of specific equipment. This is provided by reading and understanding the manufacturer's operating manuals and guides and is supplemented by vendor-offered formal training sessions, when available, and
- Applicable health and safety training pursuant to the local air monitoring program.

Laboratory QA Staff – The quality and integrity of the air toxics data is dependent upon skilled and knowledgeable managers within the laboratory. Therefore, the following qualifications are required:

- Reading and understanding the NATTS and Air Toxics QAPP Monitoring Program. All laboratory QA staff are required to read this QAPP and sign/date their training plans upon completion,
- Reading and understanding the laboratory quality manual, and
- Reading and understanding of the EPA Compendium Methods applicable to the analytical methods performed for the Florida NATTS and Air Toxics Monitoring Program.

Laboratory Analyst/Chemist – The laboratory analyst must be qualified and competent to analyze the air toxics samples as per the applicable EPA Compendium Method. As such, the following qualifications are required:

- Reading and understanding the laboratory quality manual,
- Reading and understanding of the laboratory SOP(s) for the instrument(s) use to analyze air toxic samples,
- Reading and understanding of the EPA Compendium Method(s) applicable to the analytical methods performed for the Florida NATTS and Air Toxics Monitoring Program, and
- General and background knowledge of installation, operation, and maintenance of specific equipment. This is provided by reading and understanding the manufacturer's operating manuals and guides and is supplemented by vendor-offered formal training sessions, when available.

6.1 Initial Demonstration of Capability

Once any new staff completes the relevant instrument training specified above, the staff member must demonstrate proficiency with a given procedure prior to performing activities that generate or manipulate air toxics program data, independently. The initial DOC includes documentation that staff has read and understands the instrument SOP, has performed the activity under the supervision of

a trainer (experienced staff member), and is approved to perform the activity independently. The initial DOC is "Accepted" by the program manager when the trainee performs the activity and completes the related documentation without error.

6.2 Ongoing Demonstration of Capability

Each staff member performing air toxics monitoring field work must demonstrate continued proficiency with tasks for which they are responsible, at least every three (3) years. The ongoing DOC includes the observation of staff performing the activity by a QA staff member and documentation that the ongoing DOC is "Accepted" by the program manager or designee when the staff member performs the activity and completes the related documentation without error.

Each laboratory analyst or chemist must annually demonstrate continued proficiency by completing one of the following:

- Repeat of the initial DOC procedure.
- Acceptable performance on one or more blind samples (single blind to the analyst) following the approved method for each target analyte. Acceptable performance is indicated by demonstrating recovery within limits of the method Laboratory Control Sample (LCS) for each target analyte.
- Analysis of at least four consecutive LCSs with acceptable levels of bias. Acceptable performance is indicated by demonstrating recovery within limits of the method LCS for each target analyte.
- Acceptable performance on a proficiency test (PT) sample. Acceptable performance is defined by the provider of the PT sample, as indicated by no results marked as "Unacceptable" or equivalent, for target analytes.

7.0 DOCUMENTATION AND RECORDS

This section includes information concerning the management of documentation and records, including this Quality Assurance Project Plan (QAPP). As one PQAO, QAPP and SOP revisions, including changes to forms, must be submitted to Florida DEP for approval prior to use and be sufficiently document controlled. Additionally, SOPs must not conflict with any part of this QAPP or with any other relevant local, state, or federal regulation.

The majority of documentation and records produced by Florida's NATTS and Air Toxics monitoring program consist of data and information gathered to support the data collection activities. Documentation and records include:

- Quality Assurance Project Plans (i.e., this QAPP and others supporting the PQAO's air toxics monitoring program),
- Standard Operating Procedures (SOPs),
- Logbooks and data collection records in electronic and written format,
- Instrument and equipment calibration information,
- Quality assurance documentation in electronic and written format, and
- Documentation that supports data review, validation, and certification activities.

Section 17 of this QAPP contains more detailed information regarding how data will be managed from Florida's NATTS and Air Toxics monitoring network, including information on data recording, transmittal, storage, and retrieval.

7.1 Policy and Procedure Documentation

Florida's PQAO maintains records of program policy and procedure documentation. Documents in this category are published with the date and revision information clearly noted, generally in a document header. Documents in this category include:

- Quality Assurance Project Plans (QAPPs – i.e., this document), and
- Standard Operating Procedures (SOPs), which contain the electronic QA/QC data forms that must be documented

All of these records/documents are posted to the statewide air monitoring database, AirMVP. When a document is superseded by a newer version, the replacement document clearly states the effective date of the document. All individuals operating air toxics samplers receive notification that a new version is available and has been posted to AirMVP.

Copies of current program policy and procedure documents are retained in electronic file format (i.e., pdf) in a secured folder on the Florida DEP network, where access is limited to a read-only status to personnel other than the Florida DEP Administrators and the QAM. When replaced by a newer version, the previous (older) version is moved to a subfolder on the network that is marked for archived documents. As such, the superseded document is no longer available in AirMVP, as it has been moved to the archived folder. In this manner, older versions of the

policy/procedure documents are always available, in case procedures from a specific period in the past ever need to be revisited.

7.2 Data Collection Records and Logbooks

To reduce the potential for data entry errors, automated systems will be used where appropriate and will record the same information that would be recorded on hardcopy data entry forms. Information on data collection is detailed in Section 17 of this QAPP.

Each field and laboratory technician are responsible for obtaining, maintaining and documenting the appropriate field and lab logbooks and associated QA/QC data forms. Logbooks are used to record information about the site and laboratory operations, as well as document routine operations. QA/QC forms are used to document the QA/QC activities described in Section 7.3 below. The field logbooks are made for each sampling instrument or site location. Laboratory logbooks retain all records pertaining to equipment certifications, performance acceptance testing, calibrations, materials tracking, general comments and notations as well as other pertinent information required for support of the NATTS and Air Toxics monitoring network data integrity activities.

Logbooks and QA/QC forms are either electronic or hardcopy records. Electronic logbooks/forms must contain locked cells, so that formulas cannot be overwritten; be filled out clearly and completely; and dated and signed. Hardcopy logbooks must be legible; filled out completely in ink; and dated and signed. Corrections to these records shall be made either electronically or manually. For electronic logbooks or QA/QC forms, corrections will be made such that the original entry remains legible or accessible, corrections are signed/initialed and dated with the date the correction was made. For hardcopy logbooks, corrections will be made by crossing out the incorrect entry with a single line, initialing and dating with the date the correction was made. The correct information should then be written beside the incorrect entry, if there is space to legibly do so, or should be written in a space nearby. Hardcopy records are either scanned and stored on the network drive or maintained in a file cabinet.

7.3 QA/QC Records

Quality assurance and quality control are achieved through the performance of periodic activities such as:

- Technical systems audits (TSAs)
- Quality assurance systems audits
- Operational flow checks
- Maintenance activities

- Annual instrument audits and certifications
- Traceability certifications/calibrations
- Corrective actions

With the exception of the TSAs, the QA/QC activities listed above are typically documented and maintained using a variety of methods which include: Excel spreadsheets (as data forms), fillable PDF data forms, worksheets, and data management systems (LIMS/AirMVP/AirVision). Use of these methods to create the air monitoring QA/QC records is described in the associated SOPs (see Appendix A of this QAPP). These records are retained and archived according to the procedures identified in Section 7.5 below. If the entire QA/QC record needs to be corrected, then a new form should be created and appended to the incorrect form, to ensure traceability.

7.4 Reference Materials

Because of the technical nature of ambient air toxics monitoring, numerous reference materials are required to effectively administer the program. Publications such as instrument operation manuals, troubleshooting guides, EPA guidance documentation, EPA technical memoranda, and various other reports are included in this category. Florida's PQAO maintains access to applicable reference materials as long as they are administratively valuable. These documents are maintained in the monitoring agency's office in hardcopy or electronic format.

7.5 Archiving and Retrieval

Documentation is classified according to its intended use, future applicability, and regulatory requirement for retention. Information listed in Table 7-1 will be retained for a minimum of ten (10) complete calendar years from the date of collection in accordance with the Florida Administrative Code and Florida Administrative Register, Chapter 1B-26.003 – Records Management: Standards and Requirements, as well as Florida's Quality Management Plan. Additionally, if any litigation, claim, designation, audit, or other action involving the records has been started before the expiration of the ten-year period, the records will be retained until completion of the action and resolution of all issues which arise from it, or until the end of the regular (ten-year) period, whichever is later.

Electronic records are stored within the record management systems of each local agency within the Florida NATTS and Air Toxics Monitoring network. The local program record management system includes electronic files which reside on the local computer network servers and/or hardcopy files retained in cabinets. The network servers are backed up nightly and back-up data is stored off-site.

Table 7-1: Documentation and Records

Categories	Record/Document Type	Location
Management and Organization	▪ Reporting Agency Information ▪ Quality Management Plan ▪ Personnel Qualifications and Training ▪ Training Certification ▪ Organizational Structure ▪ EPA Directives ▪ Grant Allocations ▪ Support Contracts	Tallahassee, FL – Florida DEP's Central Office & Local Program Offices
Site Information	▪ Network Descriptions ▪ Site Files ▪ Site Maps ▪ Site Pictures	Tallahassee, FL – Florida DEP's Central Office & Local Program Offices
Environmental Data Operations	▪ Quality Assurance Project Plans ▪ Standard Operating Procedures ▪ Field and Laboratory Notebooks ▪ Sample Handling/Custody Records ▪ Inspection/Maintenance Records	Tallahassee, FL – Florida DEP's Central Office & Local Program Offices
Raw Data	▪ Any Original Data (routine and quality control)	Local Program Offices
Data Management	▪ Data Algorithms ▪ Data Management Plans/Flowcharts ▪ Data Management Systems ▪ Pollutant Data ▪ Meteorological Data	Local Program Offices
Data Reporting	▪ Data/Summary Reports ▪ NATTS Program Reports	Local Program Offices
Quality Assurance	▪ Network Reviews ▪ Quality Assurance Documents and Reports ▪ Technical System Audits ▪ Response/Corrective Action Reports	Tallahassee, FL – Florida DEP's Central Office & Local Program Offices

8.0 NETWORK DESCRIPTION

The primary function of the air toxics monitoring program is to establish a long-term air toxics dataset for determining trends. Other purposes are to record urban background and baseline concentrations, determine the effects on air quality from adjustments to source emissions, and verify air quality modeling programs correlated to the health effects of air quality levels. Sampling network design and monitoring site selection are determined according to the NATTS TAD, Section 2.4 Siting Considerations.

8.1 Network Objectives

The NATTS and Air Toxics monitoring network is designed to meet a minimum of four basic monitoring objectives. These basic monitoring objectives are to:

- Determine the long-term temporal trends in the concentration of air toxics,
- Determine the impact of air toxic sources or source categories on ambient pollution levels,
- Determine general background concentration levels, and
- Determine the welfare-related impacts in rural and remote areas (such as visibility impairment and effects on vegetation).

8.1.1 Monitoring Objectives and Spatial Scales

Each monitor within Florida's current NATTS and Air Toxics monitoring network, or future air toxic site, is assigned one of the following monitoring objective designations:

- ***Population exposure*** **–** the monitor is located within an area associated with high population density.
- ***General Background*** **–** the monitor is located where man-made pollutant emissions are minimal.
- ***Highest Concentration*** **–** the monitor is located where a high concentration of the pollutant is expected.
- ***Upwind Background*** **–** the monitor is located to determine the concentrations of a pollutant coming into an area.
- ***Quality Assurance*** **–** the monitor is collocated for precision reporting.

Data collected within the air toxics monitoring network must be representative of the spatial area under study. The goal in siting a monitoring station is to match the spatial scale represented by the samples obtained with the spatial scale most appropriate for the monitoring objective of the station.

The monitoring objective for the current NATTS and Air Toxics monitoring network is to measure the "*General Background*" concentration. A collocated monitor is located for "Quality Assurance". Since the objective of the existing NATTS and Air Toxics monitoring network is for general background concentrations, the monitors are sited for neighborhood scale of representativeness; 0.5 to 4 kilometer range.

8.2 Site Selection

The selection of a specific monitoring site includes the following activities:

- Developing and understanding the monitoring objective and appropriate data quality objectives,
- Identifying the spatial scale most appropriate for the monitoring objective of the site,
- Identifying potential locations where the monitoring site could be placed,
- Identifying the specific monitoring site, and
- Following the site selection criteria specified the NATTS TAD, Section 2.4.

8.2.1 Site Location

Four criteria are considered when evaluating potential sites. Monitoring sites should be oriented to measure the following (singly or in combination as appropriate for the sampling objective):

- Impacts of known pollutant emission categories on air quality,
- Population density relative to receptor-dose levels, both short- and long-term,
- Impacts of known pollutant emission sources (area and point) on air quality, and
- Representative air quality.

