**Air Monitoring QAPP Review Checklist**

To facilitate consistent reviews of Quality Assurance Project Plans (QAPPs) for ambient air monitoring networks, the following QAPP Review Checklist is provided. This checklist was developed by an EPA workgroup consisting of technical air monitoring and quality assurance (QA) experts in the EPA Regional Offices and the Office of Air Quality Planning & Standards (OAQPS) who review and approve QAPPs. This checklist works in conjunction with the guidance document *Guide to Writing Quality Assurance Project Plans for Ambient Air Monitoring Networks* (EPA-454/B-18-006, August 2018). The checklist is designed for EPA reviewers and assumes the reviewer possesses proficiency in ambient air monitoring and QA requirements; however, various references are provided throughout the checklist to point the reviewer to specific regulatory or guidance resources that may prove beneficial. This checklist helps the QAPP reviewer identify the major areas that must be addressed in the air monitoring QAPP. This checklist can also be used by QAPP writers, in conjunction with the aforementioned QAPP guidance document, to help explain the type of information required for the various QAPP elements.

To effectively focus QA efforts, OAQPS utilizes a four-tiered project category “graded approach” to its QA Program. This graded approach was initially developed by the U.S. EPA, Risk Reduction Engineering Laboratory, Cincinnati, Ohio (EPA/600/9-89/087), and its application to ambient air monitoring networks is discussed in detail in Appendix C of the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II* (EPA-454/B-17-001, January 2017). Category I involves the most stringent QA approach, whereas Category IV is the least stringent. **Air Monitoring QAPPs are reviewed based upon the sections and details required for each QAPP category**, identified within the document to ensure proper review.

This QAPP Review Checklist is developed in a manner that each question can be answered in one of four ways:

* **IA (Included and Acceptable**) – The information presented for this element of the QAPP is adequate.
* **IU (Included and Unacceptable) –** Some information has been provided within the QAPP, but it is either inadequate, unclear, or does not address all facets of the element / program.
* **NI (Not Included) –** Information is missing from the QAPP and should be added.
* **NA (Not Applicable) –** Information is not required or necessary for the specific air monitoring project or QAPP category.

It is not expected that each question in the QAPP Review Checklist be answered with a standalone paragraph, nor do the questions have to be answered in the element where the checklist question is initially asked. The 24-element structure of a Category I QAPP presents some areas of potential content overlap; therefore, the QAPP writer has flexibility to place required information where it best works structurally for the document. The objective of the QAPP Review Checklist is to draw attention to the critical information that should be included within the air monitoring QAPP to ensure it is properly addressed. To facilitate review the QAPP author may want to provide a cross-reference sheet that identifies where each checklist element is found in the document. Content is more important than format and the QAPP is not required to be redundant. Additionally, the use of specific citations and references by the QAPP writer is encouraged to streamline QAPP content. In accordance with 40 CFR Part 58, Appendix A, Section 2.1.2, the QAPP must contain standard operating procedures (SOPs). If SOPs contain the information required in particular QAPP sections, the QAPP writer can refer to the **specific** sections within the referenced SOPs where the information can be found. In this instance, however, the referenced SOPs must be available to the QAPP reviewer in order to verify the content.

The QAPP review should also be helpful to the monitoring organization (QAPP writer). If a question does receive an “IU” or “NI”, the reviewer should present comments on why the information is inadequate and, if possible, provide guidance on appropriate information. Many elements of a QAPP can be addressed with the use of tables and figures. QAPPs deemed inadequate must be reviewed again. Thus, it is advantageous to the QAPP reviewer to provide as much assistance to the QAPP writer as possible to reduce the chances of multiple reviews. The QAPP reviewer will make a judgment on whether to accept or reject the document. These judgments need to be based on the QAPP category, knowledge of the monitoring program, and whether the reviewer determines that there is an adequate quality system in place to ensure that the project will meet its objectives.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **QAPP Title:** | Type QAPP title here | | **Agency:** | Type agency name here |
| **QAPP Category:** | Choose an item. | |
| **Date Submitted:** | Select date | |
| **EPA Reviewer(s):** | |
| **Recommended for:** | | **Date Reviewed:** |  | |
| * **Approval** |  | Select date |  | |
| * **Conditional Approval** |  | Select date |  | |
| * **Not Approvable** |  | Select date | **Reviewer Signature(s):** | |
| **Uploaded to AQS?** | **Yes** | **No** |  | |
|  | |
|  | |
|  | |
| **Comments:** | | | | |
