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Quality Assurance Document

Quality Assurance Project Plan for the Federal National Performance Evaluation Program (NPAP) for NAAQS Gasses



Foreword

U.S. Environmental Protection Agency (EPA) policy per EPA Order CIO 2105 requires that all projects involving the generation, acquisition, and use of environmental data be planned and documented and have an Agency-approved Quality Assurance Project Plan (QAPP) before the start of data collection. The primary purpose of the QAPP is to provide a project overview, describe the need for the measurements, plan, and define quality assurance/quality control (QA/QC) activities to be applied to the project, all within a single document.

The following document represents the QAPP for the environmental data operations involved in EPA's National Performance Evaluation Program for the National Ambient Air Quality system (NAAQS) Gas Monitoring Network: the National Performance Audit Program (NPAP) for Mailed and Through the Probe (TTP) audit methods. This QAPP was generated by using the following EPA monitoring and QA regulations and guidance:

- 40 CFR Part 50, Appendices A,C,D, and F
- 40 CFR Part 58, Appendices A, C, and E.9
- *EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans*
- *EPA QA/G-5, Guidance for Quality Assurance Project Plans*
- *EPA QA/G-9, QA00 update, Guidance for Data Quality Assessment: Practical Methods for Data Analysis.*

All pertinent elements of the QAPP regulations and guidance are addressed in this QAPP.

This document and related NPAP-TTP (or Mailed) SOPs are accessible in PDF format on the Internet on the Ambient Monitoring Technology Information Center (AMTIC) Bulletin Board (available at <http://www.epa.gov/ttn/amtic/amticpm.html>) under the QA area of the PM_{2.5} Monitoring Information. The document may be read and printed using Adobe Acrobat Reader software, freeware that is available on many Internet sites, including the U.S. Environmental Protection Agency's (EPA) Web site. The Internet version is write-protected. Hardcopy versions are available by writing to or calling:

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This is a living document, which means it may be revised as program objectives and implementation procedures evolve. Comments about technical content and the presentation of this document may be sent to Mark Shanis.

The document mentions trade names or brand names. Any mentions of corporation names, trade names, or commercial products do not constitute endorsement or recommendation for use.

1.0 QA Project Plan Approval

Title: NPAP Performance Evaluation Program Quality Assurance Project Plan

The attached Quality Assurance Project Plan (QAPP) for the NAAQS (Gasses) National Performance Audit Program (NPAP) is hereby recommended for approval and commits the participants of the program to follow the elements described within.

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Region 4	Signature: <u>Michael Crowe</u> Name: Michael Crowe	Date: <u>8/14/14</u>
Region 5	Signature: <u>Bilal Qazzar</u> Name: Bilal Qazzar	Date: <u>8/14/14</u>
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Acknowledgments

This QAPP is the product of the combined efforts of EPA's Office of Air Quality Planning and Standards (OAQPS); EPA Regional offices; and State, Local, and Tribal (SLT) organizations. Mark Shanis of OAQPS led and directed the 2013 update and the NPAP QA Workgroup reviewed the material in this document. The following individuals are acknowledged for their contributions.

SLT Organizations

EPA Regions

Region:

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- 2 Avraham Teitz
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- 5 Scott Hamilton
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A.2.1 Document Control List – Updated 8/07/2006

1. Converted to R-5 format
(A) See Table of Contents
2. Change from NERL to OAQPS in 1998
(A) Coordinator to Manager
 - (1) Shifted some coordinator’s duties to contractor
 - (a) Move procedures from the QA Plan and SOP 001 to the contractor
 - (2) NERL laboratory to EPA Region 7 laboratory
3. Modified to include NATTs Proficiency Testing Program in 2005
4. *Modified 2006 to include Through-the-Probe (TTP) (vs. Mailed) NPAP Audit Delivery for Gaseous Criteria Pollutants*
5. *Deleted Mailed and NATTS June 2014;TTP only*

A.2.2 Abbreviations:

ORD	Office of Research and Development
NERL:	National Environmental Research Laboratory. Part of EPA ORD (Office of Research and Development)
OAQPS:	Office of Air Quality Planning and Standards
AQAD:	Air Quality Analysis Division
NPAP:	National Performance Audit Program
AMTIC:	Ambient Monitoring Technology Information Center, Website on the EPA TTN
TTN:	Technology Transfer Network
NIST:	National Institute of Standards and Technology

A.2.3 Table of Contents

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APPENDICES

Appendix A: Table of Contents of the TTP SOP Compendium-The Compendium is posted on AMTIC, as is this QAPP

Appendix B: QAPP and SOPs for Evaluation (Verification) by EPA Region 7 of NPAP Contractor Performance – These will be posted on AMTIC

Appendix C: NPAP TTP QA/QC Summary tables

% of Complete TTP PE out of 100% in 5 Years, and in most Recent Year

Regional Exceedance Summaries for 5 Years and Most Recent Year

NPAP TTP Whole System Verifications 2004-2014

Blended Gas Cylinder Verifications

Ozone Analyzer Verifications

Annual NPAP TTP Personnel Certification/Recertification Training; Remote and Hands-on Sessions: Ozone Checklists, Blended Gas Checklists, and Everything Else Checklists

Critical Highlight (PP Slides)

SOP Slides

Appendix D:

NPAP SOPs: Data Validation for Data Bases of the NPAP:

Procedure for Checking the Data in the EXCEL Workbooks:

- 1) Check to be sure all of the following information is included or selected on the information (1st) page/worksheet of the workbook:
 - a) AQS site ID (for correctness: i.e., missing digits, too many zeroes, remove dashes if included)
 - b) Date of audit
 - c) NPAP TTP Audit or Certification Data
 - d) Method Code/POC
- 2) Check AQS transactions page (last page/EXCEL worksheet in the workbook) for data and concentration separators, and that they are in the correct places

Directions for Entering Audit Data into the Intermediate (Access) Data Base:

- 1.0) Processes (Audit and Verification results)
 - 1.1) Load new data via spreadsheets to AQS staging area
 - 1.2) Enter Staging area data by hand
 - 1.3) Process staging area data
 - 1.4) Edit Cylinder Assays
 - 1.5) Edit processed audits
- 2.0) Report (Query)
 - 2.1) Audit Details → Query by Region; view 1 page at a time
 - 2.2) Audit Summaries → Query by Region; Summary of Regions audits
 - 2.3) Failed Audits Report → Query by Date, where Failed
 - 2.4) Certification Report → Query by beginning and ending date
 - 2.5) Tanks Certifications → Query by beginning and ending date

Appendix E: SRP: Schedule, SOP Table of Contents, & Guidance Document

Appendix F: NPAP TTP Audit EXCEL Workbook

Appendix G: TTP SOP Section 6 Table of Contents

A3 – Distribution List

<u>Role</u>	<u>Organization</u>
Audit Support Contractor(s)	Contractor(Alion)
Contractor’s Program Manager	
Contract Project Officer	EPA, OAQPS-OD, COR Contracts
NPAP WorkAssignment Manager (NPAP)	EPA, Work Assignment
AAMG Group QA Team Leader	EPA,
OAQPS QA Manager	EPA,

A4 – Project/Task Organization

The Audit Support Program is conducted by EPA OAQPS, and an RTP audit development, testing, and training, and, as available, certification, support contractor; in the ten EPA Regions, by the EPA Regional Laboratory Staff, and their ESAT contractors who are trained and certified by EPA for NPAP TTP audits, with third party, independent verification support provided as needed through an MOU with EPA region 7 (NPAP).