Selection consistent with these criteria requires detailed information concerning the location of sources, geographic variability of ambient pollutant concentrations, meteorological conditions, and population density. The sampling site selection process also involves consideration of the following factors:

- ***Economics*** **–** The quantity of resources required to accomplish all data collection activities, operations, including instrumentation, installation, maintenance, data retrieval, data analysis, QA, and data interpretation, must be established.
- ***Security*** **–** In some cases, a preferred location may have associated problems that compromise the security of monitoring equipment (i.e., high risk of theft, vandalism, etc.). If such problems cannot be remedied using standard measures such as additional lighting, fencing, etc., then an attempt to locate the site as near to the preferred location as possible shall be made.
- ***Logistics*** **–** This process includes procurement, maintenance, and transportation of material and personnel for the monitoring operation. The logistics process requires full knowledge of all aspects of the data collection operation: planning, reconnaissance, training, scheduling, safety, staffing, procuring of goods and services, communications, and inventory management.
- ***Atmospheric Considerations*** **–** These considerations may include spatial and temporal variability of pollutants and their transport. Effects of buildings, terrain, and heat sources or sinks on air trajectories can produce localized anomalies of pollutant concentrations. Meteorology must be considered in determining the geographic location of a site as well as the height, direction, and extension of sampling probes. Evaluation of winds is essential to properly locate many

monitoring sites (e.g., siting either to detect or avoid emissions from specific sources).

- ***Topography*** **–** Evaluation of the local topography based upon land use maps, U.S. Geological Survey topographic maps, and other available resources must be completed. Minor and major topological features that impact both the transport and diffusion of air pollutants must be identified and evaluated. Minor features may consist of an adjacent tree lined stream or tall structures either upwind or downwind of a point source, each of which may exert small influences on pollutant dispersion patterns. Major features in Florida include large lakes and bays.

An interdependence exists between all the factors listed above. Consequently, an iterative procedure must be employed to successfully select appropriate sites that can provide the data necessary to accomplish the project's stated objectives. In situations where the sites do not specifically meet the requirements necessary to obtain the project objectives, reevaluation of the project may be necessary. Staff familiar with the operation of air quality measurement systems; estimates of air quality, field, and theoretical studies of air diffusion; and considerations of atmospheric chemistry and air pollution effects make up the required expertise needed to select the optimum sampling site for obtaining data necessary to fulfill the monitoring objectives.

8.2.2 Monitor Placement

The placement of each monitor is generally determined by the defined monitoring objectives. Due to the various factors discussed above, tradeoffs are often necessary to locate a site for collection of optimally representative data. Final placement of a monitor at a selected site is dependent on physical obstructions and activities in the immediate area. Monitors must be placed away from obstructions such as trees and fences so that their effects on airflow can be avoided. To prevent sampling bias, airflow around the monitor's sampling probes must be representative of the general airflow in the area. In addition, the availability of utilities (i.e., electricity and communications services) is critical.

8.3 Probe Siting Criteria

Sampling inlet probe siting criteria for NATTS and Air Toxics monitoring instruments adhere to Section 2.4 of the NATTS TAD, Table 2.4-1. The requirements are summarized below.

- The vertical placement of the sampler inlet shall be 2 – 15 meters above ground level,
- The horizontal and vertical placement of the sampling inlet probe shall be at least 1 meter from supporting structures,
- The sampler inlet shall be at least 10 meters from the dripline of trees and obstructions,
- Unrestricted airflow 270 degrees around the sampler,

- The horizontal placement of the collocated sampler inlet to the primary sampler inlet shall be 0 - 4 meters for the VOC and carbonyl samplers, and 2 - 4 meters for the PAH and PM_{10} metals samplers, and
- The vertical placement of the collocated sampler inlet to the primary sampler inlet shall be ≤ 3 meters for all air toxic samplers.

8.4 Rationale for Florida's NATTS and Air Toxics Monitoring Network

Florida's NATTS and Air Toxics Monitoring Network was established as part of the US EPA NATTS initiative and a local air toxic study in Broward County. In 2002, the EPA selected two locations in the Tampa Bay area for the national trends sites. Consequently, the PCAQD and EPCHC agreed to support and implement the NATTS program sites at Skyview (AQS# 12-103-0026) and Sydney (AQS# 12-057-3002), respectively.

The non-NATTS air toxics monitoring conducted at the Broward County Daniella Banu NCORE site (AQS# 12-011-0034) and the Pinellas County Azalea Park site (AQS# 12-103-0018), are to characterize the impacts of HAPs on the public health and the environment.

9.0 SAMPLING METHODS

Ambient air toxics data generated by the Florida Air Toxics Monitoring Network are collected according to the sampling methods recommended in the NATTS TAD. There are four (4) classes of target analytes, also referred to as "compounds", which are sampled by a specified EPA analytical method listed in Table 9-1, below. The following subsections provide a summary of each sampling method. A more detailed description of the sampling method is contained in the individual sampling instrument's SOP. The analytical methods are described in Section 11 of this QAPP and in the EPA Compendium Method documents and laboratory SOPs, in greater detail.

Table 9-1: Air Toxics Sampling Methods

Class of Analytes	Analytical Method	Sampler(s)
VOC	TO-15	ATEC VOC Model 2200 Analyzer Mechanical Canister System
Carbonyl	TO-11A	ERG: C Sampling System
PM_{10} metals	IO-3.5	VFC Hi-VOL PM_{10} Sampler
PAH	TO-13A	Hi-VOL PUF Sampler

9.1 VOC Sampling

The collection of VOCs is performed by a flow controlled, ambient air sampling system, using either an electronic mass flow controller (MFC) or mechanical flow regulator with a critical orifice. The ambient sample is drawn through the sample path using a specially coated passivated 6-liter stainless steel canister. The sample is collected at a constant flowrate over a 24-hour period and the final sample pressure is slightly below ambient. The Florida NATTS and Air Toxics Monitoring program uses VOC samplers either manufactured by ATEC or an in-house sampler design using a mechanical flow controller and a low-wattage solenoid valve. A more detailed description of the sampler and collection procedures is contained in either the sampling SOP DEP 23-02, *Statewide Standard Operating Procedure for ATEC VOC Model 2200 Analyzer* or SOP DEP 23-05, *Statewide Standard Operating Procedure for Mechanical Canister VOC Sampling.*

Following completion of sample collection, the canister is transported to the VOC laboratory (PCAQD, BCNRD) for lab analysis using Method TO-15. Sample analysis is completed within 30 days of collection. The VOC lab verifies the results and performs all quality assurance procedures described in this air toxics monitoring QAPP. All results are provided to the Florida local air monitoring programs collecting the samples and are validated in accordance with Section 20, Data Validation, of this QAPP.

9.2 Carbonyl Sampling

The collection of airborne carbonyl compounds is performed by a flow controlled, ambient air sampling system, using a denuder style ozone scrubber. The ambient air sample is drawn through the ozone denuder onto a sorbent cartridge coated with 2,4-dinitrophenylhydrazine (DNPH). Sample collection is over a 24-hour (nominal) period every six days. The Florida Air Toxics Monitoring program uses carbonyl samplers manufactured and maintained by Eastern Research Group, Inc. A more detailed description of the sampler and collection procedures is contained in the sampling SOP, *Field Procedure for Collecting Ambient Carbonyl Compounds Samples Using the ERG: C Sampling System (with O_3 Denuder Scrubber).*

The DNPH-coated cartridge is shipped to the ERG analytical laboratory in Morrisville, North Carolina, for carbonyl extraction and analysis according to EPA Compendium Method TO-11A. The ERG Laboratory verifies the results and performs all quality assurance procedures described in the ERG QAPP, *Support for the EPA National Monitoring Programs, 2018*. Results are provided to the Florida local program collecting the samples and are validated in accordance with Section 20, Data Validation, of this QAPP.

9.3 PM_{10} Metals Sampling

PM_{10} metal compounds are collected on a quartz fiber filter (QFF) substrate using a high-volume (Hi-VOL) sampler. The Hi-VOL sampler contains an electric motor to draw a known volume of ambient air at a constant flow rate. The ambient air is drawn through a size-selective inlet and then through 8x10 inch filter media. It is collected over a 24-hr (nominal) sampling period every six days. The Hi-VOL samplers utilize a volumetric flow control (VFC) system to maintain the constant flow rate through the inlet. A choked-flow venturi is operated such that the air attains sonic velocity in the throat of the device. In this "choked" mode, the flow rate is unaffected by downstream conditions such as motor speed or exit pressure and is a predictable function of upstream conditions, such as the stagnation pressure ratio and temperature. Florida agencies sampling for lead follow the *Standard Operating Procedure for PM_{10} Metals High-Volume Samplers, DEP 23-03*.

Although there are various manufactures for Hi-VOL PM_{10} samplers, Florida uses only units designated as a Manual Reference Method, 40 CFR Part 50, Appendix J, for high-volume particulate sampling. These samplers are extremely durable and can be easily refurbished due to the simplicity of the sampling system. Preventative maintenance and routine quality control checks are prescribed in the PM_{10} Metals Hi-VOL sampling SOP, DEP 23-03.

A portion of the QFF substrate is digested by a heated nitric acid and hydrochloric acid solution, and then the metal compound concentrations are quantitated using inductively coupled plasma mass spectrometry (ICP-MS). The Florida Air Toxics Monitoring program utilizes the EPCHC Laboratory for PM_{10} metals sample

analysis. The EPCHC Lab verifies the results and performs all quality assurance procedures described in this air toxics monitoring QAPP. All results are provided to the Florida local air monitoring program collecting the samples and are validated in accordance with Section 20, Data Validation, of this QAPP.

9.4 PAH Sampling

The collection of polycyclic aromatic hydrocarbon (PAH) compounds is performed by a volumetric flow control (VFC), high-volume, ambient air sampler. PAH compounds are collected on a quartz fiber particulate filter and a glass thimble containing poly-urethane foam (PUF) and styrene-divinylbenzene polymer resin sorbent. Sample collection is over a 24-hour (nominal) period every six days. The Florida NATTS and Air Toxics Monitoring program uses the TE-1000 Poly-Urethane Foam (PUF) High Volume Air Sampler manufactured by TISCH Environmental. A more detailed description of the sampler and collection procedures are contained in the sampling SOPs, *NATTS Standard Operating Procedure for TE-1000 Poly-Urethane Foam (PUF) Analyzer, DEP 23-01* and *NATTS Standard Operating Procedure for Polycyclic Aromatic Hydrocarbon Sampling by TE-1000 Polyurethane Foam Sampler, Hillsborough County, DEP 23-06.*

The QFF and contents of the glass cartridge are extracted by way of accelerated solvent extraction and then analyzed by gas chromatography-mass spectrometry (GC/MS). The Florida NATTS and Air Toxics Monitoring program utilizes the ERG Laboratory and the EPCHC Laboratory for PAH sample analysis. The ERG Laboratory verifies the results and performs all quality assurance procedures described in the ERG QAPP, *Support for the EPA National Monitoring Programs, 2018*. The EPCHC Lab verifies the results and performs all quality assurance procedures described in this air toxics monitoring QAPP and those described in the *Hillsborough County Environmental Protection Commission Laboratory Quality Manual, May 9, 2018*. All results are provided to the Florida local air monitoring program collecting the samples and are validated in accordance with Section 20, Data Validation, of this QAPP.

10.0 SAMPLE HANDLING AND CUSTODY

The Florida NATTS and Air Toxics Monitoring network collects samples run on the national one-in-six-day sampling schedule. An integrated ambient air sample is collected for a 24-hour duration. The sample media are shipped or couriered to an internal laboratory associated with one of the local environmental agencies or an external laboratory working under the EPA national laboratory contract. In order to protect sample integrity and maintain data consistency, sample handling and custody procedures are detailed in the instrument SOPs (see Appendix A).

Air toxic samples may be invalidated for a number of reasons such as equipment failures, power outages, or failed quality control checks. In order to increase the likelihood of attaining the data completeness objective of ≥ 85%, make-up samples should be collected whenever a sample is invalidated and as close to the original sampling date as possible, preferably before the next scheduled sampling date. If it is not feasible or practical to collect the make-up sample prior to the next scheduled sampling date, the sample should be collected within 30 days of the original sampling date. In all cases, the make-up sample should be collected within the calendar year, January 1 through December 31.

Florida's NATTS and Air Toxics monitoring program collects physical samples for each class of analytes: VOC, carbonyl, PM10 metals, and PAH compounds. The subsections below describe the sample's life cycle and chain-of-custody (COC) handling necessary to document integrity of the physical sample.

10.1 VOC Sample Handling

The Florida NATTS and Air Toxics monitoring network collects VOC samples using six (6) liter, stainless steel canisters with interiors specially treated with fused silica or the SUMA process. Each canister undergoes a leak check and batch blank analysis prior to field deployment. Upon canister installation, a sampler leak check procedure and initial pressure check is performed as described in DEP 23-04 or DEP 23-05. The sampling event begins where a single pump pulls the ambient air sample from the inlet probe through the sampling system directly into the evacuated sample collection canister. The vacuum in the sample canister provides the differential pressure for the VOC sample to flow into the canister (sub-ambient sampling) from the ambient air stream. The ATEC 2200 instrument utilizes a MFC to regulate the flow rate, while the mechanical sampling system uses a critical flow orifice.