|  | | | | |

| **IA = Included Acceptable IU = Included Unacceptable NI = Not Included NA = Not Applicable** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Element** | **IA** | **IU** | **NI** | **NA** | **Comment** |
| **Section 1. QAPP Identification and Approval**  *Does this page include:* | | | | | |
| Name of organization implementing the project? |  |  |  |  |  |
| Title and version/revision number? |  |  |  |  |  |
| QAPP adherence statement? |  |  |  |  |  |
| Signature placeholders for approval personnel (PQAO and EPA)? |  |  |  |  |  |
| **Section 2. Table of Contents**  *Does the table include:* |  |  |  |  |  |
| List of required elements based upon QAPP category? |  |  |  |  |  |
| List of appendices? |  |  |  |  |  |
| List(s) of tables and figures? |  |  |  |  |  |
| Header illustrating document control format? |  |  |  |  |  |
| **Section 3. Distribution / Notification List**  *Does the list include:* |  |  |  |  |  |
| Names/titles of key personnel who receive original and updated copies of the QAPP? |  |  |  |  |  |
| Names/titles of personnel from partnering agencies and/or contractors/subcontractors who are to receive the QAPP? |  |  |  |  |  |
| Contact information for key personnel? |  |  |  |  |  |
| A disclaimer that indicates the QAPP may be distributed to other personnel, if the distribution list is extremely large? |  |  |  |  |  |
| Explanation of whether QAPP distribution is hardcopy or electronic (notification) format? |  |  |  |  |  |
| Identification of the location where the official version of the QAPP is housed (e.g., agency website, LAN, etc.)? |  |  |  |  |  |
| **Section 4. Project/Task Organization**  *The reviewer should compare the structure and activities described in this section to the requirements stated in 40 CFR Part 58, Appendix A, particularly Sections 2.1.2 and 2.2.*  *Does this section of the QAPP illustrate or explain:* | | | | | |
| The organizational structure of project personnel? |  |  |  |  |  |
| An independent quality assurance (QA) management function? |  |  |  |  |  |
| A structure appropriate to accomplish the QA objectives of the project? |  |  |  |  |  |
| PQAO status/structure (i.e., designated as or affiliated with)? |  |  |  |  |  |
| District/regional offices internal to the PQAO? |  |  |  |  |  |
| Additional monitoring organizations operating under the PQAO? |  |  |  |  |  |
| Contingency measures, such as agreements with other entities to perform additional monitoring services? (e.g., back-up laboratory) |  |  |  |  |  |
| Reference to an approved Quality Management Plan for the organization (PQAO)? |  |  |  |  |  |
| The chain-of-command / lines of communication amongst key personnel? |  |  |  |  |  |
| Delegations of authority? |  |  |  |  |  |
| Individual(s) with authority to stop/resume work? |  |  |  |  |  |
| Responsibilities of partnering agencies (e.g., interdepartmental offices, laboratories, EPA, etc.)? |  |  |  |  |  |
| Responsibilities of contractors / subcontractors? |  |  |  |  |  |
| Lines of communication with partnering agencies (e.g., liaison to EPA Regional Office) and/or contractors (e.g., liaison to contract gravimetric laboratory, etc.)? |  |  |  |  |  |
| *More specifically, does the QAPP identify key personnel responsible for various monitoring, field, or laboratory activities? Depending on the specific project, the QAPP should answer personnel questions such as the following:* | | | | | |
| Who has the authority to make changes to monitors within the network? (i.e., install, discontinue, replace, etc.) |  |  |  |  |  |
| Who is primarily responsible for developing the Annual Network Plan and the 5-year Network Assessment? |  |  |  |  |  |
| Who is the final decision maker regarding QA/QC issues and disputes regarding data validity? |  |  |  |  |  |
| Who is responsible for the overall quality of the project’s data? |  |  |  |  |  |
| Who verifies data? (e.g., field technician) |  |  |  |  |  |
| Who validates data? (e.g., QA staff) |  |  |  |  |  |
| Who certifies data? (e.g., QAM, air program manager, agency director) |  |  |  |  |  |
| Who manages the agency’s documents and records? (e.g., QAM, records custodian) |  |  |  |  |  |
| Who is responsible for writing/revising/maintaining the agency’s QAPP/SOPs? |  |  |  |  |  |
| Who is responsible for communicating and distributing QAPP/SOP revisions? |  |  |  |  |  |
| Who is the designated AQS Administrator? |  |  |  |  |  |
| Who manages other database systems for the monitoring project, if applicable? |  |  |  |  |  |
| Who uploads data into AQS? |  |  |  |  |  |
| Who operates, calibrates, and performs required QC checks on analyzers/samplers? |  |  |  |  |  |
| Who collects physical samples? |  |  |  |  |  |
| Who performs preventive maintenance and/or instrument repairs? |  |  |  |  |  |
| Who certifies standards (if these procedures are performed in-house)? |  |  |  |  |  |
| Who is responsible for sending standards to vendors or metrology labs for recertification? |  |  |  |  |  |
| Who tracks the certification of standards for the organization? |  |  |  |  |  |
| Who tracks inventory and orders supplies and consumables? |  |  |  |  |  |
| Who tracks and orders equipment and standards for the project? |  |  |  |  |  |
| Who conducts instrument performance audits? |  |  |  |  |  |