The EPA RTP Work Assignment Manager (WAM) or TOPO/COR is Mark Shanis (NPAP). He reports to Group Leader, OAQPS/AQAD/AAMG (currently Lewis Weinstock). The EPA Work Assignment Manager is responsible for overseeing the activities program. EPA also performs systems and performance audits on the contractor. The NPAP OAQPS WAM/TOPO/COR works with the ten EPA Regional NPAP Contacts to ensure the participation of the state, local, private, and tribal agency participants in their respective Regions.

Contractor personnel consist of a Program Manager and staff. The contractor's responsibilities are listed in section A6.

The EPA Region 7 Laboratory conducts performance evaluations of the Regional audit systems and materials provided to NPAP participants by OAQPS and used by the Regions. The details for responsibility of the Region 7 NPAP Laboratory are provided in the QAPP for that laboratory. See Appendix B.

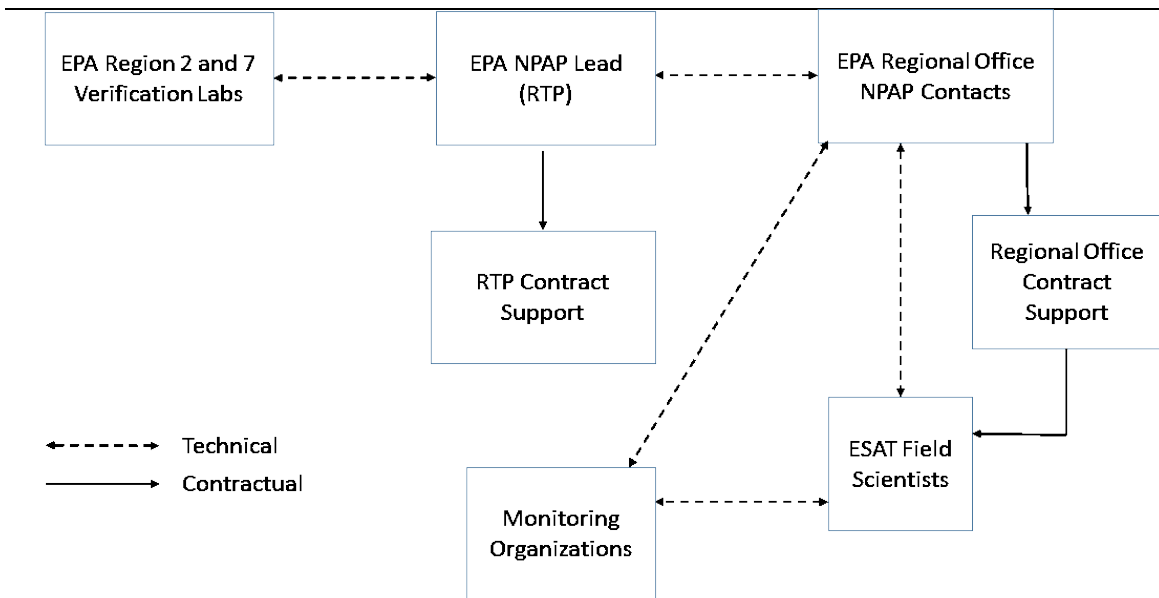


Figure A 4-1 NPAP Program Structure

A5 – Problem Definition/Background

A5.1 NPAP

The National Performance Audit Program (NPAP) the means to by which EPA assesses the proficiency of agencies that are operating monitors in the State and Local Air Monitoring System (SLAMS) and Tribal networks, and the Prevention of Significant Deterioration (PSD) permits and the CASTNET programs. The NPAP is a quality assurance audit program required under Section 2.4 of 40 Code of Federal Regulations Part 58, Appendix A (SLAMS and PSD, now combined in the October 2006 promulgated revision). The monitoring data from these networks are of critical importance in gathering information to make decisions about protecting public health. They are used to determine if an area is in attainment or non-attainment of the NAAQS, and for trends assessment and modeling projections. If, in reviewing the data, an area is found to be in non-attainment the State and Local agencies must develop a control strategy in a State Implementation Plan (SIP) to come into attainment. The economic impact of this decision can be in the millions of dollars and the integrity of the data to make this decision is essential. Similarly, Tribes may use their data work with sources to better control the pollution they generate that impacts tribal members.

NPAP is a key regulatory requirement to ensure and maintain the integrity of these data, especially as regards comparability of data sets (sufficiently or acceptably low amount of

systematic variability) in monitoring programs across cities, states, air sheds, regions, and nationally; and in maintaining the traceability of measurement standardization to NIST.

NPAP delivers Performance Evaluation/audit gas samples to the ambient air monitors in two programs:

- 1) The mailed program, started in the 1970's by the Office of Research and Development (ORD). Until 2005, gas samples were generated centrally to supply audits from the back of the analyzer (BOA) sample intake.
- 2) The Through-the-Probe (TTP) program (2003), which is operated regionally. The TTP audit system generates enough audit test gas to challenge most ambient air monitoring stations starting at the sample inlets. This larger test flow capacity can go up to a high of 20 or 30 lpm, vs the low mailed flow of from 4-6 lpm. This higher capacity enables evaluation of the entire sampling flow path, from the sampling station inlet up to and through the BOA into the analyzer. The program was based on a model operated for 20 years by the California Air Resources Board (CARB) to address limitations of the mailed program, and was made more economically feasible by the PM_{2.5} Performance Evaluation Program, developed by OAQPS for the 1998 PM_{2.5} standard.

The equipment of both mailed and TTP audit systems generate concentrations in the ranges agencies are required to operate at for attainment and related decision-making. The required audit ranges are specified in 40 CFR Part 58, Appendix A and in guidance, and are intended to give appropriate flexibility to the EPA (Regional and CASTNET) and agency (State, Local, and Tribal) staff charged with conducting the audits. As NPAP does not specify audit ranges, the auditors will use the same ranges that agencies use to perform their own internal audits as specified in 40 CFR part 58, App. A. Until October, 2006, the CFR-required FRM or FEM monitors for gases were set at most sites at from zero to 50 ppm full-scale for carbon monoxide (CO) and from zero to 50 ppb ozone (O₃), sulfur dioxide (SO₂), and nitrogen dioxide (NO₂). An updated table of audit ranges was published in October, 2006 for the agency-required audits. These ranges acknowledged the addition over the years of a small network of gas analyzers that perform more reliably and accurately for CO, SO₂ and NO₂ at a lower full scale range; and for a lower O₃ standard. The NPAP audit SOP and audit data Workbooks have been modified to reflect this change.

A5.2 NPAP MAILED & NPAP TTP

The mailed program devices and NPAP TTP audit systems for gaseous audits only generate proficiency test samples of NAAQS gases (O₃, CO, SO₂, and NO₂).

In the mailed program, settings were provided to the agency's station calibrator or operator, who performed the audit. EPA values for the blind settings, used by the operator per instructions, were provided after the agency's data and the audit devices

were returned to the contractor in RTP. This led to significant time delays in notification of results. These delays were of concern even if the results were within the EPA acceptance limit (15%), but especially if the acceptance limit was approached or exceeded. However, the cost was much lower than if the devices were delivered and the audits done by a qualified, independent person.