10.1.1 Pre-Sample Custody for VOC Compounds

VOC sampling canisters are prepared by the PCAQD or the BCNRD laboratory according to the EPA NATTS TAD, Rev 3 (October 2016), section 4.2.3.2. Once the canister is deemed prepared for field deployment, each canister is assigned by the lab to a specific site and a scheduled run date using a chain of custody spreadsheet (See DEP 23-02) or hand-written chain of custody form.

10.1.2 Sample COC Transfers for VOC Compounds

Canisters shipped or couriered from the PCAQD program to another Florida local program for sampling, use a written form to document the chain-of-custody. The COC procedures and documentation apply when the canister is transferred between the PCAQD lab and external organizations (e.g. air monitoring agencies or secure transfer stations). Once the sample media is in the possession of the local air monitoring program, it is not required to document COC transfers within the program unless specified by the applicable SOP.

10.1.3 Post-Sample Custody for VOC Compounds

The field technician retrieves the canister and completes the chain of custody.. The post sampling canister is transported back to the PCAQD or BCNRD lab by the field technician or via a secure transfer station, in which the chain of custody will reflect all transfers of possession. All interim locations will be secure until arrival and acceptance by the PCAQD lab or BCNRD lab,

10.2 Carbonyl Sample Handling

The Florida NATTS monitoring network collects carbonyl samples using the ERG:C Sampling System with a denuder style ozone scrubber. The ERG carbonyl sampler uses a vacuum pump to draw ambient air through an ozone denuder and then through a sorbent cartridge coated with DNPH. A single pump pulls the ambient air sample from the inlet probe through the sampling system and exhausted outside the air monitoring shelter. The ambient air sample is first drawn through the ozone denuder and then through the sampling cartridge. A critical flow orifice, downstream of the cartridge, controls the flow rate through the sample.

10.2.1 Pre-Sample Custody for Carbonyl Compounds

Carbonyl sample cartridges are prepared by the ERG laboratory according to ERG QAPP, Contract No. EP-D-14-030, *Support for the EPA National Monitoring Programs, 2018.* More detail for carbonyl sample custody by the ERG laboratory is outlined in the ERG QAPP, Section 9.2 and their referenced SOPs.

Although there is no requirement to ship DNPH sampling media below ambient temperatures, the carbonyl cartridges are shipped cold by the ERG lab in insulated coolers with freezer packs or ice. The cartridge is sealed in a foil pouch to protect it as light may degrade the DNPH derivatives. Once received by the Florida NATTS monitoring program, the DNPH sampling cartridge is stored refrigerated (not frozen) ≤ 4 °C until transported to the NATTS station and installed on the ERG:C Sampling System. The field technician installing the DNPH cartridge will annotate the ERG Carbonyl Compounds Data Sheet (CCDS) which is the COC form.

The field technician must wear powder-free nitrile or vinyl gloves when handling DNPH cartridges and avoid exposing them to combustion engine exhaust fumes, sunlight, or other sources of carbonyl compounds such as acetone. The carbonyl

sample will be installed for the designated sampling date specified on the COC form. If it is not used on the sampling date, a comment will be made on the CCDS and the unused cartridge will be shipped back to the ERG lab. The ERG:C Sampling System SOP provides more detail on the handling and installation of the carbonyl sample (see Appendix A).

10.2.2 Sample COC Transfers for Carbonyl Compounds

The COC documentation procedures apply when the sample is transferred between the ERG lab and air monitoring agencies. The COC transfers are recorded on the CCDS. Once the sample media is in the possession of the local air monitoring program, it is not required to document COC transfers within the program unless specified by the applicable SOP.

10.2.3 Post-Sample Custody for Carbonyl Compounds

The field technician retrieves the carbonyl sample according to the ERG:C Sampling System SOP. The observed system conditions are documented of the CCDS and the collected sample is immediately placed in an insulated cooler with ice or frozen ice packs for transport to the storage refrigerator at the local program office. The carbonyl sample is shipped to the ERG lab on the next working day, Monday through Thursday. The air monitoring agency should avoid shipments on Friday's since the ERG lab may not be open and available for receipt on weekends. According to EPA Compendium Method TO-11A, carbonyl cartridge samples should be extracted within 14 days of the sampling day.

10.3 PM_{10} Metals Sampling Handling

The Florida NATTS and Air Toxics monitoring network collects an integrated sample of PM_{10} metals using a high-volume air sampling method. Ambient air is drawn through a size-selective inlet (SSI) such that only particulate matter with an aerodynamic diameter less than 10 microns (µm) is captured on an 8x10 inch, quartz-fiber filter (QFF) over the 24-hour sampling period. The constant flow rate across the filter is maintained by a volumetric flow control (VFC) system. A portion of the filter is digested to dissolve the PM_{10} metal compounds for analysis by ICP/MS.

10.3.1 Pre-Sampling Custody for PM_{10} Metals

The quartz fiber filters used in the Florida NATTS and Air Toxics network for PM_{10} metals sampling are ordered annually from the US EPA national contract. Accordingly, each lot of filters is evaluated by the EPA's acceptance testing protocol for fiber filters prior to shipment and delivery to the EPCHC and PCAQD laboratories. The EPA acceptance testing results are distributed by the US EPA Ambient Air Monitoring Group (C304-06) along with the boxes of filters ordered for use each calendar year. The acceptance protocol includes:

- Visual inspection,

- Assessment of the physical characteristics,
- Filter thickness and tensile strength,
- Flow rate and retention acceptance criteria, and
- Background metals content.

Once the filters are received by the laboratory, the lab analyst(s) conduct additional visual inspections, analyze batch blanks, and other quality control procedures specified in the Florida *Standard Operating Procedure for the Determination of PM_{10} Particulates in Ambient Air by High Volume Filter Analysis, Revision 1, February 2018 (DEP 16-22)*.

As per DEP 23-03, each box of quartz fiber filters is relinquished to the field technicians for the ambient air monitoring section for scheduled sampling events. The laboratory analyst provides the chain-of-custody, Form No. DEP 23-03-C, listing each individual filter. The field technicians in the ambient air monitoring section complete their entries on Form No. DEP 23-03-C as they prepare the filters for installation and sampling by the PM_{10} Metals Hi-VOL sampler.

10.3.2 Post-Sampling Custody for PM_{10} Metals

Ambient monitoring field technicians collect the PM_{10} metals samples as soon as practical after the scheduled sampling run date. Technicians observe the sample filter and note any damage or unusual appearance on the sample record comment section, Form No. DEP 23-03-A. If it is determined by the technician or subsequent quality assurance officer that the damage to the filter is significant, the sample is considered to be invalid, and then notated as such on the sample record.

The filters are folded lengthwise and placed in a protective envelope, Form No. DEP 03-18-H, for storage and transport to the EPCHC laboratory for analysis. Upon receipt, the EPCHC lab documents the chain-of-custody of exposed filters on Form No. DEP 16-22-A.

NOTE: The SOP DEP 23-03 refers to the filter envelope form DEP 03-18-H from the SOP for PM_{10}/Pb-TSP Hi-Volume Sampler and form DEP 16-22-A from the SOP for the Determination of PM_{10} Particulates in Ambient Air by High Volume Filter Analysis.

The unused portion of exposed filters are archived and stored in the protective envelope by the EPCHC laboratory. The samples are retained for 1 year on-site, and then transferred to a climate-controlled storage facility for 5 years. Thereafter, samples are destroyed.

PM_{10} metals samples collected by PCAQD are transferred to the EPCHC ambient air monitoring program for delivery to the EPCHC laboratory. Form No. DEP 23-03-E is used to track the COC of samples between these two agencies.

10.4 PAH Sample Handling

The Florida NATTS monitoring network collects PAH samples using a high-volume air sampling method. Ambient air is drawn through the sample media at a constant flow rate over a 24-hour sampling period. The flow rate across the system is controlled by the fan motor speed and a ball valve. The sample media is contained in a dual chamber aluminum module which holds a quartz fiber particulate filter and a glass thimble containing PUF and styrene-divinylbenzene polymer resin sorbent. Since some PAHs, such as naphthalene, are subject to volatilization and decomposition from exposure to light, the PAH sample cartridge should always be protected from light exposure and brought to ≤ 4 °C as soon as possible after the end of the sampling period.

10.4.1 Pre-Sample Custody for PAH Compounds

PAH sample cartridges are prepared by either the ERG laboratory according to ERG QAPP, Contract No. EP-D-14-030, *Support for the EPA National Monitoring Programs, 2018*, or the EPCHC laboratory according to the EPC Laboratory SOP, *Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air Using Gas Chromatography/Mass Spectrometry (GC/MS).* More detail on PAH sample handling and custody by the ERG laboratory is outlined in the ERG QAPP, Section 9.3.

The PAH sample media, prepared by the ERG, are shipped to the PCAQD air monitoring program packed in a cooler at or below ambient temperature. The sample media are assembled into the PAH cartridge by the PCAQD field staff and placed into a refrigerator at ≤ 4 °C until ready for use. The fully assembled PAH sample cartridge, prepared by the EPCHC laboratory, is stored in the laboratory refrigerator at ≤ 4 °C for retrieval by the EPCHC air monitoring field technician. The Florida NATTS network air monitoring field technicians will follow the PAH sample handling procedures and COC documentation specified in the PAH sampler SOP for their respective agencies (see Appendix A).

10.4.2 Post-Sampling Custody for PAH Compounds

The air toxics monitoring field technicians collect the PAH sample cartridge according to PAH sampler SOP for their respective agencies (see Appendix A). The sample is collected as soon as possible after the end of the sampling period. According to the NATTS TAD, it is preferable to collect the sample within 24 hours. However, the collection shall not exceed 72 hours after the end of the sampling period.

As per the PAH sampler SOPs, the collected sample cartridge is transported from the field location to the agency office in a cooler with ice or frozen, ice packs and then immediately placed in the laboratory refrigerator. The PCAQD disassembles the PAH sample cartridge and stores the sample media in the laboratory refrigerator until

ready for shipment to the ERG laboratory. On the next shipping day, PCAQD packs the PAH sample media in a cooler with frozen, ice packs for shipment.

11.0 ANALYTICAL METHOD

The Florida NATTS and Air Toxics monitoring program uses four laboratories for the analysis of ambient air toxic samples. The Eastern Research Group, Inc. laboratory prepares, analyzes, and reports to AQS the carbonyl samples from the Florida NATTS program. The ERG laboratory also performs the analysis for the PAH samples collected at the Skyview NATTS site by the PCAQD. The EPCHC laboratory prepares and analyzes the PAH samples collected at the Sydney NATTS site by the EPCHC air monitoring program. In addition, the EPCHC laboratory analyzes the PM_{10} metals samples from the Florida NATTS program. The PCAQD laboratory prepares and analyzes the VOC samples from the Florida NATTS and Air Toxics monitoring programs. Finally, the BCNRD uses its own laboratory for the analysis of VOC samples by TO-15. The lab is available to serve as a back-up to the PCAQD laboratory for VOC sample analysis.

All laboratories serving the Florida NATTS and Air Toxics monitoring network provide a data package containing the analytical results and quality assurance data demonstrating compliance with this QAPP and the ERG QAPP. The data package identifies any laboratory QC failures and subsequent corrective actions to certify the laboratory data provided. Refer to the laboratory SOPs for details of the corrective action procedures related to QC failures.

This QAPP, in coordination with the ERG QAPP, assures that the Florida NATTS and Air Toxics monitoring network verifies that the air toxics data generated is of sufficient quality to evaluate the NATTS program DQOs.

11.1 EPA Compendium Method TO-15

VOCs are identified and quantified via cryogenic pre-concentration GC/MS and a typical analysis scheme is as follows. A known volume of the whole air (an air parcel from which gases have not been removed and are completely captured for sample collection) is passed through and the VOCs are cryogenically trapped onto a sorbent bed while N_2, O_2, Ar, CO_2, and to the extent possible, H_2O are selectively removed. The volume trapped is measured by the change in pressure of a known volume downstream of the sorbent trap. The sample introduction pathway and sorbent bed are then swept with dry inert gas (helium) to remove water, while the VOCs are retained on the cold sorbent. After the pre-concentration and dehydration, the sorbent is heated to desorb the VOCs. The VOCs are then entrained in a carrier gas stream where they are refocused and subsequently introduced onto the GC column for separation. After separation on the column, VOCs are ionized in a quadrupole MS which detects the ion fragments according to their mass to charge (m/z) ratio. The responses of the ion fragments are plotted against the retention time and compared to the standard chromatogram to identify and quantify the compounds in the sample based on retention times and ion fragments of standards analyzed under the same chromatographic and MS conditions. (*EPA NATTS TAD, Rev 3*, 2016, pp. 62-63)

Detailed procedures and equipment used by the PCAQD and BCNRD are described in SOP *DEP-23-04, Standard Operating Procedure for Air Toxics Characterization Program: Volatile Organic Compounds*. The laboratory quality control criteria are specified in Table 5.1, in Section 5.0 of this QAPP.