| Who conducts systems audits (field and lab)? |  |  |  |  |  |
| Who conducts Appendix E siting evaluations (i.e., probe measurements)? |  |  |  |  |  |
| Who performs data quality assessments? |  |  |  |  |  |
| Who performs audits of data quality? |  |  |  |  |  |
| Who tracks the completion of corrective actions? |  |  |  |  |  |
| Who judges the success of corrective actions? |  |  |  |  |  |
| Who supervises laboratory activities? |  |  |  |  |  |
| Who performs secondary and tertiary review of laboratory data packages? |  |  |  |  |  |
| Who approves release of laboratory data packages to the monitoring organization? |  |  |  |  |  |
| Who oversees laboratory corrective actions? |  |  |  |  |  |
| Who is the sample custodian? |  |  |  |  |  |
| Who oversees laboratory QA? |  |  |  |  |  |
| Who oversees training? |  |  |  |  |  |
| Are additional tasks performed by contractors, subcontractors, or partnering agencies identified? |  |  |  |  |  |
| **Section 5. Problem Definition/Background**  *Does this section of the QAPP describe or explain:* | | | | | |
| The environmental problem to be studied? |  |  |  |  |  |
| The background/history of the problem? |  |  |  |  |  |
| The problem’s importance? |  |  |  |  |  |
| If the project is regulatory or research-based? |  |  |  |  |  |
| The Clean Air Act and applicable NAAQS (if it is a regulatory network / criteria pollutant project)? |  |  |  |  |  |
| Specific regulation(s) driving the project? (e.g., SO2 DRR) |  |  |  |  |  |
| Which pollutant(s) the QAPP is addressing? |  |  |  |  |  |
| Project start date? |  |  |  |  |  |
| Amount of data needed to fulfill project’s requirements? (e.g., 3 years) |  |  |  |  |  |
| Information regarding where to find previous versions of the QAPP, including when the original QAPP was developed (if this is a long-term monitoring project)? |  |  |  |  |  |
| Explanation regarding whether the project is managed by a single agency or by a multi-organizational PQAO? |  |  |  |  |  |
| Review cycle for this specific QAPP and its associated SOPs? (Can be addressed in Section 9) |  |  |  |  |  |
| **Section 6. Project/Task Description**  *The QAPP reviewer should cross-check the summary provided in this section with requirements specified in 40 CFR Part 58, if the project is regulatory.*  *Does this section adequately summarize:* | | | | | |
| The monitoring objective(s)? |  |  |  |  |  |
| The work required to collect, document, and report the ambient monitoring data? |  |  |  |  |  |
| Measurements expected to be taken? |  |  |  |  |  |
| Regulatory standards pertinent to the project? |  |  |  |  |  |
| The project duration? |  |  |  |  |  |
| Significant project milestones / timelines (if this is a QAPP for a new project)? |  |  |  |  |  |
| The typical field activities performed? |  |  |  |  |  |
| The typical lab activities performed? |  |  |  |  |  |
| QA oversight of contractual work and resulting data? |  |  |  |  |  |
| Required assessments, schedule, and personnel responsible for completing them? |  |  |  |  |  |
| Critical documents and records to be maintained? |  |  |  |  |  |
| **Section 7. Quality Objectives and Criteria for Measurement Data**  *For this section of the QAPP, the reviewer should cross-check the Data Quality Objectives (DQOs) against the requirements stated in 40 CFR Part 58, Appendix A, Section 2.3.1. The types and frequencies of some Measurement Quality Objectives (MQOs) are also found in Appendix A; however, the majority of the MQOs for the criteria pollutants are summarized in Appendix D of the* EPA QA Handbook Volume II (January 2017)*. For certain programs, such as NCore, PAMS, and NATTS, DQOs / MQOs and validation templates may be found in EPA Technical Assistance Documents (TADs). The QAPP reviewer should compare the information found in this section of the QAPP against these references, as appropriate.*  *The QAPP should address the following questions:* | | | | | |
| Has the organization developed DQOs in-house or adopted those established by the EPA? If the former, does the QAPP describe the 7-step process used to develop the DQOs? |  |  |  |  |  |
| If the organization utilizes the DQOs established by the EPA, does the QAPP clearly state that (thereby justifying the omission of the 7-step DQO process in the QAPP)? |  |  |  |  |  |
| Is the intended use of the data clearly stated? |  |  |  |  |  |
| Are the types of data needed clearly listed? |  |  |  |  |  |
| Are tolerable error limits included (measurement uncertainty)? |  |  |  |  |  |
| Has the organization adopted the EPA’s Data Validation Templates (Appendix D of the QA Handbook) as the MQOs for the specific pollutants covered by the QAPP? If so, does the QAPP clearly state that adoption? |  |  |  |  |  |
| If the QAPP does not adopt the EPA’s Data Validation Templates, is a table(s) included with the agency’s MQOs for each pollutant(s)? Are the MQOs appropriate, adequate, and an acceptable alternative to the EPA’s Data Validation Templates? |  |  |  |  |  |
| Has the organization personalized the EPA’s Data Validation Templates in any manner? Are those edits acceptable? |  |  |  |  |  |
| Are all quantitative Data Quality Indicators defined? (precision, bias, accuracy, completeness, and sensitivity) |  |  |  |  |  |
| For each DQI, does the QAPP explain how the agency measures the specific metric? |  |  |  |  |  |