In the TTP program, first four (2004), then six (2005-6), and now eight (2007-2012) regionally-based mobile TTP laboratories are in operation and the audits are delivered by regionally-based, EPA-trained and certified EPA and/or contractor audit personnel. By 2013, all ten Regions had their own, complete TTP audit systems to deploy. The mobile laboratories contain a carefully assembled system of high quality and high capacity (volume/flow) audit gas support, generation, and analysis equipment. The stability and ranges of the concentrations are independently certified to be traceable to NIST standards by the on-board analyzers. Once this information is available, staff may start monitoring the audit gas sample. The results are automatically calculated and the audit reports generated in the EPA data entry forms. OAQPS asks that the Regional auditors provide copies to the station operator that day, before the TTP auditor leaves the site.

The generating, analytical and delivery equipment are transported to the audit sites in at least three different mobile “platforms.” The platform with the largest capacity and greatest maneuvering challenges is the tow vehicle and trailer combination. The truck platform is more maneuverable but carries less cargo. The most flexible and portable arrangement is the case-based system, which is delivered in vehicles from “bread truck” size on down to medium and small vans,

These transport vehicles are modified for transporting compressed gas cylinders and can provide power to the audit system instruments for warm-up and to allow for audit gas flow path conditioning during transport.

The latest TTP development is the Precursor Gas analyzer TTP audit system and method, for CO, SO₂, and NO_x monitors and the national network of NCORE sites. The first system was assembled and initially tested in RTP (from 2007/8 to the present). A second one is based out of the EPA Region 9 lab in Richmond, CA.

The reduced mailed audit program’s GDS devices have been tested with the RTP PG TTP system cylinders and found to be useable for that level of concentrations in the Regions to generate supplementary QC and/or QA information, especially during the initial development of the NCORE network and given the currently very limited NPAP TTP PG mobile laboratory capacity.

A6 Project Description and Schedule

The NPAP audits all of the gaseous pollutants for which there are NAAQS. Specifically, the following criteria air pollutants will be audited under the NPAP during the period of this contract: SO₂, NO₂, carbon CO, O₃.

In the past, there were 5000-plus air pollution monitors in the ambient air network comprised of SLAMS and PSD sites. In 1997, the monitors were distributed as follows: SO₂ (645); CO (540); NO₂ (373); O₃ (943). In 2004, there were 733 sites for O₃, 339 for SO₂, 284 for CO, and 213 for NO₂. The SLAMS monitors are operated by approximately 170 State and Local agencies, all of whom are eligible to be audited in the NPAP. Also included in the NPAP are approximately 135 governmental and private that operate air monitors at PSD sites, for a total of approximately 305 participating organizations.

A 6.1 Mailed NPAP

The NPAP mailed audits were accomplished using a variety of systems. The participants, i.e., the personnel of the monitoring organization being audited used these audit systems to generate pollutant concentrations and flowing air streams, which they introduced into their sampling system. The pollutant concentrations were unknown to the audit participants. The outputs from the sampler that resulted from the use of the audit systems were recorded on a data form, returned to EPA, and compared to the concentration or flow rate that should have been generated by the audit system under the environmental conditions at the site where it was used. The differences between the EPA expected (certified) values and the NPAP participants reported values were calculated and returned to the participant within two to four weeks of the audit. Summaries of the results within the NPAP acceptable limits of 15%, the results that were not within these limits, as well as corrective action responses, were reported monthly to the WAM and designated NPAP contacts in the ten EPA Regional Offices. Currently, a number of the Regions have taken a few of the mailed devices to be used to measure the NAAQS gasses and a few of them are being kept in RTP. In the future, they will be used by the Regions, or their SLT agencies.

A 6.2 TTP NPAP

The NPAP TTP audits, currently only provided for the gaseous criteria pollutants (O₃, CO, SO₂, and NO₂) are performed in ten mobile laboratories, containing the safest, most accurate, reliable, and cost-effective gas generating, analysis, and support instrumentation available. The mobile labs are located in the ten EPA Regions. Before 2014, in order to give all Regions the opportunity to use these labs, two of the eight were shared between adjacent Regions. The Region 9 mobile lab was shared for about a month/year with Region 10 and Region 7 shares its mobile lab with Region 8 for two weeks.

The mobile laboratories in Regions 5, 6, and 9 are based in trailers that must be towed by a tow vehicle. The mobile labs in Regions 4 and 7 are based in truck-type vehicles that do not require towing. In Region 2, support, generation and analysis equipment was first mounted in a case-based system and a second case-based system was developed and provided to Region 3. Region 1 assembled its own case-based system, based on the

Region 2 design. Region 9 changed to a case-based system in 2008. Recently, OAQPS provided the equipment for two new case-based audit systems, Regions 8 and Region 10. Case-based systems are used in Regions 1, 2, 3, 8, 9, and 10.

Personnel independent of the audited monitoring organizations use these audit systems to generate pollutant concentrations and flowing air streams, which they analyze onsite with independent analyzers calibrated onsite using NIST-traceable standards. If the on-board analysis and recording system document the stability and correct concentration of the generated gases, the TTP operator tells the site operator to start analyzing the TTP gases using the site's monitors and procedures. The introduction of the TTP audit gases into the inlet of the monitoring station's sampling system (TTP) is the critical step in the process.

EPA auditors may choose to provide trouble-shooting and/or perform a re-audit after problems are found initially. A typical trouble-shooting procedure is a BOA audit. If the problem is resolved before the EPA auditor has left the site, s/he may choose to do the re-audit. If not, the Region will work with the agency to arrange a re-audit. All valid re-audits are to be reported and the results distributed in the same way as the initial audits. If the auditor is a contractor, s/he may not take the time to provide trouble-shooting services or re-audit unless approved by the EPA WAM.

NOTE: No auditor may in any way change the audited system, before, during, or after the audit. No auditor may stop the audit before completion of the audit to allow agency staff to trouble-shoot if audit limits are exceeded, or if findings, such as dirt in manifolds, are identified before or during the audit process.

The Regionally-based TTP program began as a pilot program in three Regions in 2004 with EPA Program funds. Currently all regions are now served by eight mobile lab systems, with Regions 8 and 10 sharing management. In 2014, Regions 8 and 10 will have their own audit systems.

The NPAP program has been funded with State, Local, and Tribal grant funds since 2007. Agencies wishing to implement their own TTP audit programs were provided with guidance and independent certification support. The certification indicates that the agency TTP audit data are equivalent to the data obtained by a Regional TTP auditor. The certification process includes a side-by-side performance audit at no less than one site by both TTP systems, and a review of the critical elements of the audit.

The gaseous TTP pollutant concentrations are unknown to the audit participants. The outputs from the agency analyzers that result from the use of the audit systems are recorded on a data form, returned to EPA, and compared to the concentrations that were generated by the audit system .

The TTP program is more flexible than that of the mailed BOA program. The TTP concentrations may be adjusted onsite as needed and the audit data are recorded in an EPA EXCEL spreadsheet-type workbook of individual audit worksheets, which automatically generates a preliminary audit report for each pollutant, and a summary for

the site visit. The workbook and /or the summary report, reviewed by both site operator and TTP operator, should be given to the site operator before the TTP operator leaves the audit site. The workbooks and TTP operator's electronic log notes are emailed to EPA (Region and OAQPS) within two work days of the completion of the audit. *Similarly to what was done for the mailed program*, summaries of the results that are within the NPAP acceptable limits of 15%, for CO, SO₂, and NO₂, and 10% for O₃ and the results that are not within these limits, as well as corrective action responses, may also be reported monthly to the WAM and, if different people, the designated NPAP contacts in the EPA Regional Offices.