11.2 EPA Compendium Method TO-11A

Carbonyl compounds are identified and quantified according to EPA Compendium Method TO-11A whereby, carbonyl compounds are eluted from the DNPH sample media and characterized by high performance liquid chromatography (HPLC). The ERG, Inc. laboratory in Morrisville, North Carolina, is the analytical laboratory for carbonyl compounds collected by the Florida NATTS monitoring network. As per method TO-11A, carbonyl compounds captured on a DNPH-coated adsorbent are eluted with 5 milliliters (mL) of acetonitrile. The eluted extracts are analyzed by HPLC with an ultraviolet (UV) detector at a wavelength of 360 nanometers (nm). The laboratory quality control criteria are specified in Table 5.2, in Section 5.0 of this QAPP.

Detailed procedures and equipment used by the ERG laboratory to perform this analysis are described in the ERG QAPP and ERG laboratory SOPs referenced therein.

11.3 EPA Compendium Method IO-3.5

PM_{10} metals in ambient air are collected by the Florida NATTS monitoring network onto quartz fiber filters (QFF) by high-volume sampling method. A portion of the QFF is digested to dissolve the metal compounds by heating in acid and then quantify the metals by introducing the solution into a plasma, in which desolvation, atomization, and ionization occurs. Ions are extracted from the plasma and separated on the basis of their mass-to-charge ratio by a quadrupole mass spectrometer. Ion intensities are recorded and compared to external calibration standards to determine concentration values for the sample according to EPA Compendium Method IO-3.5. The EPCHC Water Division lab is the analytical laboratory for PM_{10} metal samples collected by the Florida NATTS monitoring network. The laboratory quality control criteria are specified in Table 5.3, in Section 5.0 of this QAPP.

Detailed procedures and equipment used by the EPCHC laboratory to perform this analysis are described in the lab SOP, the *Determination of Metals in Ambient Air by Heated Nitric Hot Block Digestion and ICP-MS Analysis, Revision 1.3, November 1, 2017*.

11.4 EPA Compendium Method TO-13A

PAHs are semi-volatile organic compounds (SVOCs) which are collected by the Florida NATTS monitoring network onto a dual chambered sample cartridge. The PAH cartridge utilizes a quartz fiber particulate filter and a glass thimble containing

styrene-divinylbenzen polymer resin “sandwiched” between two PUF plugs. As per Method TO-13A, the PAH compounds are extracted from the QFF and sorbent media, then analyzed by gas chromatography and mass spectrometry. The laboratory quality control criteria are specified in Table 5.4, in Section 5.0 of this QAPP.

Detailed procedures and equipment used by the ERG laboratory to perform this analysis are described in the ERG QAPP and ERG laboratory SOPs referenced therein. Detailed procedures and equipment used by the EPCHC laboratory to perform this analysis are described in the lab SOP, the *Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air Using Gas Chromatography/Mass Spectrometry (GC/MS), Revision 1.4, November 1, 2017.*

12.0 QUALITY CONTROL

Quality control is the overall system of technical activities that measure the attributes and performance of a process against established standards to verify that performance meets the stated requirements. This section contains QA/QC information regarding the specifications and performance criteria for the air toxics samplers and laboratory equipment utilized in the Florida NATTS and Air Toxics monitoring network. Information on QA data validation and verification can be found in Section 20.

To assure the quality of data from air monitoring measurements, two distinct and important interrelated functions must be performed. One function is the control of the measurement process through broad QA activities, such as establishing policies and procedures, developing DQOs, assigning roles and responsibilities, conducting oversight and reviews, and implementing corrective actions. The second function is to control measurement error by implementing specific QC checks at established frequencies to ensure the monitoring instrumentation operates within specified criteria.

QC procedures for each air toxic compound sampler and analytical instrument are addressed (and discussed in more detail) in the instrument-specific SOPs (see Appendix A of this QAPP). Calculations and formulas related to the QC checks are defined in the individual SOPs. Associated forms utilized by the air monitoring network contain these formulas embedded in cells and generate values for the laboratory and field technicians immediately. Similarly, EPA's AQS provides statistical software that evaluates the DQIs of precision, bias, and completeness, once the data is uploaded into the AQS database.

The following summarizes the QC procedures performed for both field sampling equipment and laboratory analytical instruments. Therefore, the descriptions in this section of the QAPP are broad and inclusive except where there are QC procedures specific to a class of air toxic compounds field sampling or analytical instruments.

12.1 Calibrations and Calibration Checks

Calibration is the process employed to verify and rectify an instrument's measurements to minimize deviation from a standard. This multiphase process begins with certifying a calibration or transfer standard against an authoritative standard. The sampling or analytical instrument's measurements are then compared to this calibration/transfer standard. If deviations exist between the instrument's measurements and the calibration/transfer standard's measurements that are beyond the acceptance criteria, corrective action is implemented to rectify the instrument's measurements. This corrective action is in the form of an instrument *adjustment*. Henceforth, the term "calibration" will be used to mean *adjustment*. A "calibration check" is a verification that the instrument is in within acceptable tolerance, in good working order, or that the adjustment to the instrument is within the acceptance criteria. Acceptance criteria for the critical field and laboratory equipment are found in Tables 5-1 through 5-4 of this QAPP, the SOPs and in the specific instruments' operations manuals.

Periodic calibration checks are used to confirm the instrument is in good working order. The frequency of these QC checks is defined in Tables 5-1 through 5-4, of this QAPP. Periodic calibration checks ensure the accuracy and bias meets the assigned acceptance criterion, as defined in Tables 5-1 through 5-4, of this QAPP, instrument SOPs and operation manuals. Calibration checks challenge the instrument at a single point of typical use or at multiple points across the range of measurement.

12.2 Precision Analysis

Precision is the measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. To meet the DQOs for precision, the determination will ensure the entire measurement process is within statistical control. As per the NATTS TAD, precision between collocated, duplicate and replicate samples must be within the acceptance criteria for relative percent difference (RPD) of the target compound(s) specified in Tables 5-1 through 5-4 of this QAPP.

The Florida NATTS and Air Toxics monitoring network includes collocated or duplicate field sampling instruments and replicate laboratory measurements as part of the quality assurance process for the evaluation of sample precision. Duplicate VOC samples are collected at the Skyview NATTS site and at the Daniella Banu site, collocated PM_{10} metals and collocated PAH samples are collected at the Sydney NATTS site, and duplicate carbonyl samples are collected at both Skyview and Sydney sites.

Laboratory precision is also defined in Tables 5-1 through 5-4, of this QAPP for replicate sample analyses. Since the carbonyl samples are analyzed by the ERG laboratory, the requirements for evaluating laboratory precision are defined in the ERG QAPP which is consistent with the NATTS TAD and this Florida Air Toxics QAPP.

12.2.1 VOC Sample Precision

The VOC sample precision is determined by collocated or duplicate sample collection and the laboratory analytical precision is evaluated by replicate analysis. Precision estimates must be ≤ 25% RPD for target compound concentrations ≥ 5 times the MDL.

12.2.2 Carbonyl Sample Precision

The carbonyl sample precision is determined by duplicate sample collection where the precision estimate must be ≤ 20% RPD for target compound concentrations ≥ 0.5 µg/cartridge. The laboratory analytical precision is evaluated by replicate analysis where the precision estimates must be ≤ 10% RPD for target compound concentrations ≥ 0.5 µg/cartridge.

In addition, the laboratory precision for both extraction and analysis procedures are assessed by laboratory control sample duplicate (LCSD). The LCSD precision estimate must be ≤ 20% RPD of the laboratory control sample.

12.2.3 PM_{10} Metals Sample Precision

The PM_{10} metals sample precision is determined by collocated sample collection where the precision estimate must be ≤ 20% RPD for target compound concentrations ≥ 5 times the MDL. The laboratory analytical precision is evaluated by replicate analysis where the precision estimates must be ≤ 10% RPD for target compound concentrations ≥ 5 times the MDL.

In addition, the laboratory precision for both digestion and analysis procedures are assessed by laboratory control sample duplicate (LCSD) and a matrix spike duplicate (MSD). The LCSD and MSD precision estimate must be ≤ 20% RPD of the laboratory control or matrix spike sample, respectively.

12.2.4 PAH Sample Precision

The PAH sample precision is determined by collocated sample collection where the precision estimate must be ≤ 20% RPD for target compound concentrations ≥ 0.5 µg/mL. The laboratory analytical precision is evaluated by replicate analysis where the precision estimates must be ≤ 10% RPD for target compound concentrations ≥ 0.5 µg/mL.

In addition, the laboratory precision for both extraction and analysis procedures are assessed by laboratory control sample duplicate (LCSD). The LCSD precision estimate must be ≤ 20% RPD of the laboratory control sample.

12.3 Field, Lot and Method Blanks

The Florida NATTS and Air Toxics monitoring network collects field blanks, sample media lot blanks, and analytical method blanks to evaluate sampling and analytical bias. The frequency and acceptance criteria are defined in Tables 5-1 through 5-4, of this QAPP.

The evaluation of bias for VOC canister sampling is best accomplished by analyzing a canister batch blank for every cleaning cycle as described in the NATTS TAD, Section, 4.2.4.2.4.. Additionally, a canister zero check is performed with every new canister, as described in NATTS TAD, Section, 4.2.4.1.1. The laboratory analytical method, TO-15A, also requires an instrument blank and method blank for each analysis run, as summarized in Table 4.2-3 of the NATTS TAD.

The evaluation of bias for carbonyl samples is accomplished by field blanks as well as lot blanks. The laboratory analytical method, TO-11A, also requires solvent blanks, extraction blanks, and method blanks, as summarized in Table 4.3-4 of the NATTS TAD.

The evaluation of bias for PM_{10} metals samples is accomplished by field blanks and lot blanks. The laboratory analytical method, IO-3.5, also requires method blanks, reagent blanks, and various calibration blanks, as summarized in Table 4.4-3 of the NATTS TAD.

The evaluation of bias for PAH samples is accomplished by field blanks and cartridge lot blanks. The laboratory analytical method, TO-13A, also requires solvent blanks and method blanks, as summarized in Table 4.5-3 of the NATTS TAD.

12.4 Performance Evaluation Audits

Performance evaluation audits for the Florida NATTS and Air Toxics network samplers – are conducted internally by each agency on a frequency that is defined in the instrument SOP. Audits are performed to verify flow rate, elapsed time and other sampling parameters that insure the collection of a valid sample. Personnel conducting audit procedures are designated agency staff that are not normally involved in routine operational activities for the sampling instrument being audited.

12.5 Laboratory Proficiency Testing and Method Detection Limits

The Florida NATTS laboratories participate twice per year in the NATTS Performance Testing (PT) program. The EPA provides a blind sample (concentration is unknown to the lab) for analysis where the results are compared to the average results (arithmetic mean) of three referee labs, the average (arithmetic mean) of all participating NATTS labs, and the nominal spike value.

In order to ensure that measurements of air toxics in the ambient air are sufficiently sensitive to meet the NATTS program measurement quality objectives (MQOs) for method detection limits (MDLs), the Florida NATTS laboratories must be equal to or less than the MDL MQOs listed in the NATTS workplan submitted by the local air monitoring program each year. Therefore, the Florida NATTS laboratories will perform MDL determinations as described in Section 4.1.3.1 of the NATTS TAD to determine the statistical estimate of the lowest concentration at which there is a 99% chance that the concentration is greater than zero. The MDL concentrations will be determined annually, or when changes to the instrument of preparation procedure result in significant changes to the sensitivity of the instrument and/or procedure.

13.0 EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Preventative maintenance is a foundational element to an effective QA program. This section discusses the procedures used to verify that all instruments and equipment are maintained in sound operating condition and can operate at acceptable performance levels. All instrument inspection and maintenance activities must be documented and filed. See Section 17 of this QAPP for document and record management details.

13.1 Performance Testing

Prior to field installation of air toxics sampling instruments and support equipment, the instrument and equipment shall successfully undergo an operational check including a leak check and verification that all system components are functioning properly according to the instrument SOP or manual, as applicable. In general, the following acceptance/testing activities are performed upon receipt of new instrument, and/or after an instrument has undergone significant repair. If the instrument is new and fails to meet the field readiness certification described below, the vendor will be contacted.

- Verify that instrument meets the sampling requirements of the NATTS TAD and the specifications of the purchase request.
- Verify that all expected parts arrived with the instrument and that nothing is physically broken. Contact the vendor if there are issues.
- Perform field readiness "certification" testing, summarized as follows:
    - Check and document the diagnostics of the sampler, looking for any fault lights or warnings. Ensure that parameters such as sample flow rate, temperatures, pressures and so forth are within specifications (see user manuals). Perform a leak check(s) on the sampler.
    - Allow the instrument to run in its normal sampling mode in the shop (or the field station) and perform verification check(s) for flow rate(s), temperature(s), pressure(s), as applicable. If all parameters fall within the acceptance criteria (see SOPs), the instrument is deemed "field ready". If any point fails, the verification fails, and troubleshooting must be performed. The performance/maintenance log is documented with the results of this testing.

Following site installation, the field operators will initiate, observe, and document the successful completion of an operational check(s). If the sampler meets the acceptance criteria, it will be assumed to be operating properly. These tests will be properly documented according to the instrument SOP.