| Is representativeness addressed? |  |  |  |  |  |
| Is comparability addressed? |  |  |  |  |  |
| Are limits established for each quantitative DQI? |  |  |  |  |  |
| Are statistical reporting units included? |  |  |  |  |  |
| Is there an appropriate amount of QA / QC in the system to control and evaluate the accomplishment of the DQOs? |  |  |  |  |  |
| **Section 8. Training**  *The QAPP reviewer should compare this section to the information found in Section 4 of the QA Handbook.*  *Does this section of the QAPP describe or explain:* | | | | | |
| Special training or certification procedures / courses for field activities? |  |  |  |  |  |
| Special training or certification procedures / courses for lab activities? |  |  |  |  |  |
| Special training or certification procedures / courses for data review / verification / validation activities? |  |  |  |  |  |
| Special training or certification procedures / courses for ambient air monitoring QA? |  |  |  |  |  |
| Required reading (e.g., the QAPP, SOPs, etc.), along with attestation of reading completion? |  |  |  |  |  |
| Training frequency? |  |  |  |  |  |
| How proficiency is assessed? |  |  |  |  |  |
| Documentation of completed training? |  |  |  |  |  |
| The individual(s) responsible for tracking the completion of required training activities and associated documentation? |  |  |  |  |  |
| **Section 9. Documentation and Records**  *For this section of the QAPP, the reviewer should compare the QAPP contents against requirements found in 2 CFR 1500 and 2 CFR 200.333. Additionally, the QAPP reviewer should reference Section 5 of the QA Handbook, as well as compare the QAPP contents to the April 2016 Technical Memo from OAQPS titled* Use of Electronic Logbooks for Ambient Air Monitoring.  *Does this section of the QAPP describe:* | | | | | |
| The organization’s document control system? |  |  |  |  |  |
| A listing of critical documents that are controlled by the organization? (e.g., QAPP, SOPs, blank data entry forms, etc.) |  |  |  |  |  |
| Location(s) of controlled documents? |  |  |  |  |  |
| QAPP/SOP revisions and distribution to staff? |  |  |  |  |  |
| A listing of critical records generated and maintained as part of this project? *Examples to look for, depending on the specific project, may include:*   * *Field QA / QC records* * *Sample collection records* * *Paper or electronic strip charts* * *Logbooks (field and lab)* * *Chain of custody records* * *Field maintenance records* * *Audit reports (internal and external)* * *Corrective action records (field and lab)* * *Laboratory QA / QC records* * *Data packages from contract laboratories* * *Commercial or in-house databases or spreadsheets* * *Training records* * *Monitoring site files (photographs, measurements, addresses, lease agreements, etc.)* * *Emails that include significant monitoring information* |  |  |  |  |  |
| Documentation and maintenance guidelines for electronic records? |  |  |  |  |  |
| Documentation and maintenance guidelines for handwritten or hardcopy records? |  |  |  |  |  |
| Procedures for correcting data (handwritten and electronic)? |  |  |  |  |  |
| Specific location(s) where listed records are filed? |  |  |  |  |  |
| A designated records custodian(s)? |  |  |  |  |  |
| A discussion of document / record security procedures (e.g., restricted access, etc.)? |  |  |  |  |  |
| Specific location(s) where documents are archived, especially QAPPs / SOPs? |  |  |  |  |  |
| The records retention policy (may include federal, state, and/or local regulations; minimum required is 3 years, if agency receives EPA grant dollars)? |  |  |  |  |  |
| Special requirements for retaining data/records/documentation involved in litigation? |  |  |  |  |  |
| Back-up procedures for records (both hardcopy and electronic)? |  |  |  |  |  |
| **Section 10. Network Description (or Sampling Process Design)**  *Network design criteria for ambient monitoring are specified in 40 CFR Part 58, Appendices A, D, & E (regulatory networks). In this section of the QAPP, the reviewer should review the network description against those specifications, where applicable. Section 6 of the QA Handbook can also be used as a reference for the QAPP reviewer. For large networks, references to the organization’s Annual Network Monitoring Plan may be provided in lieu of site descriptions, if appropriate.*  *Does this section of the QAPP describe or include:* | | | | | |
| The rationale for the network design? |  |  |  |  |  |
| Network objectives? |  |  |  |  |  |
| Sampling locations (including maps)? |  |  |  |  |  |
| Identification of ownership of sampling locations (if multi-organization PQAO)? See 40 CFR Part 58, Appendix A, Section 2.1.2. |  |  |  |  |  |
| AQS site identification codes for sampling locations? |  |  |  |  |  |
| Identification of pollutants monitored at each sampling location? |  |  |  |  |  |
| Sampling schedules? |  |  |  |  |  |
| Sampling frequencies? |  |  |  |  |  |
| Site types (e.g., maximum concentration, background, transport, etc.)? |  |  |  |  |  |
| Monitoring designations (e.g., SLAMS, SPMs, NCore, PSD, etc.)? |  |  |  |  |  |
| Criteria for evaluating potential sites? |  |  |  |  |  |
| Factors influencing site selection? |  |  |  |  |  |