NOTE: *Re-audits should be treated as separate audits. Auditors should not offer to resolve an issue for the agency before the audit is completed, unless the failure and request for help comes from the agency and the auditor's management approves the time. Since a number of auditors are contractors, they would have to be notified in writing before they arrive, or get legal authorization after they are at the site location.*

A.6.3 The TTP Program NAAQS Gas Audit Support Contractor and the Regional EPA and ESAT contractor or State, Local or Tribal auditor staff responsibilities are listed below:

1.0 Preparation, calibration of Audit Systems and Execution of Technical Systems Audits

The EPA, State, Local agency, Tribe or contract shall provide support for the preparation, calibration of audit systems and the execution of technical systems audits as described below:

1.1 Preparation and Calibration of Audit Systems.

NPAP Gas (O₃, CO, SO₂, NO₂) audits: The auditor or audit support contractor shall prepare/calibrate the audit systems/materials according to the NPAP TTP Standard Operating Procedures (SOPs) Compendium. The mailed program compendium and the TTP Program compendium are posted on the EPA's Technical (Information) Transfer network (TTN), accessible to the public through the internet. The EPA auditor or audit support contractor shall check each audit system and component device and standards for cleanliness, operational fitness and calibration prior to use in the NPAP. The specific internal quality control guidelines are located in Section A7, Quality Objectives and Criteria for Measurement Data.

The EPA shall select, and the EPA or contractor auditor shall use the system for NPAP audits based on the types of monitors to be audited, cost-

effectiveness, and audit quality needed in calibrating, delivering (by shipping, driving, or carrying), connecting, and using the system. For example, when only O₃ monitors are to be audited, the equipment needed for doing the CO, SO₂, and NO₂ audits may or may not be taken on the audit trip. When only SO₂, NO₂ and CO monitors are to be audited, the O₃ analyzer may not need to be brought to the site. The contractor shall follow procedures in EPA SOPs for these monitors.

EPA provides TTP audits for NAAQS gas monitors at the sites for which an agency is required by EPA to report data to AQS, within the limit of the number of sites that resources allow, taken from the State's 105 grant funds for that year. The allowed exceptions include when access or other logistical practicality makes TTP cost ineffective or inappropriate. In that case, mailed devices, and, if absolutely necessary, BOA audits will be allowed. NPAP TTP SOPs that must be used by the national program auditors are available at the EPA AMTIC website, along with the mailed program SOPs, and this QA Project Plan, The SOPs and this QA Plan are updated as time and other resources allow.

- 1.2 Technical System Audits (TSA) Conducting TSAs at the same time as PEs are performed may be cost effective. Therefore, at times and on request of the EPA Work Assignment Manager (WAM) or Task Order Project Officer (TOPO), the contractor shall perform technical systems audits of State, Local or Tribal agencies as required in 40 CFR 58 Appendix A in accordance with the guidance in *Quality Assurance Handbook for Air Pollution Measurement Systems Volume II; Part 1, Ambient Air Quality Monitoring Program Quality system Development Section 13*.

If requested, a contractor shall accompany the EPA WAM, COR, or TOPO of the TTP programs of the Regions, States, Local, or Tribal agencies. The qualifications and experience of the TSA team members should be independent and adequate, as indicated in the criteria listed in the independence and adequacy appendices of the annual NPAP and PEP implementation decision memos sent out each year to the Regions and their State, Local, and Tribal agencies. The EPA NPAP TOPO, as resources allow, will periodically perform a TSA of the Region 7 NPAP Verification Laboratory. Prior to the TSA trip, the supporting contractor shall provide the WAM, TOPO, or COR with any recommendations for modifications to the Technical Systems Audit checklist in the NPAP QA Plan. Within one week following the trip, the contractor shall provide written recommendations to the EPA WAM/TOPO/COR to use in preparing the Audit Report, and comments on the NPAP Program manager's draft report.

See also Section C1.2 (former p.35, Systems Audits)

2.0 Annual Planning, Scheduling and Delivery of Audit Systems.

- 2.1 NPAP Annual Planning The EPA NPAP Manager will determine the eligibility of any potential new participant in the NPAP, based on discussions with and priorities of the EPA Regional Office NPAP Contacts. The mailed audits will primarily be provided from the Regions in which they will occur. The audit support resources in each region for the four NPAP TTP gasses are now sufficient to check the output of the mailed devices. Also, a few mailed devices have been provided to the Regions that have asked for them. A few will be maintained in RTP, NC.
- 2.2 Audit Funding Currently the level of funding and use of the mailed program is so minimal that all communications from NPAP participants either go through the Regions, if the audits are TTPs, or through the EPA OAQPS NPAP Program Manager for either program. The annual letter inviting past (current and immediately previous years) audit requestors to communicate their contact information and annual audit needs now comes from the EPA AQAD Division Director. The agencies indicate their intention to participate in the next year's audits, as required by 40 CFR Part 58, Appendix A, by completing and returning the attached forms, indicating the number of sites with monitors of the NAAQS criteria gases and particulates.
- 2.3 Audit Planning The responses are accumulated into an annually updated contact list and distributed to the Regional NPAP contacts by the OAQPS NPAP Program Manager. From this list, both annual withholds from State Air Grant (STAG 105) funds are prepared by OAQPS, and Regional NAAQS gas audit site plans for the coming FY are prepared by the ten EPA Regional Office contacts for the NPAP TTP program in their Region. Funding and site planning are initiated and provided for CASTNET and National Park Service (NPS). O₃ site planning is done by a contact in the EPA Clean Air Markets Division (CAMD).
- 2.4 Identifying Required Sites
As early as circumstances allow before the beginning of each calendar year (CY), the EPA NPAP manager proposes lists of selected agencies and required sites for each pollutant. The EPA Manager works with the EPA Regional NPAP contacts to develop these lists.

These lists are organized by EPA Region, State, Local or Tribal agency and by site. The list is limited to the number of agencies for which

anticipated funds will be withheld, and then provided through OAQPS (or in the case of CAMD funds, provided directly) to the Regions to allow NPAP gas audits or materials to be provided in the next calendar year.

Each selected agency gets only one TTP audit, one mailed audit device or set of materials that year. Each mailed device may be used to audit more than one site. TTP cost estimating and funding will be based only on the number of sites, since the major cost determinant for site delivery of the mobile lab is the trip time and associated expenses traveling to and from the base to the site.

For the TTP program selections of sites, the EPA required SLAMS site list must be completed as is, and allows for no other sites, except as determined by the EPA Region. The funding by the state grants (STAG 105), may at times be supplemented by other resources, such as CASTNET/Park Service, Tribal and NCORE STAG 105, or as a result of circumstances of site operation, such as equipment failure or sudden closure decision due to power failure. The proposed lists of agencies and required sites are sent to each region with a request that the Region get feedback from the state and local agencies and provide OAQPS with any resulting corrections for errors and/or recommendations for changes of sites or selected agencies.

The proposed required lists are amended based on the feedback from the regions, if possible by mid-November, after the annual budget (fiscal year or FY) has been determined, so that they (one for SLAMS/NCORE, one for Tribes one for CASTNET) may be sent to the DC staff who do the withholds.

Since the limit of the number of agencies to be funded in one year is always based on the FY budget, and on what is requested (estimated # sites x estimated rate/ site), if an agency has not been audited for a pollutant for four years, an audit for that agency becomes a priority. The revised, proposed, funded lists are then provided to the EPA Regional Office NPAP TTP contacts for the NPAP program contractors to be incorporated into the requested schedule for the year.