13.2 Inspection and Preventative Maintenance

Preventive maintenance is important to maintaining data quality as well as minimizing sampler downtime. Field technicians are to use the maintenance schedule prescribed in the instrument's SOP as a tool to ensure the timely completion of all maintenance activities. The routine preventive maintenance activities and schedules are detailed in the instrument's SOP and supplemented by the instrument instruction manual.

Laboratory technicians operating the GC/MS or ICP-MS must perform daily, monthly, and annual instrument maintenance as described in the instrument-specific SOP. Maintenance must also be performed on an as needed basis to maintain data integrity and adherence to QA/QC requirements. These maintenance tasks are recorded on a spreadsheet by the analyst and records are maintained in the LIMS. Annually, preventative maintenance is performed by an instrument manufacturer certified technician as described in the instrument-specific SOP.

If an instrument has undergone significant repair and fails to pass the performance testing and flowrate verifications described above, the vendor will be contacted. If after working with the vendor, the instrument cannot be repaired such that it passes performance testing, then the instrument will be decommissioned (i.e. permanently removed from service).

14.0 INSTRUMENT CALIBRATION AND FREQUENCY

Instrument calibrations performed in Florida's NATTS and Air Toxics monitoring network are conducted using traceable standards to ensure that the ambient air toxics data meets the Florida PQAO and NATTS data quality objectives. Therefore, laboratory standards and reference standards used in the air toxics monitoring network are traceable to National Institute of Standards and Technology (NIST).

Calibration is defined as the comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustment. Use of the term "calibration" indicates that an adjustment either in the instrument or the software occurred. EPA recommends that adjustments be minimized to prevent introducing measurement uncertainty and that verifications, "i.e., checks without correction (adjustment)," be used to confirm if an instrument is operating within its acceptance range. Thus, the purpose of calibration is to minimize bias.

Traceable is defined in 40 CFR Parts 50 and 58 as meaning that a local standard (i.e., one maintained by a monitoring organization) has been compared and certified, either directly or via not more than one intermediate standard, to a primary standard such as a NIST Standard Reference Material (NIST SRM) or an EPA/NIST-approved Certified Reference Material (CRM). Similarly, traceability is the property of a measurement result whereby the result can be related to a stated reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty. Standard traceability, therefore, is the process of transferring the accuracy or authority of a primary standard to a field-usable standard, resulting in a documented unbroken chain of calibrations/certifications.

The term "certification" refers to the actions or processes that attest the status, operational capacity, and/or functionality of an instrument. An overview of the certification procedures will be discussed in this section; however, the specific verification, calibration, and certification procedures for the laboratory and field equipment can be found in the applicable SOPs or operation manuals. See Appendix A of this QAPP for the applicable SOPs.

14.1 Certification of Local Primary Standards

Primary standards used to verify instrument sensors or field transfer standards are maintained in the DEP Standards Laboratory, the Florida NATTS laboratories, and the local air monitoring program office. Each is briefly described below:

- The local primary flow rate standard used to calibrate the flow orifice transfer standards is maintained and recertified against a NIST-traceable flow rate standard by the DEP Standards Laboratory or the orifice manufacturer. The Standards Laboratory maintains a certified rootsmeter manufactured by Dresser (SN 0812472).

- The local primary temperature standard used to verify the accuracy of the field temperature transfer standards will be a mercury-in-glass thermometer and will be recertified against a NIST primary standard when there is an observed shift in performance or the instrument manufacturer.
- The local primary pressure standard used to verify the accuracy of the field barometer transfer standards will be a stationary mercury barometer maintained at the local air monitoring program office or from the instrument manufacturer.
- The DEP Standards Laboratory maintains a Fluke 5528 Voltage Generator as a local primary standard, which is used to certify voltmeters (e.g., Fluke digital voltmeters) used at the air monitoring sites.
- The local primary weight standards are the ASTM Class 1 weights that are used to calibrate the laboratory balance are recertified annually. During the annual visit by the instrument service technician, the local primary standard weights will be checked against the service technician's standards to ensure acceptability.

14.2 Certification of Transfer Standards

Transfer standards used to verify instrument sensors are certified against a NIST-traceable standard of a higher order every 365 days. Each is briefly described below:

- The volumetric flow meters used as transfer standards for flow rate verifications as certified, annually by the instrument manufacturer, traceable to a NIST primary standard.
- The flow orifice transfer standards used for flow rate verifications will have their own certifications and are traceable to the local primary flow rate standard. A calibration relationship for the flow rate standard, such as an equation, curve, or family of curves, is established by the manufacturer (and verified if needed) as accurate to within 2% over the expected range of ambient temperatures and pressures at which the flow rate standard is used. The flow rate standards shall be recalibrated and recertified at least annually. The unit's observed flow must be within SOP-established control limits and the observed points must be linear.
- The field temperature transfer standards used for calibration of temperature sensors will be handheld digital thermometers that have their own certification. They will be certified at least annually against the local primary temperature standard, or the auditors transfer standard, to within 2°C of the expected range of ambient temperatures at which the temperature standard is to be used.

- The field pressure transfer standards will be handheld digital aneroid barometers that will have their own certification and will be certified at least annually against the local primary pressure standard.
- The field time standards used in the Florida NATTS and Air Toxics monitoring network are certified to the WWV NIST atomic clock in Boulder, CO (telephone number: 1-303-499-7111) as a primary time standard. A time transfer standard is considered reliable when it has proven to be consistently accurate to ±5 minutes over a six-month period (±50 seconds per month) and is not adversely affected by an electrical power failure. A newly designated time transfer standard should be checked monthly, to establish its compliance, for the first six months of operation and semi-annually thereafter.
- Digital voltmeters used in the air toxics network are certified annually by the instrument manufacturer or by the DEP Standards Laboratory which maintains a Fluke 5528 Voltage Generator as a local primary standard.

15.0 ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Florida's NATTS and Air Toxics monitoring network SOPs itemize the apparatus, equipment, materials, and supplies required for various monitoring and laboratory equipment. In general, supplies and consumables are procured directly from the vendor manufacturing the analyzers used within the air toxics network. Parts lists, including recommended replacement schedules, are itemized in most manufacturers' operating manuals as well. Florida uses this information to determine the appropriate procurement schedule and volume of consumables required to support continuing operations.

Supplies and consumables for the air toxics monitoring network are tracked by the Florida NATTS laboratory managers, local air monitoring program managers and/or staff; when replacements are needed. Supplies are inventoried by each program for later distribution. Received materials are inspected to ensure the proper part number was received as ordered. General inspection to identify any damaged products is also performed. A revolving inventory system (first in, first out) is used to ensure that storage times do not affect the material's integrity. If a manufacturer or NATTS program requirement indicates a specific expiration period for supplies, those supplies exceeding expiration dates are discarded if not used within the acceptable period.

16.0 NON-DIRECT MEASUREMENTS

Some data not obtained by direct measurement from Florida's NATTS and Air Toxics monitoring network are used to support the monitoring program. This includes data from outside sources and historical monitoring data. Possible databases and types of data and information that might be used include:

- Chemical and Physical Properties Data
- Sampler Manufacturers' Operational Literature
- Geographic Location Data
- Traffic Count Data
- Census Data
- Dispersion modeling
- Historical monitoring data measured by other sources
- National Weather Service Data

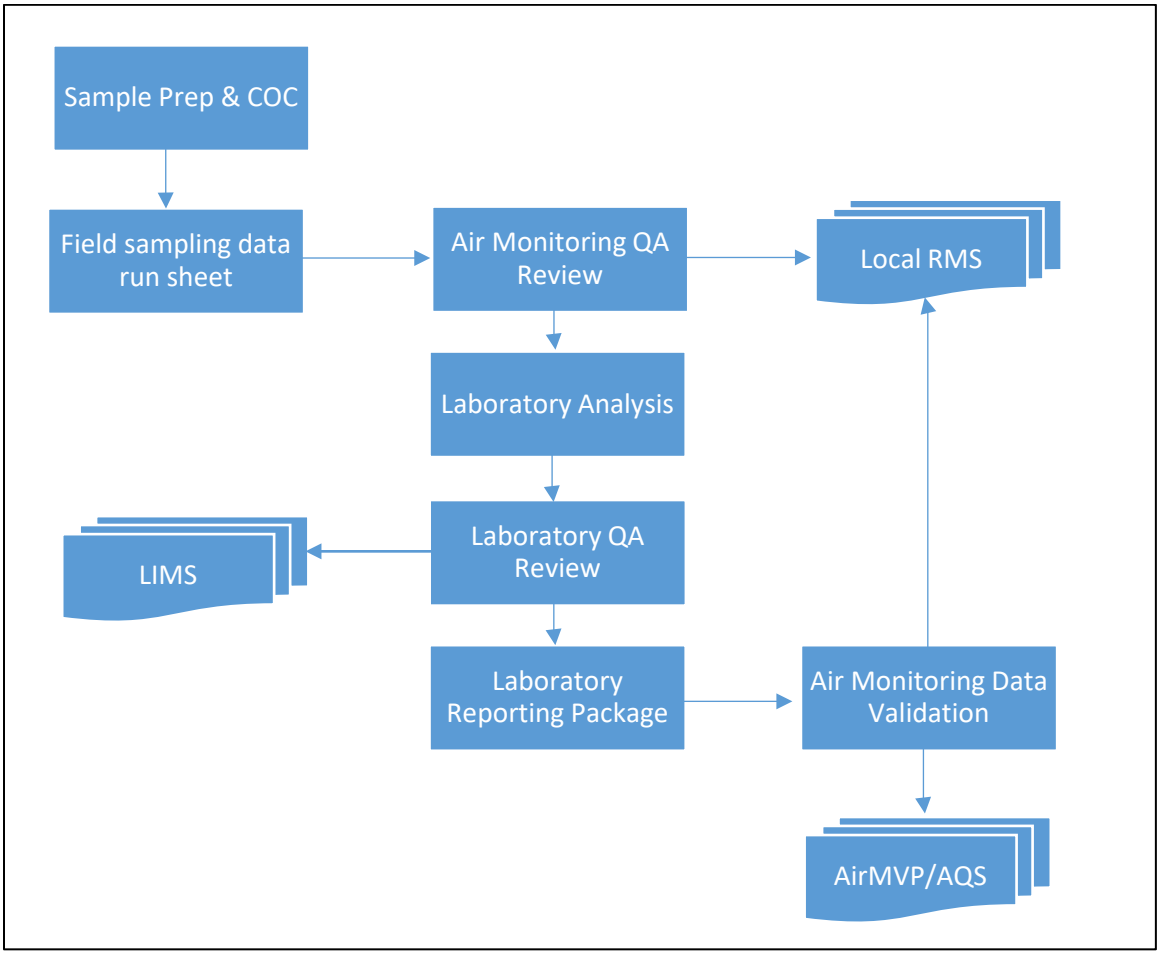
Any use of outside data will be quality controlled to the extent possible following QA procedures outlined in this document and in applicable EPA guidance documents.

17.0 DATA MANAGEMENT

The primary work product of Florida's NATTS and Air Toxics monitoring network is data. Accordingly, formalized procedures are required to ensure successful data management. Data management describes an inter-related set of standardized processes used to acquire, transmit, transform, reduce, analyze, store, and retrieve data. When documented and followed, a data management system helps maintain the integrity and validity of the data throughout its entire life cycle. Florida's air monitoring data follows a documented flow path. The data life-cycle starts before data collection begins and ends with use of the data. Figure 17-1 illustrates the flow of air toxics data from sampling media preparation to data archive and reporting in AQS and local record management systems (RMS).

Laboratories supporting the Florida's NATTS and Air Toxics monitoring program use either a Laboratory Information Management System (LIMS) or the air monitoring program record management system to track each sample and final data package for validation and transmittal to AirMVP/AQS.

Figure 17-1: NATTS & Air Toxics Data Flow Diagram



17.1 Data Collection and Recording

Ambient air toxics monitoring samplers and analytical instruments are described in the NATTS TAD for collecting NATTS program data. The Florida NATTS and Air Toxics monitoring network utilizes only samplers and analytical instruments which meet the requirements of the NATTS TAD. Upon installation, and at regular intervals as specified, the network instrumentation is calibrated in accordance with the specified instrument SOPs, listed in Appendix A of this QAPP.

The air toxics data and sampling media are collected by the Florida's NATTS and Air Toxics monitoring network and recorded both in hardcopy (carbonyl, PAH) and electronic formats (VOC, PM_{10} metals, PAH). Field (parameter) data associated with each sample media is recorded on relevant data forms contained in the corresponding field sampling and analytical laboratory SOPs. Initial sample preparation and COC information are recorded in the local air monitoring program RMS or corresponding LIMS. The field sampling data and final laboratory results are recorded in the local air monitoring program RMS.

17.2 Data Transmittal and Transformation

Data is transmitted from the field sampler to the local air monitoring program's record management system and the LIMS, by electronic or hardcopy forms, specified in the field sampling and analytical laboratory SOPs. Sample information may also be transmitted to the local record management system or LIMS by electronic storage devices such as, flash drives or cards. Calculations for transforming observed data from measurement units to final concentrations are specified in the instrument SOPs and automatically calculated by the electronic forms and/or LIMS database systems.