| **Section 11. Sampling Method Requirements**  *For this section of the QAPP, the reviewer should cross-check technical information against the requirements found in 40 CFR Parts 50, 58 and the appendices. In accordance with 40 CFR Part 58, Appendix A, Section 2.1.2, SOPs must be included with the QAPP. Some EPA guidance documents can also be referenced to provide additional information or insight into field sampling methods. For example, see Section 7 of the QA Handbook. FRM / FEM designation specifications for approved methods can be found on AMTIC.*  *Does this section of the QAPP describe or identify:* | | | | | |
| Field sampling method for **each** pollutant monitored? |  |  |  |  |  |
| The SOP(s) for **each** field sampling method? (referenced or attached) |  |  |  |  |  |
| Identification of monitoring instrumentation for **each** of the sampling methods? |  |  |  |  |  |
| AQS method codes and FRM/FEM designation codes for all regulatory methods? |  |  |  |  |  |
| How the PQAO will ensure that instrumentation will be operated in accordance with the FRM / FEM designation specifications? |  |  |  |  |  |
| Sample probe materials used? |  |  |  |  |  |
| Sample probe design and maintenance? |  |  |  |  |  |
| Shelter or station type? |  |  |  |  |  |
| Shelter climate-control requirements? |  |  |  |  |  |
| Information on possible monitor interferences and how they will be addressed? (e.g., dust build-up) |  |  |  |  |  |
| Protocols for making method changes (i.e., swapping out instruments) or corrections? |  |  |  |  |  |
| **Section 12. Sample Handling and Custody**  *For this section of the QAPP, the reviewer should compare the stated information with technical requirements found in the field and analytical methods for the project pollutants, including 40 CFR as well as any TO or IO method compendia, if applicable. Section 8 of the QA Handbook can also be referenced.*  *Does this section of the QAPP describe or explain:* | | | | | |
| *Pre*-sample custody requirements and procedures for **each** sample type?? |  |  |  |  |  |
| *Post*-sample custody requirements and procedures for **each** sample type? |  |  |  |  |  |
| Identification of sample handling SOPs? (referenced or attached) |  |  |  |  |  |
| Make-up sample policy and procedures? |  |  |  |  |  |
| Field holding times? |  |  |  |  |  |
| Field sample preservation methods (e.g., PM2.5 filters shipped in chilled containers)? |  |  |  |  |  |
| Laboratory holding times that the field technician must be aware of? |  |  |  |  |  |
| Procedures for packing samples for transport (shipment) to and from laboratory? |  |  |  |  |  |
| Shipment schedules and protocols (such as identification of courier)? |  |  |  |  |  |
| Devices employed to ensure samples are not tampered with (e.g., custody seals) or subject to unacceptable conditions? |  |  |  |  |  |
| Designation of sample custodian(s)? |  |  |  |  |  |
| Discussion of COC (hardcopy and/or electronic)? |  |  |  |  |  |
| COC documentation requirements, and inclusion of COCs (forms, labels) as example figures for each sample type? |  |  |  |  |  |
| Designation of COC custodian? |  |  |  |  |  |
| Procedures for COC review and filing, including back-up (i.e., scanning or similar method)? |  |  |  |  |  |
| Sample archival procedures after analysis? |  |  |  |  |  |
| **Section 13. Analytical Methods**  *For this section of the QAPP, the reviewer should cross-check technical information against the requirements found in the analytical methods (which, if regulatory, may be included in the appendices to 40 CFR Part 50). For toxics, the TO and IO method compendia should be reviewed. Some EPA guidance documents can also be referenced to provide additional information or insight into the analytical methods (such as the EPA QAGD 2.12 for PM2.5).*  *Does this section of the QAPP describe or identify:* | | | | | |
| Analytical methods (e.g., FRM, FEM, TO, IO, etc.) and equipment for **each** pollutant monitored (including FRM or FEM reference, if applicable)? |  |  |  |  |  |
| Analytical SOPs utilized for **each** method (referenced or attached)? |  |  |  |  |  |
| Identification of the analytical laboratories? |  |  |  |  |  |
| For contract laboratories, inclusion of the laboratory QAPP (or equivalent)? (referenced or attached) |  |  |  |  |  |
| Analytical equipment utilized (e.g., ICP-MS, microbalance)? |  |  |  |  |  |
| Sample media used? |  |  |  |  |  |
| Sample containers? |  |  |  |  |  |
| Analytical preservation methods? |  |  |  |  |  |
| Analytical holding times? |  |  |  |  |  |
| Preparation of QC samples (e.g., number / types)? |  |  |  |  |  |
| QC checks on analytical equipment? (e.g., balance checks for the microbalance) |  |  |  |  |  |
| Digestion and elution methods for filters and cartridges (analyzed for metals, toxics and carbonyls)? |  |  |  |  |  |
| Laboratory quantitation limits? |  |  |  |  |  |
| Information on possible interferences and how they will be addressed? |  |  |  |  |  |
| Procedures to follow in the event of laboratory failures? |  |  |  |  |  |
| Individuals responsible for laboratory corrective actions and subsequent documentation? |  |  |  |  |  |