Late in each CY prior to the next audit, EPA sends out invitations for NPAP participation to the registered organizations that have taken part during that or the previous year, inviting them for the next year's audits, as required by 40 CFR part 58, Appendix A. They are asked to complete and return forms for each audit of each criteria pollutant that they should audit.

Each summer, states are required to decide if they would rather would do the TTP audits at their sites in the next CY. If a state chooses to do the

audits, the Region in which they are located will be required to review the state's TTP audit program and determine if it meets the national program adequacy criteria, so that the state audits can be demonstrated to be equivalent to the national audits. This review and certification has to include at least one annual side-by-side comparison of the two systems, and at least one more, depending on the size of the network. The difference between the two sets of results are required to be within an agreed upon acceptance limit.

The goal for this annual decision is currently set at 20% each CY, with an expected 100% evaluation of all network sites reporting to AQS within five years. Exceptions are allowed for high priority repeat audits, for those that exceed the acceptance limits, and especially for exceedances at sites near to the NAAQS or where the state audits are found to exceed the state's own acceptance limits.

2.5 Scheduling Audits with Agency Operators

The Regional EPA Auditors (Regions 1 and 2 and some in Region 7) or Regional ESAT TTP contractors shall develop an audit schedule. The contractors' schedules will be approved by the EPA Regional ESAT WAM or TOPO. The list of agencies and sites for which the Regions plan to provide audits in the coming CY will be submitted electronically to the EPA NPAP Program manager in RTP as soon as possible before the audit season starts for the upcoming year.

3.0 Data Base Maintenance, Processing, and Distribution

3.1 NPAP Database Background:

- 3.1.1. The NPAP data are currently contained in two paper and two electronic data bases. The data from the mailed program have been kept by the EPA contractor since EPA requested that a data base be established in 1989. The electronic mailed data base was created in FOXPRO, and operated and maintained by a mailed program contractor. The mailed paper data base has been archived. The oldest paper data sheets are scheduled to be or already have been disposed of according to EPA procedures. EPA has an electronic copy of the mailed data base.
- 3.1.2. The second paper and electronic data base, which contains the initial NPAP TTP audit and certification data, was created in EXCEL in 2003-2004 by EPA Regional personnel. A central OAQPS-developed, operated, and maintained intermediate database for the critical audit and certification data was created in

ACCESS by AQS staff. The critical audit and certification data were moved from the central OAQPS CDs of individual EXCEL workbooks and associated certification files into the intermediate data base. In 2007, screening QC procedures were performed to ensure that the intermediate audit data were acceptable for entry into AQS. About 75% of the data were acceptable and entered into AQS.

NOTE: A procedure for using AQSQA to check for invalid AQS codes, and a related procedure to be conducted by the EPA Regional or contractor staff to check for valid but incorrectly used codes, has been developed with assistance from the AQS staff and presented to the NPAP Regional network.

3.1.3. The TTP field data are collected by Regional EPA personnel, but mostly by EPA Regional ESAT contractor personnel. The EXCEL workbooks are printed out and provided on site, at least as Preliminary Reports, to the station operator staff, on the day of the audit, prior to the TTP operator leaving the site. They are given to the EPA Regional NPAP TTP contact staff, who are responsible for sending the final reports, with requests for any follow-up action, to the appropriate audited agency lead personnel and to OAQPS.

3.1.4. OAQPS has been entering the workbooks into the central OAQPS Intermediate ACCESS database. , Until 2012, AQS staff entered the last worksheet in the workbook, the AQS transaction sheet, into AQS. As of 2013, AQS entering is no longer available. OAQPS TTP or Regional staff will have to do the attempted entering. Some entering errors do occur for some transaction pages. Most need to be corrected by Regional staff, so, with limited help from OAQPS, entering TTP results into AQS will need to be done by the Regions. A brief Region 5 “how-to” procedure has been tested and provided to several Regions to try out. All the Regions will need to use it to enter the TTP results from 2014 on.

An improved entering application is being developed by AQS.

A7 Quality Objectives and Criteria For Measurement

The quality objectives and criteria for measurement are to provide audit materials and devices that will enable EPA to assess the proficiency of agencies that are operating monitors in the SLAMS/NAMS/PAMS/PSD/ networks. Based on performance data for all of the EPA Regional network of NPAP mobile audit systems, and quality objectives for their use, EPA has established acceptance limits or criteria for each of the audit

systems and their component materials and devices. Each audit system, material, or device is tested following established SOPs (see Appendix). Quality criteria for each audited parameter are discussed in Section “B5 Quality Control requirements” below and in referenced SOPs. Any audit system, device or material not meeting these pre-determined criteria are not used in the programs.

A7.1 Audit Devices/Materials

All audit devices and materials used in NPAP will be certified as to their true value and that certification will be traceable to NIST standard materials or devices unless not available or applicable. Accuracy and precision will be determined by the NIST-traceable material or device but in all cases will be known. Control charts showing the trends of critical parameters will be maintained. SOPs for the calibration of all instruments, devices, and the analysis of performance audit/proficiency test samples will be maintained and kept up to date.

The materials used in the NPAP will be as representative and comparable as possible to the calibration materials and actual air samples used/collected by the SLAMS/NAMS/PAMS/PSD networks.

A7.2 Audits

The objectives for the NPAP audits are two-fold: (1) to complete at least 95 percent of the scheduled audits by the end of the year and (2) to determine if the participant’s performance exceeds the limits shown in Table A7 Accepted Limits.

A7.3 Data Base

All NPAP TTP program results will be entered into the intermediate data base by OAQPS personnel as received from the Regional EPA NPAP contact staff or contractor field operators. Screening QC checks to catch entry errors are built into the intermediate ACCESS data base. They are also being incorporated into the new ACCESS field data entry and reporting software. The errors or systematic program problems that are identified by these checks are used in a process of continual program process quality improvement.

A8. Special Training Requirements/Certification

Training may involve self-training and seminars/classes, as available. On-the job training will occur as an audit is performed and experience gained. In-house training will be conducted by personnel presenting the principles and techniques used in similar audits.

As resources allow, EPA provides TTP personnel audit system training and certification at least annually for both new and trained personnel. This scheduled recertification allows auditors to share their knowledge and share real-world experiences with one another. EPA is now using phone and PC and, where resources allow, Internet Conferencing to provide the initial non-hands-on sessions for new auditors. All auditors must take the written exam session and the hands-on sessions together. However, as travel resources may become tighter, as the Regional EPA NPAP contact staff are able, some of these latter sessions may be given by the Regional staff, or at least at the Regional locations. Continually updated training materials are available.

In addition to the initial and recertification classroom and hands-on training, all auditors must complete at least three supervised audit trips, each trip consisting of two to three audit sites. This must be done before the new auditor may perform an audit alone. The on-board trip supervisor should be an experienced NPAP TTP auditor,

A9 Documentation and Records

Before leaving the audited station, EPA or EPA contractor NPAP TTP auditor should give the agency station operator a report showing the results of the audit compared to EPA values.

The site operator should co-initial or co-sign a paper copy of the cover page of the NPAP TTP EXCEL Audit Workbook/report for the auditor to give to the NPAP Regional Office Contact for their files. A copy should be made to send to OAQPS.