17.3 Data Verification and Validation

Field technicians record instrument parameters at the time of sample installation and sample collection according to the sampler SOP. This is the first level of quality assessment and QC checks recorded on the sample record. These procedures are outlined in the corresponding field sampling SOPs. The sample record is then reviewed by QA staff to verify the correctness and completeness of the data entries and determine a validity of the sample. Sample data provided to the laboratory is also reviewed by the laboratory analyst and laboratory QA officer. Sample data, analytical QC checks, and concentration results are also verified by the laboratory LIMS or local record management system and air monitoring program QA staff.

Laboratory and the air monitoring program QA staff verify calculations and formulas contained within the electronic forms and the LIMS. In addition, QA staff identify data with errors, biases, and physically unrealistic values as part of the validation process. Once any problems are identified, the data is corrected or invalidated, and the proper qualifier flags or null codes are applied to the results. If necessary, corrective actions will be taken by field or laboratory personnel.

Furthermore, the air toxics samplers in the Florida NATTS and Air Toxics monitoring network undergo periodic audits and annual calibration verifications. These procedures are outlined in the field sampling and data handling SOPs. Performance audits and calibrations ascertain the accuracy, precision, and repeatability of each instrument in performing its required function.

17.4 Data Storage and Retrieval

All environmental data generated from the Florida NATTS and Air Toxics monitoring network are stored on the local record management system and/or LIMS for the air monitoring program. Records are stored electronically on office servers backed-up, nightly to an off-site recovery server. The sample concentration data and QA/QC results are entered into AirMVP on a quarterly basis. This data is then uploaded quarterly into the EPA's Air Quality System (AQS) by the FDEP AQS Coordinator. Local agency original records and records in AirMVP are retained for a period of ten (10) years, unless any litigation, claim, negotiation, audit, or other action involving the records has been started before the expiration of the ten-year period. If this happens, the records will be retained until completion of the action and resolution of all issues that arise from it, or until the end of the regular ten-year period, whichever is later.

After the storage period has passed, the storage media may be disposed of or recycled. However, the validated dataset, including quality assurance data, is uploaded to the EPA Air Quality System (AQS) to be retained for long-term storage.

18.0 ASSESSMENTS AND OVERSIGHT

Assessments or evaluations are designed to determine whether the ambient air quality monitoring program is being implemented in conformance with its approved QA Project Plan. These activities are conducted to increase confidence in the information obtained, and ultimately to determine whether the information may be used for their intended purpose. Table 4-1 provides a summary of the relevant assessments performed in Florida's NATTs and Air Toxics monitoring network.

18.1 Assessments and Response Actions

To ensure the adequate performance of the quality system, the Florida PQAO performs and/or participates in the following assessments. These assessments are used to measure the performance and effectiveness of the quality system, the ambient air toxics monitoring network design and operation, and various measurement phases of the data operation.

- Network Reviews/Site Assessments
- Internal Performance Evaluations
- Technical Systems Audits
- Laboratory Proficiency Testing
- Data Quality Assessments

18.2 Network Plans and Site Assessments

40 CFR §58.10 provides the requirements for annual network plans and the more intensive 5-year assessment for the entire Florida Ambient Air Monitoring Program. These assessments are completed primarily by the DEP Quality Assurance Manager in conjunction with other air monitoring staff, when necessary.

In summary, the annual monitoring network plan provides documentation of the establishment and maintenance of Florida's air monitoring network, which consists of SLAMS, SPM monitoring stations, as well as NATTS and non-NATTS air toxics monitoring sites. The goal of the network plan is to determine conformance with network requirements as set forth in 40 CFR Part 58, Appendices A, C, D, and E, as well as continued appropriateness of the NATTS and air toxics monitoring locations. Any proposed changes to the monitoring network are detailed in the annual plan; proposed additions and discontinuations of SLAMS monitors are subject to EPA approval in accordance with 40 CFR §58.14. The annual monitoring network plan is made available for public inspection and comment for at least 30 days prior to submission to EPA Region 4 and the submitted plan addresses, as appropriate, any received comments. Annual network plans, in accordance with 40 CFR §58.10, began July 1, 2007. Annual network plans are due to EPA Region 4 on July 1 of each year.

For more information about the monitoring locations in the Florida's network please see the Annual Network Plan at this link: https://floridadep.gov/air/air-monitoring/content/air-monitoring-publications-and-reports.

An annual site assessment of each air toxic monitoring location in the Florida NATTS and Air Toxics monitoring network is conducted by the local QA staff/auditor. The site assessment is used to evaluate consistency with the NATTS TAD and compliance with Section 8.0 of this QAPP.

18.3 Internal Performance Evaluations

Performance evaluations (PEs) are a type of audit in which the quantitative data generated in a measurement system are obtained independently and compared with routinely obtained data to evaluate the proficiency of the instruments. The internal audits of the field sampling instruments and laboratory instruments will be conducted by the local air monitoring program and laboratory, respectively. The audit frequency is specified in Tables 5-1 through 5-4, of this QAPP.

The audit activities must be performed by designated technical personnel, QA staff, or team who is not involved in the routine operation and maintenance of the monitoring instruments. All devices used for the audit, such as orifice standard, flow meter, temperature and pressure standards, etc., must not be involved in the calibration and verification of the target analyzer or sampler.

If an audit finds that sampling equipment needs corrective action, the auditor will generate a corrective action report, utilizing the *SOP for Performing Corrective Actions (DEP 01-4)*. The corrective actions may include refresher training for air monitoring staff. Training may be provided in the form of additional communications regarding approved practices, along with discussions of the elements necessary to satisfy these requirements. It may also be in the form on hands-on technical training.

18.4 Technical Systems Audits

A Technical Systems Audit (TSA) is a thorough, independent, and systematic on-site qualitative assessment, where facilities, equipment, personnel, training procedures, protocols, and recordkeeping are examined for conformance with the requirements of this QAPP. The US EPA NATTS program conducts a TSA of the Florida NATTS program every 3 - 5 years. The EPA reports its findings to Florida DEP and Local Program senior management such as the Director and Program Administrators (Florida DEP and Local Program). The Program Administrators (or delegate) regularly monitors progress on corrective action(s) required as a result of TSA findings, and communicates progress to the Director and EPA Region 4.

EPA TSA auditors may segregate the TSA activities into multiple categories, which may include field, laboratory, and data management activities. The categories may be audited independently, or they may be combined. Key personnel with responsibilities for planning, field operations, laboratory operations, QA/QC, data

management, and reporting are included in TSA audit activities and are often interviewed during the process.

Upon completion of the audit, EPA verbally alerts PQAO senior management of any deficiencies or findings during an on-site TSA exit briefing. This briefing allows Florida PQAO staff to begin formulating or implementing corrective actions. A draft TSA Report is typically distributed within 30 days of the completion of the audit. EPA Region 4 allows a brief comment period of the draft report for factual accuracy; after comments are received (if necessary), the TSA report will be finalized and resubmitted to Program Administrator(s). A formal response to address the TSA findings must be completed and resubmitted to EPA Region 4 within 30 days. The Program Administrator(s) will communicate with EPA routinely after the Corrective Action Plan has been submitted and provide progress updates on a periodic basis until the corrective actions have been completed.

TSAs conducted by EPA shall be performed according to the EPA NATTS TSA schedule, and only for the NATTS program sites. At the discretion of the EPA, the non-NATTS air toxics monitoring site(s) may be included in the EPA TSA for criteria pollutant monitors.

18.5 Laboratory Proficiency Testing

The Florida NATTS laboratories participate in the NATTS Proficiency Test (PT) program conducted by EPA. Air toxic audit samples are prepared by EPA and sent to the Florida NATTS laboratories twice per year; every other calendar quarter. The laboratory results are compared to the average of three referee labs, the NATTS labs and the nominal spike value. Results and PT observations are discussed in quarterly conference calls with EPA and the NATTS PT program participants.

The non-NATTS laboratory in Broward County does not always participate in the NATTS PT program,on those occasions,the VOC PT sample provided to the NATTS program VOC lab in Pinellas County is shared with the non-NATTS lab. The analytical results from the non-NATTS VOC lab are then compared to NATTS program PT result reports.

18.6 Data Quality Assessments

A data quality assessment (DQA) is the statistical analysis of environmental data to determine whether the data meet the assumptions that the DQOs and data collection design were developed under, and whether the total error in the data is tolerable. AQS provides statistical software that evaluates the DQIs of precision, bias, and completeness for the monitoring organizations. At a minimum, the PQAO must report the data as specified in the NATTS TAD (Rev 3) section 3.3.1.3.15. Optionally, additional QA/QC checks (per Section 12 of this QAPP) may be reported to AQS. Measurement uncertainty will be estimated for both automated and manual data recording methods.

The statistical estimates of the data quality for precision and bias estimates will be calculated in AQS (AMP 251, QA Raw Assessment Report) or within the quarterly reports recorded in the LIMS and/or local RMS. The following equation is used to determine the relative percent difference (RPD), d_i, between collocated samples, replicate or duplicate samples.

$$d_i = \frac{X_i - Y_i}{(X_i + Y_i)/_2} * 100 \qquad \textit{Equation 18-1}$$

Where, X_i is the concentration from the primary sampler and Y_i is the concentration from the audit sampler or replicate sample.

The following equation is used to determine the percent difference (%DIFF), d_j, between a field sampling parameter and the NIST-traceable transfer standard.

$$d_j = \frac{meas - audit}{audit} * 100 \qquad \textit{Equation 18-2}$$

Where, *meas* is the measured value from the field sampler and *audit* is the value from the transfer standard device.

These statistics assist in confirming the validity of the air toxics data using the MQOs in tables 5-1 through 5-4, of this QAPP. Prior to the quarterly submittal of the NATTS and air toxics data to AirMVP/AQS, the local air monitoring program QA staff verify the data handling processes carried out by field technicians and laboratory analysts. Then the QA Coordinator confirms the validity of the data.

18.7 Reporting and Resolution of Issues

An important function of a quality system is a communication structure that ensures corrective actions, when needed, are implemented in a timely manner and their effectiveness is confirmed. To address the findings from the assessments described above and noted in Table 4-1, the following structure and associated protocols shall be employed to identify and implement corrective actions.

The local air monitoring programs are responsible for identifying the need for corrective actions, which can occur during site visits, audits, data review activities, or routine field and laboratory activities. This shared responsibility, coupled with diligent attention to detail and accuracy, will assure that Florida's NATTS and Air Toxics monitoring network consistently collects quality data, and that the data is reduced, analyzed, and presented in an accurate and representative manner. Any air monitoring staff member who perceives a need for corrective action(s) shall present the situation/concern to the air monitoring program manager.

In most cases, the air monitoring program manager will assess the need for corrective action, although occasions may arise where consultation with the Florida DEP and/or senior management personnel is necessary. A suitable corrective action will be selected and disseminated to the field technician(s) or air monitoring staff member, generally within the week.

Field technicians are primarily responsible for implementing corrective actions, however, any personnel within the air monitoring network may initiate the corrective action process. In accordance with the PQAO Corrective Action SOP (DEP 01-4). The Corrective Action SOP (DEP 01-4) describes the corrective action process and this process must be used whenever a failure or deviation from accepted standards arises and action is taken to rectify the problem.

Although the corrective action SOP (DEP 01-4) was developed for the ambient air monitoring program for criteria pollutants, it is applicable to the NATTS and Air Toxics monitoring program with the following caveats:

- Any reference to a criteria pollutant QAPP shall be interpreted as reference to this NATTS and Air Toxics QAPP;
- The file naming
- References to the review and reporting of a corrective action report by FDEP shall be interpreted as review and reporting to the local air monitoring program manager.

Following the implementation of a corrective action, the air monitoring manager may, at their discretion, require a Data Quality Assessment to verify the efficacy of the corrective action. Both the action of implementing the corrective action and the influence of the corrective action on the operations of the NATTS and Air Toxics monitoring network must be evaluated. Any deficiencies in the correction must be noted and the procedure should be updated to completely correct the discrepancy.

19.0 REPORTS TO MANAGEMENT

The reports to management, specifically for the overall US EPA NATTS program, are discussed in various sections of 40 CFR Parts 50, 53, and 58. This section describes the quality-related reports and communications to local management, Florida DEP, and EPA Region 4 in support of the Florida NATTS and Air Toxics monitoring network operations and the associated data acquisition, validation, and assessment. These reports are summarized in Table 19-1 and described in greater detail in the subsections, below.