| **Section 14. Quality Control Requirements**  *For this section of the QAPP, the reviewer should cross-check technical QC elements against the requirements found in 40 CFR Part 58, Appendix A, in order to ensure adequacy and compliance (if the QAPP covers regulatory monitors). In some cases, the appendices to 40 CFR Part 50 may also need to be referenced. Important QC activities that are necessary for each pollutant monitor type are itemized in the Data Validation Templates as well.* ***The reviewer should compare the language in the QAPP to the QC items in the Data Validation Templates for the specific pollutant(s) covered by the QAPP****. In some cases, the reviewer should also compare the stated QC procedures to OAQPS technical memoranda found on the AMTIC website. Sections 10 and 12 of the QA Handbook can also be used as a reference.*  *Does this section of the QAPP describe:* | | | | | |
| Calibration scale (or for laboratory methods, the range for calibration standards) for each pollutant monitored? |  |  |  |  |  |
| Rationale for the designated calibration scale? (See Section 10.4 of the QA Handbook) |  |  |  |  |  |
| Calibration acceptance criteria? |  |  |  |  |  |
| Calibration frequency? |  |  |  |  |  |
| Calibration standards preparation frequency (for laboratory methods)? |  |  |  |  |  |
| Calibration blanks (for laboratory methods)? |  |  |  |  |  |
| Calibration verification frequency? |  |  |  |  |  |
| Types of QC checks performed on the gaseous analyzers?  **Includes manual and automated procedures.**  *Terminology may vary per organization; and, organizations typically perform more than one type of QC check on the gaseous analyzers. The reviewer should look for* ***discussions*** *of activities such as:*   * *1-point QC checks* * *Precision checks (p-checks)* * *Biweekly checks (“P&A”, “P&B”)* * *Zero, Precision, Span (ZPS) checks* * *Pre-calibrations* * *Multi-point verifications (MPVs)* |  |  |  |  |  |
| Types of QC checks performed on particulate samplers? (e.g., flow rate checks) |  |  |  |  |  |
| QC check frequency? |  |  |  |  |  |
| QC check concentration(s) and range? Rationale for the QC check concentration(s)? |  |  |  |  |  |
| QC check acceptance criteria? |  |  |  |  |  |
| Discussion of stability? (See Section 10.4 of the QA Handbook) |  |  |  |  |  |
| Calculations (formulae) for the various QC checks? |  |  |  |  |  |
| Examples of invalid QC checks (compelling evidence)? |  |  |  |  |  |
| QC samples collected in the field? (e.g., field blanks, trip blanks) |  |  |  |  |  |
| Collocated sampling (if required)? |  |  |  |  |  |
| Collocation sampling frequency (1-in-12, minimum) and acceptance criteria (e.g., aggregated and individual sample pairs)? |  |  |  |  |  |
| Types of instrument performance evaluations (APEs or audits) performed, and who performs them? (internal and external) |  |  |  |  |  |
| Instrument performance evaluation frequency? (Internal and external) |  |  |  |  |  |
| Audit levels and rationale for those concentrations? |  |  |  |  |  |
| Procedures to follow if QC checks exceed acceptance criteria? |  |  |  |  |  |
| Control charting? |  |  |  |  |  |
| Documentation and reporting requirements? |  |  |  |  |  |
| Types of QC checks and calibrations performed on analytical lab equipment? |  |  |  |  |  |
| For analytical lab equipment, what is done if QC samples fail to meet specifications? |  |  |  |  |  |
| **Section 15. Instrument/Equipment Testing, Inspection, and Maintenance Requirements**  *Does this section of the QAPP describe or identify:* | | | | | |
| Performance acceptance testing procedures for new equipment (after receipt from vendor)? |  |  |  |  |  |
| Instrument performance acceptance testing SOPs (referenced or attached)? |  |  |  |  |  |
| Procedures to follow when new equipment does not meet purchase requirements or performance specifications? |  |  |  |  |  |
| MDL testing? |  |  |  |  |  |
| General preventive maintenance activities for each method? |  |  |  |  |  |
| Maintenance schedule and frequency? |  |  |  |  |  |
| Periodic inspection procedures (for sites, support equipment, such as zero air supplies, etc.)? |  |  |  |  |  |
| Critical spare parts maintained? |  |  |  |  |  |
| Spare analyzers maintained? |  |  |  |  |  |
| Periodic testing / inspection procedures for spare equipment? |  |  |  |  |  |
| Procedures for resolving deficiencies identified? |  |  |  |  |  |
| Documentation requirements? |  |  |  |  |  |
| Warranties or service contracts and who is responsible for maintaining them? |  |  |  |  |  |
| **Section 16. Instrument Calibration and Frequency**  *Does this section of the QAPP describe or identify:* | | | | | |
| Calibration methods / procedures? If already described in Section 14, is a reference to see Section 14 of the QAPP included? |  |  |  |  |  |
| Traceability of standards? |  |  |  |  |  |
| Types of standards and equipment used needing calibration / certification (field and lab). *Will vary per project, but may include the following:*   * *Ozone – Photometers* * *Gaseous Analyzers – MFCs within gas dilution calibrators; gas (source) cylinders* * *Particulates – Flow rate transfer standards, orifices, variable plates, thermometers, barometers, manometers* * *Gravimetric lab – Mass reference standards, RH and temperature standards* |  |  |  |  |  |
| Hierarchy of in-house standards? |  |  |  |  |  |
| Procedures for certifying equipment (SOPs)? (referenced or attached) |  |  |  |  |  |
| Frequency of certifications? |  |  |  |  |  |
| Certification schedule? |  |  |  |  |  |