When the Regional Office contact for NPAP TTP gets the copy of the audit workbook from the auditor, the Regional contact sends a letter to the agency to the effect that 1) the audit results were satisfactory, or 2) that the agency needs to carry out corrective action, and then notifies the Regional contact of these actions and any results. The SOP includes a form letter template.

EPA OAQPS is also planning to prepare a tool that will show where an agency's results fall in a distribution based on the cumulative results of the audits from all the Regions for the previous year.

Data and records from participants are maintained on site for at least one year by the contractor. The data is then turned over to EPA where it is maintained for five years and is then archived by EPA.

GROUP B. MEASUREMENT/DATA ACQUISITION

B1 Sampling Process Design (Experimental Design)

For the TTP audit program, the sampling design objectives are to meet the requirements for stability, accuracy, completeness, representativeness, and comparability of the test gas provided to the station's analyzer. There are two areas of sampling performance to control and check in TTP auditing: sampling of the generated audit gas test concentrations by the auditor's analysis system and sampling of the test audit gasses delivered to the analyzers via the inlet and manifold. The sampling quality controls are incorporated into the required EPA TTP SOPs. The reasons for these control choices may be listed in the SOPs, or are available by contacting the EPA Regional NPAP contacts or the EPA OAQPS TTP network manager.

B2 Sampling Methods Requirements

The term "critical" or "non-critical" can be applied to data received from the field audits as well as the calibration/verification data for audit devices and analyzers. Whether data are critical varies from audit to audit. Flow is not as important to the accuracy of the audit gas test concentrations as the analyzers receive a partial, non-dilution-based calibration just before the audit gasses are added. Most agencies check their calibrator's mass flow controllers to make sure that the calibration and audits are correct. This check does not pick up flow issues such as leaks in other parts of the sampling system flow path, and does not check for chemical interference or reaction issues. Also, for example, the ambient barometric pressure reading is taken during the CO audit, but it is not critical since the analysis is not affected by this entry. However, the barometric pressure reading is critical to the O₃ audit since it is used in the calculations.

The specific sampling design issues are addressed and documented in the SOPs, Implementation Plans, and Quality Assurance documents developed for each of the sampling networks served by NPAP. For NPAP TTP audits, the test gas generation and analysis sampling requirements for flow path materials, flow rates, residence times, temperature, pressure, etc. are addressed in 40 CFR part 50 in the method appendices and in 40 CFR part 58 in Appendices A and E and in appropriate parts of the TTP SOP Compendium.

B3 Sampling Handling and Custody Requirements

B3.1 Data Custody

Data custody follows standard QA procedures to ensure all data generated or received is traceable. This includes the tracking of results from shipment or direct delivery of audit materials/devices to the audit participants; receiving data results from participants at

the site on the audit delivery date; validating data results; and storing the results in the appropriate data base. Records are also kept on acceptance testing of audit materials and calibration of audit devices. These records allow the tracking of an audit material/device from its initial acceptance through to the storage of the audit results in AQS and in associated program QC and QA data in the NPAP data bases.

B3.2 Sample Custody and Handling

Since NPAP support is a directly delivered audit program, not a sampling project, there are no specific agency sampling handling and custody requirements. These may include directions to the data system that they are not sampling ambient air, but are being audited. For the auditor, audit test sample generation, analytical, and delivery requirements are detailed in the SOP Compendium.

As the Criteria Pollutant gas auditors generate dynamic reactive samples that are continuously analyzed, the TTP equipment and standards do require custody and control. Procedures and equipment needed to keep the test samples technically and legally intact, safe, and secure are detailed in the SOPs. Documentation of the process is also required and addressed in the SOPs. The critical TTP parameter for sample handling is stability of the generated test sample, which is determined first for the generating system by the TTP auditor and then for the sampling station systems by the station operator.

B4 Analytical Methods

There will be no analytical procedures other than those used to certify the quality of the audit materials or devices and the test samples they are used to generate. These analytical and certification procedures are discussed in “Section B7. Instrument Calibration and Frequency.”

B5 Quality Control Requirements

The adequacy of the internal SOPs and adherence to these SOPs will be annually reviewed by the contractor's Quality Assurance officer and the EPA Work Assignment Manager/COR or TO (Task Order) PO (Project Officer). All audit devices or materials will be checked prior to each use for cleanliness, operational fitness, and calibration. A five-point calibration will be done at least once a year, no later than at the beginning of the quarter in which it will be used in an audit, and prior to the use of the audit device in an NPAP TTP audit. Checks on calibrations will be performed using alternative materials from a different manufacturer or lot number. Control charts will be

prepared for each critical NPAP parameter. Initial values will be assigned according to the individual SOPs. Changes in the acceptable range will be documented with the reason for the change in the appropriate mobile audit laboratory notebook. Specific internal QC guidelines follow in Table B5-1.

For the Internal Quality Control of the NPAP TTP generation system, as detailed in the SOP Compendium, section 6, subsections 7.3 and 7.4, analyzed concentration of the Zero air for the TECO CO analyzer must be no greater than plus or minus 0.1 ppm. For the independent comparison between the Continuous Zero Air Generator and the UP Air Cylinder, the difference must be no greater than 0.5 ppm on the TECO CO analyzer or proven equivalent, or corrective action must be taken. As required by the CFR, the analysis of station's NO_x (NO₂) Converter Efficiency (CE) must be 96% or greater. The performance of the CO analyzer must be as specified in order to measure the CE and low NO₂ audit points.

The acceptance limit for the O₃ analyzer performance should be close enough to allow for the new 10% audit result acceptance limit (down from 15%), and the new 7% warning limit.

B5-1. NPAP Table Internal Quality Control Acceptance Values		
Device/Material	Frequency of Checks	QC Check
Compressed Gas cylinders except VOC cylinders	Prior to use in a TTP audit	± 3% of certified value
TECO 48C Analyzer	Prior to use in a TTP audit	0&Lo/Hi Span: within +/-0.1ppm
O ₃ Standard (TECO 49C or API)	Prior to use in a TTP audit	± 4% or 4 ppb of the calculated concentration +/- 1% more than for the SRP

B6 Instrument/Equipment Testing, Inspection, And Maintenance Requirements

B6.1 All instrumentation used to calibrate or analyze audit devices or materials will be maintained in accordance with the manufacturer's guidelines for routine maintenance of that instrument. Instrument/equipment testing, inspection, and other maintenance checks and procedures for each TTP audit system component are listed in the Maintenance Section 9, of the TTP SOP Compendium on AMTIC. See Appendix B. Critical Quality Control limits for the audit system analyzers and standards are included in the SOP and in "Table B5-1. NPAP Table Internal Quality Control Acceptance Values" above.

B6.2 Preventive maintenance is performed as in Table B6-1.