Table 19-1: Florida NATTS and Air Toxics Monitoring Program Reports

Report	Frequency	Prepared By	Recipient
Laboratory Data Package	Monthly	Laboratory QA Manager	Air Monitoring Program Manager
NATTS Performance Report *	Quarterly	Air Monitoring Program Manager	EPA Region 4 Project Manager
Data Quality Assessment	Quarterly	Air Monitoring QA Staff	Air Monitoring Program Manager
Data Completeness Report	Quarterly	Air Monitoring QA Staff	Air Monitoring Program Manager
Network Plan Update	Annually	Air Monitoring Program Manager	Florida DEP/EPA R4
Site Assessment Report	Annually	Air Monitoring Field/QA Staff	Air Monitoring Program Manager
Technical Systems Audit	3-5yrs, as scheduled by EPA OAQPS	EPA OAQPS	Local Air Monitoring Program
Corrective Action Report	As needed	Field/Laboratory Staff	Air Monitoring/Lab Manager

* NATTS Performance Report(s), required by the NATTS grant workplan, are required only for the NATTS programs in Pinellas County and Hillsborough County.

19.1 Laboratory Data Package

The air toxics network laboratories and the contracted lab, ERG, provide an analytical data package on a monthly or calendar quarter frequency. The lab data package provides the final concentration and quality control reports from the laboratory analyzing the collected samples. This report is submitted to the QA staff of the local air monitoring program as part of the data validation process.

19.2 NATTS Performance Reports

NATTS program performance reports are provided to EPA Region 4 after each calendar quarter and an annual report after the budget year, as per the NATTS grant workplan. These performance reports are submitted by the local program manager to the EPA Region 4 NATTS project officer.

19.3 Data Quality Assessment and Data Completeness Reports

At a minimum frequency each quarter, the local program QA staff review and report the MQIs and data completeness for the NATTS and Air Toxics monitoring within their jurisdiction. The concentration and quality assurance data submitted for the reporting period will be edited, validated, and entered into AQS using the procedures described in the EPA's AQS User Guide, and EPA's AQS Data Coding Manual. The local Air Monitoring Program QA staff is responsible for reviewing and validating the data and submitting reports to the QA Coordinator/Air Monitoring Program Manager for final review and validation before the data is transmitted to AQS.

19.4 Network Plan Updates and Site Assessments

Florida DEP conducts a network review in accordance with the requirements in 40 CFR 58.10 for the Annual Monitoring Network Plan. The purpose of the network reviews is to determine if a system meets the monitoring objectives defined in 40 CFR 58, Appendix D. The review identifies needed modifications to the network including termination or relocation of unnecessary stations or establishment of new stations. As part of the review, the local Air Monitoring Program provides an annual update of the NATTS and Air Toxics monitoring network to DEP.

In preparation of the network plan update, the air monitoring field and/or QA staff assess the air toxics monitoring site for consistency and compliance with this QAPP and the NATTS TAD. A site assessment report may be included within the network plan update, the NATTS performance report, or as a separate report to the Air Monitoring Program Manager.

19.5 Technical Systems Audit Reports

The US EPA OAQPS conducts periodic Technical Systems Audits (TSA) pursuant to 40 CFR Part 58, Appendix A, Section 5.2 and the NATTS TAD. This audit is a thorough and systematic qualitative assessment of facilities, equipment, personnel, procedures and recordkeeping. The EPA OAQPS determines the schedule for the TSA, typically on a 3 to 5-year basis. A final report detailing the findings and recommendations of these systems audits are distributed to the Florida DEP and the local Air Monitoring Program Director/Manager.

19.6 Corrective Action Reports

The Corrective Action Report (CAR) is used to document measures taken to resolve a problem or potential problem found such as a safety defect, an operational problem, or a failure to comply with procedures. The four steps below will be documented per the Corrective Action SOP (DEP 01-4) from the date of the original problem or infraction to resolution.

- Identify the problem
- Identify why the problem occurred
- Identify a process in which it can be prevented from reoccurring
- Follow up after the process has been put into place

The corrective action reports are primarily designed to document any issues that can detrimentally impact data validity and a separate report will be required for each problem identified. This report is one of the most important ongoing reports to management because it documents primary QA activities and provides valuable records of QA activities that can be used in preparing other summary reports. The corrective action report will remain "open" until all corrective actions are completed, documented and resolutions are verified.

The corrective action report may be initiated by a field technician, data processing staff, or QA staff. Upon resolution, the report will be distributed to the appropriate air monitoring supervisor(s)/manager(s) for review and approval/closure by the local QA Coordinator/Air Monitoring Program Manager.

20.0 DATA VALIDATION AND USABILITY

Each of the air toxic network's samplers and analytical instruments are employed to measure ambient air toxic concentrations integrated over a 24-hour period. To be useful, the data must undergo evaluation to determine the degree to which each data point has met its quality specifications. Air monitoring program QA staff evaluate the data to establish that data collection is consistent with this QAPP, The NATTS TAD, and the requirements specified in field and laboratory SOPs. Then the QA Coordinator and air monitoring program QA Staff estimate the potential effect any deviation from the QAPP or SOP requirements may have on the usability of the associated data item, its contribution to the quality of the reduced and analyzed data, and its effect on decisions.

Data review is the in-house examination to ensure that the data has been recorded, transmitted, and processed correctly. It includes completeness checks to determine if there are any deficiencies such as missing data or lost integrity. The data under evaluation are compared to actual events, as per guidance (Guidance on Environmental Verification and Validation (EPA QA/G-8)). In addition, it is expected that some of the QC checks will indicate that the data fail to meet the acceptance criteria. Data identified as suspect, or does not meet the acceptance criteria, shall be flagged with AQS codes prior to upload to AQS. The review of the routine and the associated QC data will be verified and validated on a quarterly basis. Corrective action is taken if errors or anomalies are found. In cases when data does not meet quality goals, it may be flagged or invalidated.

Data verification is the process for evaluating the completeness, correctness, and conformance/compliance of the dataset against method, procedural and contractual specifications. Verification can be further defined as a confirmation, through provision of objective evidence, that specified requirements have been fulfilled. Unacceptable or questionable data will be flagged by the air monitoring and laboratory QA staff during the data review process.

Data validation is a routine process designed to ensure that reported values meet the quality goals of the environmental data operations. Data validation is further defined as examination and provision of objective evidence that the requirements for the intended use, as stated in the monitoring objectives in Section 5.2, are fulfilled. A progressive, systematic approach to data validation must be used to ensure and assess the quality of data. Data validation includes the review of the PQAO datasets against the individual pollutant MQOs, which is completed by the air monitoring QA Coordinators and QA Staff. It also includes the review of data against the QA/QC results, as well as the comparison of the data against basic statistics (such as completeness). Reviewing data long-term (over a quarterly or annual time-frame) provides information about the structure of the data and may identify patterns, relationships, or potential anomalies. Invalidated data are replaced with AQS Null Data codes prior to upload to AQS. Deviations from operational procedures or quality assurance requirements that do not result in data invalidation may require that data be qualified with QA qualifier flags prior to upload to AQS.

20.1 Sampling Design

Sampling network design and monitoring site selection must comply with the NATTS TAD and 40 CFR Part 58, Appendix E – Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring. Additional guidance is provided in *Guidance for Choosing a Sampling Design for Environmental Data Collection, (EPA QA/G-5S)*.

Any deviations from the minimum siting criteria (e.g., shelter location, probe placement, and/or monitor sight path requirements) shall be thoroughly documented in the site review documentation. Examples of deviations include, but are not limited to, insufficient distance from roadways (i.e. marginal terrain criteria) and insufficient distance from influencing objects (e.g. drip line of an adjacent tree or a cell phone tower that was installed after the monitoring site was established). The impact of the deviations should be evaluated and appropriate adjustments to the confidence intervals should be determined.

20.2 Sample Collection Procedures

Sample collection procedures are outlined in sections 9 through 11 of this QAPP and in greater detail in the sampling instrument SOPs and laboratory SOPs (see Appendix A of this QAPP). Potentially unacceptable data points are routinely identified in the database through electronic application of error flags. Each instrument-specific flag is associated with a unique error. These error flags are routinely reviewed as part of the data validation process. This activity assists in identifying suspect (potentially bad) data points that could invalidate the resulting averaging periods.

The impact of any sample collection deviations shall be evaluated during data validation by the QA staff prior to upload of the data to AQS. Additionally, any deviation from the established sample collection plan must be documented in the appropriate logbook and on the field sample data sheet. Accurate and complete documentation of any sample collection deviations will assist in any subsequent investigations or evaluations. Investigations and evaluations may be necessary to determine whether the data obtained from a site may qualify as a baseline or indicator for other sites.

The data may also require qualifier flags, null codes and text comments within the data management system (i.e., AirMVP/AirVision), which are typically applied to the data by field technicians and/or QA staff. The qualifier flags, informational flags, and null codes transmitted to AQS, provide the principal means of communicating data quality characteristics to the EPA and data users. The flags/codes used for the Florida NATTS and Air Toxics Monitoring Program are listed in Tables 20-1 through 20-3, below.

Table 20-1: Qualifier Code Description

Qualifier Code	Qualifier Description
1	Deviation from a CFR/Critical Criteria Requirement
2	Operational Deviation
3	Field Issue
4	Lab Issue
5	Outlier
6	QAPP Issue
7	Below Lowest Calibration Level
9	Negative value detected - zero reported
CC	Clean Canister Residue
CL	Surrogate Recoveries Outside Control Limits
DI	Sample was diluted for analysis
EH	Estimated; Exceeds Upper Range
FB	Field Blank Value Above Acceptable Limit
FX	Filter Integrity Issue
HT	Sample pick-up hold time exceeded
LB	Lab blank value above acceptable limit
LJ	Identification Of Analyte Is Acceptable; Reported Value Is An Estimate
LK	Analyte Identified; Reported Value May Be Biased High
LL	Analyte Identified; Reported Value May Be Biased Low
MD	Value less than MDL
MX	Matrix Effect
ND	No Value Detected
NS	Influenced by nearby source
QX	Does not meet QC criteria
SQ	Values Between SQL and MDL
SS	Value substituted from secondary monitor
SX	Does Not Meet Siting Criteria
TB	Trip Blank Value Above Acceptable Limit
TT	Transport Temperature is Out of Specs.
V	Validated Value
VB	Value below normal; no reason to invalidate
W	Flow Rate Average out of Spec.
X	Filter Temperature Difference out of Spec.
Y	Elapsed Sample Time out of Spec.

Table 20-2: Null Code Description

Null Data Code	Code Description
AA	Sample Pressure out of Limits
AB	Technician Unavailable
AC	Construction/Repairs in Area
AD	Shelter Storm Damage
AE	Shelter Temperature Outside Limits
AF	Scheduled but not Collected
AG	Sample Time out of Limits
AH	Sample Flow Rate out of Limits
AI	Insufficient Data (cannot calculate)
AJ	Filter Damage
AK	Filter Leak
AL	Voided by Operator
AM	Miscellaneous Void
AN	Machine Malfunction
AO	Bad Weather
AP	Vandalism
AQ	Collection Error
AR	Lab Error
AS	Poor Quality Assurance Results
AT	Calibration
AU	Monitoring Waived
AV	Power Failure
AW	Wildlife Damage
AX	Precision Check
AY	Q C Control Points (zero/span)
AZ	Q C Audit
BA	Maintenance/Routine Repairs
BB	Unable to Reach Site
BC	Multi-point Calibration
BD	Auto Calibration
BE	Building/Site Repair
BF	Precision/Zero/Span
BG	Missing ozone data not likely to exceed level of standard
BH	Interference/co-elution/misidentification
BI	Lost or damaged in transit
BJ	Operator Error
BK	Site computer/data logger down
BL	QA Audit
BM	Accuracy check

Null Data Code	Code Description
BN	Sample Value Exceeds Media Limit
BR	Sample Value Below Acceptable Range
CS	Laboratory Calibration Standard
DA	Aberrant Data (Corrupt Files, Aberrant Chromatography, Spikes, Shifts)
DL	Detection Limit Analyses
FI	Filter Inspection Flag
MB	Method Blank (Analytical)
MC	Module End Cap Missing
QV	Quality Control Multi-point Verification
SA	Storm Approaching
SC	Sampler Contamination
ST	Calibration Verification Standard
TC	Component Check & Retention Time Standard
TS	Holding Time or Transport Temperature Is Out Of Specs.
XX	Experimental Data

Table 20-3: Informational Flag Description

Informational Flag	Flag Description
IA	African Dust
IB	Asian Dust
IC	Chemical Spills & Industrial Accidents
ID	Cleanup After a Major Disaster
IE	Demolition
IF	Fire - Canadian
IG	Fire - Mexico/Central America
IH	Fireworks
II	High Pollen Count
IJ	High Winds
IK	Infrequent Large Gatherings
IL	Other
IM	Prescribed Fire
IN	Seismic Activity
IO	Stratospheric Ozone Intrusion
IP	Structural Fire
IQ	Terrorist Act
IR	Unique Traffic Disruption
IS	Volcanic Eruptions
IT	Wildfire-U. S.
J	Construction

20.3 Sample Handling

Pertinent deviations from established sample-handling protocols for each sample physically retrieved from monitoring sites and equipment is recorded on the sample COC or run data form assigned to each sample. The data record is archived in the applicable RMS or electronic database for all pollutants.