| Tracking of certifications? |  |  |  |  |  |
| Certification documentation? |  |  |  |  |  |
| Differentiation between standards used for routine verifications/calibrations and standards used for audits (i.e., Performance Evaluations)? |  |  |  |  |  |
| **Section 17. Inspection/Acceptance Requirements for Supplies and Consumables**  *Does this section of the QAPP identify:* | | | | | |
| Critical supplies and consumables for the project (examples may include gas cylinders, sample particulate filters, filter tapes for continuous particulate samplers, Teflon tubing and so forth)? |  |  |  |  |  |
| Inspection acceptance criteria? |  |  |  |  |  |
| Procedures for labelling supplies and consumables that have expiration dates? |  |  |  |  |  |
| Procedures for tracking the use of supplies and consumables? |  |  |  |  |  |
| Individual(s) responsible for tracking/ordering supplies and consumables? |  |  |  |  |  |
| Required documentation? |  |  |  |  |  |
| **Section 18. Non-direct Measurements**  *Does this section of the QAPP describe or explain:* | | | | | |
| Types of data the agency uses to support the ambient air monitoring project that are not directly generated by the agency? |  |  |  |  |  |
| Non-direct measurement data quality limitations or concerns? |  |  |  |  |  |
| **Section 19. Data Management**  *Data management strategies will vary by agency, dependent upon data acquisition systems and software capabilities, and by pollutant (i.e., manual sample collection with subsequent laboratory analysis versus continuous / automated monitoring methods). Data management can be manual, electronic, or a combination thereof. The QAPP reviewer can reference Section 14 of the QA Handbook for additional information.*  *Does this section of the QAPP describe or explain:* | | | | | |
| The complete data flow path for those pollutants collected as 24-hour samples and analyzed in a laboratory? |  |  |  |  |  |
| The complete data flow path for those pollutants collected continuously and analyzed in-situ? |  |  |  |  |  |
| Flow of data from generation through reporting, illustrated using flow diagrams or other visuals? |  |  |  |  |  |
| How data are collected / recorded? |  |  |  |  |  |
| How and where data are stored, including raw and validated data? |  |  |  |  |  |
| Type(s) of data acquisition system in use? |  |  |  |  |  |
| Types of data handling support equipment (computers, modems, wireless routers, etc.)? |  |  |  |  |  |
| How and at what frequency data are transferred from the monitoring station to the central office? |  |  |  |  |  |
| How and at what frequency data are transmitted to the central office for the intermittent samples (manually or electronically)? |  |  |  |  |  |
| How and at what frequency data are transferred from the laboratory to the air monitoring agency? |  |  |  |  |  |
| How data are aggregated? |  |  |  |  |  |
| How data integrity is maintained? |  |  |  |  |  |
| The collection and management of analytical metadata? |  |  |  |  |  |
| Procedures to process, compile, and analyze data (referenced or attached in a specific SOP)? |  |  |  |  |  |
| Procedures to verify and validate data (referenced or attached in a specific SOP)? |  |  |  |  |  |
| The frequency and process for verifying the accuracy of data reporting? |  |  |  |  |  |
| Procedures to test or audit the acceptability of the hardware and software configurations? |  |  |  |  |  |
| Personnel responsible for each data management task? |  |  |  |  |  |
| Security measures (e.g., prevention of data modification or deletion)? |  |  |  |  |  |
| Data back-up procedures, including those for records stored on local hard drives? |  |  |  |  |  |
| Final data repository? |  |  |  |  |  |
| Data retention time frames (see 2 CFR 1500)? |  |  |  |  |  |
| **Section 20. Assessment and Response Actions**  *For this section of the QAPP, the reviewer should compare the assessments listed with the requirements found in 40 CFR Part 58, Appendix A. Additionally, the reviewer should compare the QAPP contents to Section 15 of the QA Handbook. The reviewer should cross-walk this section with the assessment information summarized in Section 6 of the QAPP, as well as with the roles /responsibilities of personnel discussed in Section 4 of the QAPP, in order to ensure completeness and consistency throughout the document.*  *Does this section of the QAPP address:* | | | | | |
| Types of assessments performed? (internal and external) *Examples may include:*   * *Annual Network Plan* * *5-Year Network Assessment* * *Appendix E Siting Evaluations* * *Technical Systems Audits* * *Instrument Performance Evaluations (audits)* * *NPAP / PEP Audits* * *Data Quality Assessments* * *Audits of Data Quality* * *Data Certification* |  |  |  |  |  |
| Frequencies of assessments? |  |  |  |  |  |
| Assessment schedules? |  |  |  |  |  |
| Assessment personnel? |  |  |  |  |  |
| Assessment reporting / documentation? |  |  |  |  |  |
| Independence of equipment and personnel during performance audits? |  |  |  |  |  |
| Procedures for reporting the need for corrective actions? |  |  |  |  |  |
| Procedures for implementing corrective actions? |  |  |  |  |  |
| Identification of individual(s) responsible for determining the adequacy / success of corrective actions? |  |  |  |  |  |