Table B6-1. Preventive Maintenance Procedures

TABLE OF CONTENTS FOR SUBSECTION (Preventive Maintenance)			
For Instruments and Equipment	Manufacturer, SubSect. Page#	Page # in Operator's Manual	
Gas Filter Correlation CO Analyzer TECO Model 48C	THERMO Environmental Instruments (TEI, TECO), p.10	Chapter 5, p.5-1	See NPEP TTP SOP Section 9.7.2
Primary Standard UV Photometric Ozone Calibrator- TECO Model 49C- PS	THERMO Environmental Instruments p.10, 11	Chapter 4, p. 4-1	See NPEP TTP SOP Section 9.7.2
Continuous zero Air Generator-Model 701	Advanced Pollution Instruments (API), p.11- 13	Sect. p. 5 - 13	See NPEP TTP SOP Section 9.7.2
UPS + Power Line Conditioner	Powerware 9125, p.14	Sect. 7, p.45	See NPEP TTP SOP Section 9.7.2
ONAN 6.8K Auxiliary Generator	Commercial Mobile Power, p.15,16	p. 15 - 21	See NPEP TTP SOP Section 9.7.2
Roof Top Air Conditioner	Duo-Therm 579 Series BRISK AIR, p.16,17	p. 9	See NPEP TTP SOP Section 9.7.2
WELLS CARGO 18' Express Wagon	WELLS CARGO, p. 17-19	p. 12 - 19	See NPEP TTP SOP Section 9.7.2
DEXTER AXLE	DEXTER AXLE, p. 19- 21	Inside Front Cover. Also pages 12, 31, 38, 40, 44, 49, 50, 51	See NPEP TTP SOP Section 9.7.2
Carbon Monoxide Alarm	Atwood p. 21	p. 25, 26	See NPEP TTP SOP Section 9.7.2

B6.3 Corrective Maintenance

Gas Filter Correlation CO Analyzer - <u>TECO Model 48C</u> ⁸	See NPED TTP SOP Section 9.7.2
Primary Standard UV Photometric Ozone	See NPED TTP SOP Section 9.7.2

⁸Thermo Environmental Instruments, Inc. Instruction Manual for Model 48C, Chapter 6, Page 6-1.

Calibrator - <u>TECO Model 49C-PS</u> ⁹	
Computerized Ambient Monitoring Calibration System - <u>EnviroNics Series 9100</u>	See NPED TTP SOP Section 9.7.2

B6.4 Initial Cleaning of Presentation Line

The new 150-foot NPAP TTP Presentation Line may arrive with fluid or viscous oil inside. Before installation of the 150 foot line, clean as follow:

- Pour enough alcohol into the line to allow complete washing of the inside of the line.
- Cap both ends and allow the alcohol to stay in the line overnight.
- Empty the alcohol.
- Shoot ten alcohol-soaked cotton balls through the line with pressurized air to remove any contaminates.
- Shoot ten cotton balls soaked in deionized or ultrapure water.
- Run clean dry air through the line for at least an hour.
- Install the Presentation Line, generate 500 ppb of O₃ and condition for 24 hours.
- Perform O₃ line loss and verify it is less than 1.5%. If O₃ line loss is more than 1.5%, condition the line for 24 hours and repeat O₃ line loss.

B7. Instrument Calibration And Frequency

B7.1 Calibration Procedures

The field calibration procedures for audit devices/materials used in the NPAP TTP program are detailed in the NPAP TTP SOP Compendium. Two copies are contained in the EPA's Technology Transfer Network (TTN) under NPAP for the TTP program, and are accessible from the TTN/AMTIC website. One copy is for experienced operators. The other is outdated, but is used for training of new auditors, as it contains more options and explanations. The laboratory calibration versions are contained in the various instrument manuals, and follow the EPA calibration procedures in 40 CFR part 50 Appendices for

⁹Thermo Environmental Instruments, Inc. Instruction Manual for Model 49C-PS, Chapter 5, Page 5-1.

the four pollutants. The procedures are carried out at the beginning of the quarter in which the audit systems are to be used to do audits.

B7.2 Generation of Audit Sample Materials

SO₂, NO and NO₂, CO, and O₃. A range of concentrations of these gasses are generated from compressed gas cylinders containing a blend of SO₂, CO and NO; for Audits of agency analyzers using a relatively portable device called a calibrator, which includes a dilution system, containing two or three mass flow controllers, feeding gasses at different flow rates into a mixing chamber; an O₃ generation system, and the ability to combine the outputs of the dilution system and the O₃ generator to generate NO₂ from NO and O₃, by the process called gas phase titration (NO₂ by GPT),

B7.3 Frequency

The frequency of calibrations and acceptance testing is detailed in the SOPs. See NPAP TTP SOP compendium, Section 3.

B8. INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

To minimize sources of variability within each audit system and between audit systems, the equipment and materials come from the most reliable vendors for use in audits as it is equivalent, in most cases, to a blind calibration application though not in a monitoring application; and meet the critical specifications EPA requires for reactive gasses (see materials required in 40 CFR Part 58, appendix E, section 9, in particular). The NPAP TTP workgroup agreed to follow the CARB model and use the same vendor since 2002.

The inspection or acceptance requirements for supplies and consumables are specified in the purchase documents, which are kept on hand for reference to insure that we get the comparable items.

B9. DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

No data used for project implementation are obtained from non-direct measurement sources, but the agency station operators are asked for the station system measurement for each delivered concentration. The EPA NPAP auditors do not participate in the agency measurement process. The NPAP auditors only record agency audit response measurement data on the NPAP data recording system.

B10. DATA MANAGEMENT

B10.1 Overview of Data Management. A listing of a subset of each agency's total network of ambient air monitoring sites is drafted each fall, based on the listing from

the year before. A copy is sent to all ten EPA Regions for confirmation. A list of sites to be audited in the coming calendar year is developed. A table of STAG funding withholds is created from this list and sent to the Regions for confirmation or corrections.

NPAP TTP audit gas samples are directly delivered to the agency measurement system through the agency sampling inlet, or probe.

For the gaseous TTP program, the critical, certified audit standard and approximate ranges (“levels”) of concentration values to be delivered at the agency audit site are entered into the TTP field data entry software by the TTP audit operator. This person is either an EPA Regional employee or an EPA Regional contractor.

This step is done at least at the beginning of the audit quarter, and always before leaving the home base. The TTP field operator performs the audit and enters the TTP and station data into the TTP data entry software. The software calculates the results and prepares a report, which is provided to the station operator by the TTP operator before leaving the station at the end of the audit. The station operator confirms the station data by signature before the audit operator leaves.

If the Regional auditor is a contractor, the auditor gives the Regional EPA TTP lead, who may also be the contractor’s WAM/TOPO/COR, a copy of the EXCEL workbook and copies of and /or access to any TTP audit lab logbook, either paper or electronic, or both. The Regional EPA audit lead either has the workbook sent to OAQPS or has the AQS transaction page entered into AQS. If sent to OAQPS, the transaction page is entered by an OAQPS staff member into the TTP Intermediate ACCESS database (See Appendix).

An EPA OAQPS or Regional staff member will have the audit transaction page of the workbook (or any future equivalent) entered into AQS. If the AQS screening process finds errors that prevent entry, a list is generated of the type of errors, and the enterer and/or Regional auditor will have to identify and correct the cause of the error.

B10.2 Data processing and reporting.

Final Closing Date. The current year's audits close on December 31.

B10.3 Unacceptable Results

Audit data results that exceed the EPA determined limits (see below) are considered unacceptable and follow-up measures are initiated. Currently, the EPA Regional Office contacts for NPAP are responsible for reviewing the monthly audit results and corrective action summaries for their Region and following up on potential problems identified by the audit results to be outside of the acceptance limits. As needed, follow up calls are made by OAQPS to the Point of Contact for the relevant EPA Regional Office. The NPAP Manager prints out a list from the NPAP data base of Audit

Data Exceedance Results. Data issues not resolved after a 30-day period can be identified and follow-up calls made using this list.