20.4 Analytical Procedures

The NATTS and Air Toxics analytical data is validated and verified utilizing both manual and electronic methods. Specific criteria, specified in the laboratory SOPs and in Tables 5-1 through 5-4, are utilized in the Florida NATTS and Air Toxics network labs with blanks, duplicates, replicates, and collocated samples to determine acceptance of valid, qualifying data.

20.5 Calibration Procedures

Section 14.1 addresses the calibration specifications and information that should be presented to verify calibration procedures, and verify the results are acceptable. When calibration problems are identified, any data produced between the suspect calibration event and any subsequent recalibration should be flagged to alert data users.

20.6 Quality Control

Quality control activities are outlined in Chapters 12 of this QAPP. Prior to upload of data to AQS, the impact of any deviations shall be evaluated by Local Program QA Coordinators/Staff during the data validation process. While not exhaustive, the list below contains some examples of data loss/invalidation and the associated methods of data handling.

- All periods of missed sample collection (e.g. unscheduled maintenance, power failures, and motor or pump failures) will be replaced with the appropriate AQS Null Data codes.
- The percent difference calculations comparing the PUF Hi-VOL sampler flowrate to the design flowrate and to a NIST-traceable flow standard during a QA Performance Evaluation must be within the acceptable operational criteria control limits (i.e. meet the MQOs) noted in Table 5-3. Otherwise, an investigation and assessment of the instrument must be conducted to ensure data quality is maintained.

It is the responsibility of the QA Coordinators/Staff to ensure that all invalidated concentration data is coded appropriately, and then correctly uploaded to AQS.

20.7 Data reduction and Processing

As mentioned in the above sections, technical systems audits will be performed to ensure the data reduction and processing activities mentioned in this document are being followed. Periodically, raw data will be reviewed, and final concentrations will be calculated by hand. The final values submitted to AQS should match the hand calculations. The data will also be reviewed to ensure that associated flags or any other data qualifiers have been appropriately associated with the data and that appropriate corrective actions were taken.

21.0 DATA VERIFICATION AND VALIDATION METHODS

As stated in Section 5.5 of this QAPP, Florida has adopted the consensus-built data validation templates in the NATTS TAD. The templates are included in this QAPP in Section 5.5 and will be used for the weight of evidence approach afforded to PQAO. The NATTS TAD, Section 7.0 provides the following guidance regarding the use of the templates, which the Florida PQAO will follow when validating air toxics data.

1. Critical – Criteria must be met for reported results to be valid – Samples for which these criteria are not met are invalidated.
2. MQO – Required NATTS Measurement Quality Objective which must be attained – Failure to meet these criteria does not necessarily invalidate data but may compromise data and result in exclusion from trends analysis.
3. Operational – Failure to meet criteria does not invalidate reported results: the results are compromised and, on a case-by-case basis may require qualification – refer to Section 3.3.1.3.15 [of the NATTS TAD] for the list of AQS qualifiers.
4. Practical – Failure to meet criteria does not invalidate reported results; results may be compromised but do not require qualification.

The following levels of data review describe the overall data verification and validation process, including the individuals responsible for the stated activities.

RAW – Level 0 (All Staff): These data are obtained directly from the sampling event and recorded on the field sampling record or the laboratory activities recorded in the LIMS. Raw data may have been reduced, but are unedited, not reviewed, and are not adjusted. Raw data are consulted on a regular basis to ascertain instrument functionality and to identify potential episodes prior to the monthly data validation process.

REVIEW (Verification) – Level 1 (Field Technician/QA Staff): This is the next step in the verification process, that occurs after the Level 0 data review. Data are revised (in the edited database only; original data remains intact in the unedited database). Verification and associated data edits include the following:

- Removal of values when monitoring instruments fail specified validation criteria.
- Verifying computer file entries against data sheets/logbooks, where appropriate.
- Replacement of data from a backup data acquisition system in the event of failure of the primary system.
- Identification and flagging of data that are beyond reasonable bounds, significantly deviate from measurement assumptions, or that may be deemed unrepresentative.
- Identification of data collected during periods of maintenance or malfunction.

QA REVIEW (Validation) – Level 2 (QA Coordinators/Staff): QA validation is the next step in data analysis. In addition to a Level 1 review of the data, the QA Coordinators/Staff verify the measurement assumptions, review comparisons of collocated measurements and ensure the data results meet the MQOs found in Tables 5-1 through 5-4. Data that do not meet the requirements of the critical criteria elements will be invalidated, unless compelling evidence and justification exists for not doing so. In case of the latter, the reason(s) for not invalidating the data will be documented. Qualifier flags may be applied to data that are found to not meet operational or systematic criteria. If multiple operational criteria flags are applied to the data, the QA Coordinators/Staff may deem that the data should be invalidated instead of qualified.

AQS READY – Level 3 (Data Quality Section Administrator and AQS Coordinator): Data is prepared for AQS submission and text files are created (see DEP 03-18, Data Handling SOP). Data deemed ready for AQS will be reviewed by the Data Quality Section Administrator before submittal approval is granted to the AQS Coordinator. Once submitted successfully, AQS AMP reports will be reviewed by the Data Validation Team and QA Coordinators/Staff to verify data upload (transfer) was successful. The data will also be spot-checked for accuracy by Data Quality Section Administrator.

22.0 RECONCILIATION WITH DATA QUALITY OBJECTIVES

The Florida NATTS and Air Toxics Monitoring program follows procedures that verify the data collected by the PQAO complies with the NATTS program DQOs. Actions will be taken based upon assessment of the DQOs to maintain compliance.

To reiterate, the air toxics data collected by the Florida PQAO will be used to:

- Detect trends between two consecutive 3-year annual mean concentrations;
- Measure concentration of NATTS Tier I core analytes and Tier II analytes of interest in the ambient air; and,
- Collect sufficient data to represent the annual average ambient concentrations of air toxics at each NATTS site.

The quantitative DQOs are established in the NATTS Quality Management Plan and stated in Section 5.1 of this QAPP. To review the results of required statistical analyses (codified in Section 4 of 40 CFR Part 58, Appendix A), the AMP256 and AMP600 AQS reports will be generated. Since Florida implements EPA's critical criteria for precision checks – the QA Coordinators should not have to directly calculate confidence intervals annually because all data should, statistically, meet the DQOs.

While DQOs will be assessed quarterly throughout the year, the local QA Coordinator/Staff will evaluate whether these objectives are achieved on an annual basis as well. The data used to calculate measurement uncertainty will be obtained from AQS, which will have been previously quality assured, coded, qualified, and evaluated based upon applicable MQOs.

If and when the data from at least one of the monitors violates the DQI bias and/or precision limits, then the local QA Coordinator will conduct an investigation to uncover the cause of the violation. If all the monitors in the network of a similar type or pollutant violate the DQI, the cause may be at the agency level (operator training) or higher (problems with method designation). If only one monitor or site violates the DQI, the cause is more likely specific to the site (particular field technician, problem with the site). Tools for determining the cause include reviewing:

- Data from performance audits and,
- QC trends.

Once the cause(s) of non-conformance has been determined, the local QA Coordinator will institute and document corrective actions to correct quality system deficiencies. Corrective actions may include revising the following:

- Pollutant MQOs;
- This QAPP; and
- Specific SOPs.

While multiple staff members will be involved in any such investigation, the local QA Coordinators/Staff will be responsible for oversight of the investigation. Modification of the MQOs, QAPP, and related SOPs will be the responsibility of the Quality Assurance Manager, with revisions subsequently approved by EPA Region 4. The Florida DEP

Quality Assurance Manager will contact EPA Region 4 for guidance during this process, when/if necessary. Ultimately specifying tolerable error limits reduces the probability of making a decision error due to uncertainty in the data. By controlling uncertainty in the data to the extent prescribed by the DQOs, decision makers can use Florida's air toxics monitoring data with confidence.

23.0 REFERENCES

Environmental Protection Agency. 2002. *Guidance for Quality Assurance Project Plans (QA/G-5)* (EPA/240/R-02/009). Washington, D.C.

Environmental Protection Agency. 2001a. *EPA Requirements for QA Project Plans (QA/R-5)* (EPA/600/R-98/018). Washington, D.C.

Environmental Protection Agency. 2006. *Data Quality Assessment: A Reviewer's Guide (QA/G-9R)* (EPA/240/B-06/002). Washington, D.C.

Environmental Protection Agency. 2005. *Quality Management Plan for the National Air Toxics Trends Stations.* Quality Assurance Guidance Document, EPA 454/R-02-006. September 2005. https://www3.epa.gov/ttnamti1/files/ambient/airtox/nattsqmp.pdf

Environmental Protection Agency. 2006. *Data Quality Assessment: A Reviewer's Guide (QA/G-9R)* (EPA/240/B-06/002). Washington, D.C.

Environmental Protection Agency. 2016. *Technical Assistance Document for the National Air Toxics Trends Stations Program, Revision 3*. October 2016.

Eastern Research Group, Inc. 2018, Contract No. EP-D-14-030, *Support for the EPA National Monitoring Programs, 2018.* Morrisville, NC.

Environmental Protection Commission of Hillsborough County. 2018. *Hillsborough County Environmental Protection Commission Laboratory Quality Manual, May 9, 2018.* Tampa FL.

APPENDIX A - FLORIDA STANDARD OPERATING PROCEDURES

Statewide PQAO SOPs				
Document Control No.	**Document Name**	**Revision No.**	**Effective Date**	**Author/Contact**
DEP 01-4	Corrective Action	2	04/1/2021	Florida PQAO
DEP 18-27	Data Handling and Data Validation	1	12/1/2019	Florida PQAO
DEP 23-01	TE-1000 Poly-Urethane Foam (PUF) Analyzer	1	10/01/2019	V. Taylor
DEP 23-02	ATEC VOC MODEL 2200 ANALYZER	0	10/01/2019	Florida PQAO
DEP 23-03	PM_{10} Metals High Volume Sampler	0	10/01/2019	Florida PQAO
DEP 23-04	Standard Operating Procedure for Air Toxics Characterization Program: Volatile Organic Compounds	0.1	10/1/2019	V. Taylor
DEP 23-05	Mechanical VOC Canister Sampler	0	10/01/2019	Florida PQAO
DEP 23-06	NATTS Standard Operating Procedure for Polycyclic Aromatic Hydrocarbon Sampling by TE-1000 Polyurethane Foam Sampler, Hillsborough County,	0	10/01/2019	A. Watson
ERG-MOR-047C	Field Sampling Procedure for Collecting Ambient Carbonyl Compounds Samples Using the ERG: C Sampling System (with O_3 Denuder Scrubber)	0	10/15/2015	ERG, Inc.
EPCHC QA & Lab SOPs				
Document Control No.	**Document Name**	**Revision No.**	**Effective Date**	**Author/Contact**
AM SOP 3.1	Air Monitoring Document Management	0	06/01/2014	A. Watson
SOP_EPAIO3.1&3.5_1.3	Determination of Metals in Ambient Air by Heated Nitric Hot Block Digestion and ICP-MS Analysis	1.3	11/01/2017	J. Barron
SOP_EPATO13A_1.4	Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air Using Gas Chromatography/Mass Spectrometry (GC/MS)	1.4	11/01/2017	J. Barron

APPENDIX B - LIST OF ACRONYMS

ADQ - Audit of Data Quality

AQS - Air Quality System

AirMVP - Air Monitoring Validation Program

ASTM - American Section of the International Association for Testing Materials

CFR - Code of Federal Regulations

CO - Carbon Monoxide

DAS - Data Acquisition System

DEP - Department of Environmental Protection

DQA - Data Quality Assessment

DQI - Data Quality Indicators

DQO - Data Quality Objectives

F.A.C. - Florida Administrative Code

FAMAC- Florida Air Monitoring Advisory Committee

FEM - Federal Equivalent Method

FRM - Federal Reference Method

FTP - File Transfer Protocol

GC/MS - Gas Chromatograph/Mass Spectrometer

HNO_3 - Nitric Acid

ICP-MS - Inductively Coupled Plasma Mass Spectrometer

IT - Information Technology

LIMS - Laboratory Information Management System

MQO - Measurement Quality Objectives

MSR - Management System Review

NIST - National Institute of Standards and Technology

NO_2 - Nitrogen Dioxide

O_3 - Ozone

OTIS - Office of Technology and Information Services

Pb	-	Lead
Pb-PEP	-	Performance Evaluation Program for lead
PM_{10}	-	Particulate matter with an average aerodynamic diameter of ≤ 10µm
$PM_{2.5}$	-	Particulate matter with an average aerodynamic diameter of ≤ 2.5µm
PSD	-	Prevention of Significant Deterioration
QA	-	Quality Assurance
QAPP	-	Quality Assurance Project Plan
QC	-	Quality Control
QMP	-	Quality Management Plan
RMS	-	Record Management Systems
SLAMS	-	State and Local Air Monitoring Stations
SO_2	-	Sulfur Dioxide
SOP	-	Standard Operating Procedure
SPM	-	Special Purpose Monitors
TSA	-	Technical Systems Audit
US EPA	-	United States Environmental Protection Agency
VFC	-	Volume Flow Control
VOC	-	Volatile Organic Compounds