| Timeframes for reporting and resolving identified deficiencies? |  |  |  |  |  |
| Documentation requirements? |  |  |  |  |  |
| Emergency/contingency procedures for times when assessment(s) show data quality/quantity is in jeopardy (e.g., approaching inclement weather)? |  |  |  |  |  |
| **Section 21. Reports to Management**  *The reviewer should compare the information in this section with the requirements stated in 40 CFR Part 58, Appendix A, Section 1.5. Additionally, the QAPP reviewer should compare the contents of this section with the information found above in Section 20 of the QAPP, but note that some agencies may not generate internal reports for all assessments performed. See Sections 15 and 16 of the QA Handbook for additional information.*  *Does this section of the QAPP identify:* | | | | | |
| Types of reports that will be developed? (**For internal and external distribution**)  *May include:*   * *Reports generated from the assessments discussed in Section 20 of the QAPP* * *Field technician reports* * *Internal systems audit reports* * *Corrective Action Reports* * *Particulate sample concentration reports* * *AQS reports generated at routine intervals and routed through staff and management* |  |  |  |  |  |
| Frequency of reports? |  |  |  |  |  |
| Content of reports? |  |  |  |  |  |
| Distribution of reports? |  |  |  |  |  |
| Personnel responsible for developing the reports? |  |  |  |  |  |
| Intended recipient(s) of each report? |  |  |  |  |  |
| **Section 22. Data Validation and Usability**  *The reviewer should compare the information in this section with the requirements stated in 40 CFR Part 58, Appendix A, Section 1.2.3. Section 17 of the QA Handbook and the EPA G-8 document can also be used as references for the QAPP reviewer. Note: Sections 22 and 23 may overlap in content. If information is missing from one section, it may be covered in the other.*  *Does this section of the QAPP explain or discuss:* | | | | | |
| Procedures used to determine whether data are usable for their intended purpose? Should include some discussion of the following technical aspects of the monitoring program:   * Sample design (including methods used) * Sample Collection Procedures * Sample Handling * Analytical Procedures * Quality Control * Calibrations * Data Reduction and Processing |  |  |  |  |  |
| Specific criteria for which, when exceeded, the agency immediately invalidates data? |  |  |  |  |  |
| Any protocols for specific situations that result in unusable data? |  |  |  |  |  |
| **Section 23. Validation and Verification Methods**  *The reviewer should compare the information in this section of the QAPP with Section 17 of the QA Handbook. Note: Sections 22 and 23 may overlap in content. If information is missing from one section, it may be covered in the other.*  *Does this section of the QAPP describe or include:* | | | | | |
| A data review process that provides adequate independence in validation procedures? |  |  |  |  |  |
| Procedures for verifying data, including individual(s) responsible for this task? |  |  |  |  |  |
| Procedures for validating data, including individual(s) responsible for this task? |  |  |  |  |  |
| Review of validated data files prior to and following upload to AQS, and conducted at least quarterly? |  |  |  |  |  |
| A Data Validation SOP? (referenced or attached) |  |  |  |  |  |
| Frequency of data verification and validation activities? |  |  |  |  |  |
| Explanation of the organization’s weight of evidence approach for validating data (40 CFR Part 58, Appendix A, Section 1.2.3)? This should include a discussion of how to interpret and implement the MQO tables found in Section 7 of the QAPP. |  |  |  |  |  |
| Explanation of how to “bracket data”? |  |  |  |  |  |
| Tools utilized in the verification / validation process, such as the DASC tool, programmable dataloggers, or other? |  |  |  |  |  |
| Listing of applicable AQS null value codes and their definitions (including examples of when to apply them)? |  |  |  |  |  |
| Listing of applicable AQS QA qualifier flags and their definitions (including examples of when to apply them)? |  |  |  |  |  |
| Procedures for identifying and flagging data that may have been impacted by exceptional events? |  |  |  |  |  |
| Documentation requirements for each step of the data review process? |  |  |  |  |  |
| **Section 24. Reconciliation with Data Quality Objectives**  *For this section of the QAPP, Section 18 of the QA Handbook can be used as a reference for the reviewer.*  *Does this section of the QAPP describe or explain:* | | | | | |
| The process used by the organization to determine if the DQOs have been attained? |  |  |  |  |  |
| Frequency of this assessment? (annual, at a minimum) |  |  |  |  |  |
| Individual(s) responsible for completing this assessment? |  |  |  |  |  |
| Tools used? |  |  |  |  |  |
| Statistical analyses performed or AQS reports generated? |  |  |  |  |  |
| Discussion of how results will be communicated to decision makers and data users? |  |  |  |  |  |
| Discussion of how results will be documented? |  |  |  |  |  |
| Discussion of potential corrective actions resulting from this process? |  |  |  |  |  |
| Discussion of how data anomalies are resolved? |  |  |  |  |  |
| How limitations on the use of the data are reported to decision makers? |  |  |  |  |  |