Audit	EPA Determined Acceptance Limits
SO ₂	Mean Absolute % difference > 15% *
NO ₂	Mean Absolute % difference > 15% *
O ₃	Mean Absolute % difference > 10% *
CO	Mean Absolute % difference > 15% *

Note: EPA has reduced some of the DQO acceptance limits listed in the QA regulations in the revision of 40CFR part 58, Appendix A, promulgated in October of 2006. EPA has reviewed the acceptance limits for the NPAP TTP audit results, and found that the gaseous acceptance limit for O₃ could be reduced to 10% and the warning limit to 7%.

B10.4 Data Reports

As indicated above, the provider of the audit distributes the data results to the participants. If a contractor is the provider, the contractor distributes the data results to the audit participants and the results and/or data summaries to the Contract Work Assignment Manager or Contract Office Representative (COR), who may be the EPA Regional NPAP Points of Contact. Audit results that are unacceptable are handled as described in B10.5 of this plan.

Reports about the individual audit results are provided by the Regions to the agency and any requests for follow up accompanies the final report. OAQPS asks the Regions to provide OAQPS with agency follow up responses for audit reports with exceedances of the NPAP TTP acceptance limits.

Summary tables of the Regional and National Completeness Results for the NPAP TTP audit program are entered (posted) onto the AMTIC/QA NPAP site of EPA Technology Transfer Network (TTN).

Summary Audit Exceedance/Follow up tables are in preparation for posting.

A variety of reports can be obtained from AQS, and/or from the related EPA data bases.

GROUP C - ASSESSMENT/OVERSIGHT

C1. ASSESSMENTS AND RESPONSE ACTIONS

C1.1 Performance Audits

C.1.1.1 NPAP TTP Program

The objective of this activity is to provide an independent assessment of the quality of the performance of the TTP audit support contractors and any EPA or state staff who are performing TTP audits. Revised ambient air QA requirements were promulgated in October 2006, and include some revisions to the ranges of audit levels required to be performed by ambient air monitoring organizations once a year on each monitoring site that reports NAAQS gaseous monitoring data to EPA's AQS.

In order to meet the objectives of the NPAP, the NPAP TTP SOPs and audit result, recording and reporting software have been revised to reflect and accommodate the new performance audit ranges/levels and versions made to carry out audits during the development and initial use of the new precursor gas audit system. This system has been made to audit the NCORE precursor gas analyzers, over the multi-year phase-in period provided for by the October 2006 regulations.

Regarding QA for the TTP program, the EPA NPAP Manager will, as needed, request and fund the cost of performance verifications of the Regional NPAP TTP mobile audit laboratories and personnel transported by audit vehicle, or if necessary, by shipping, from the Regional base or from an audit trip, from the contractor's facility to the EPA Region 7, or the EPA Region 2 NPAP Verification Laboratories. The NPAP Manager will be notified by the EPA NPAP Verification Laboratory lead analyst and team leader via e-mail when the selected audit verification has been started, and will send OAQPS the verification documentation when the activity has been completed. The difference results will be compared to the acceptance limits for these comparisons. Unless a problem is found, the comparisons are usually within 5% of the Verification Laboratory values, with the possible exception of very low level ranges. These records will be entered into the NPAP TTP Intermediate ACCESS database, if compatible, or into separate Summary tables, if not compatible with the ACCESS database. The report to the EPA NPAP Manager will also contain an assessment of the condition of the mobile audit lab (i.e., external appearance).

The TTP mobile laboratory generation, analysis, and delivery system outputs will be considered acceptable if an agreement of $\pm 5\%$ is achieved between the NPAP contractor's determined values and the R7 NPAP Laboratory determined values, for the current analyzer range of audit levels.

EPA OAQPS has reviewed the available audit data, and then prepared and posted guidance addressing the need for and providing audit result point difference acceptance limits (ppb), in addition to and, as appropriate, instead of percent difference acceptance

limits, for the difference between agency and NPAP audit points. This action responds to the need to use absolute rather than percent difference acceptance limits for the lowest precursor gas analyzer ranges and associated levels.

If the results are unacceptable, the NPAP TTP Regional Verification Laboratory will run the audit a second time to confirm the initial results.

C.1.1.2 Combination of Personnel and Audit System Verification When Possible

The Region 7 Mobile NPAP TTP laboratory and additional Region 7 gas standards and equipment from the Region 7 Criteria Pollutant NPAP support laboratory will be used, as resources permit, for hands-on training of personnel and certification of the Regional Mobile TTP labs, and/or associated equipment or standards. The requirement for personnel certification or recertification is annual.

Either directly or indirectly, but by no more than one comparison step, the Region 7 support laboratory or the NPAP audit support lab in RTP will independently certify all of the TTP Regional Mobile laboratories at least once every two years, if possible, preferably every year. A mobile TTP laboratory, properly certified within six months, and supported by equipment and standards from an EPA audit support laboratory (Region 7, Region 2, RTP audit support contractor), could be used, in the absence of other resources, to certify a Regional TTP system not properly recertified in (1-2) years. In addition, at other times of the year, certification is accomplished by shipping standards, or whole mobile audit labs, to Region 7, RTP, or Region 2. The frequency of whole TTP mobile laboratory recertification has been resource dependent, and has allowed most labs to be certified at least once in two years, on average. A table of these QA checks will be posted on AMTIC.

C1.2 Systems Audit of NPAP Contractor

At least once a year, as resources allow and frequency of NPAP audits require, a systems audit will be performed by the Regional EPA NPAP Work Assignment Manager (WAM)/TOPO/COR and appropriate EPA technical staff member to ensure that the contractor is adhering to the SOPs that cover conducting audits, entering data, distributing data, and maintaining files. The systems audit will follow a set format based on the information contained in NPAP SOPs. The systems audit will be coordinated with the contractor manager. The results of the systems audit will be forwarded in writing within five working days to the contractor manager for review. The contractor will determine the cause of deficiencies, if any, and report to the EPA Manager within five working days the cause and corrective action taken. *EPA can use the annual certification and recertification training to address the SOP's initial ("New cert") and subsequent periodic ("recert") updated NPAP TTP training requirement.*

C1.2.1 Independent Verification of Audit Support Contractors

A memorandum of understanding (MOU) with EPA Region 7 provides for support to the NPAP program through independent verification of the RTP and Regional audit support contract audit services for the NPAP TTP program. A systems audit of this program, consistent with the Level of Effort, should include review of the Region 7 component and whole system performance audit check, and of the documentation of that program. As resources allow, the OAQPS will perform and report on an independent systems audit (TSA) of the Region 7 support to the NPAP TTP program.

C1.2.2 TTP Program Independent Verification of Regional Audit Support Contractors

The Regional or State-based audit staff, including contractors supporting Regional NPAP TTP audits, and the verification activities they carry out for the program, should be reviewed in a TSA, annually if possible, by OAQPS, and/or by the Region 7 MOU audit support staff, and/or by one of the other experienced Regional TTP auditors or auditor program managers/trainers.

The program element documentation that should be reviewed includes all the documentation of QA and QC checks and the associated acceptance criteria that are listed in the TTP SOP Compendium, section 3:

- 1) The comparison of the Regional TTP O₃ analyzer standard to the Regional SRP, done each quarter in which audit trips are made and before any trips are made;
- 2) Line loss tests, performed at the same time each audit quarter as the SRP comparison;
- 3) Cylinder standard verifications, done annually, if possible;
- 4) Personnel certifications (initial or re-certifications) done annually;
- 5) Whole Regional TTP system compared to the Region 7 TTP system, or to one that has recently been compared to the Region 7 whole system.

Table C1.2-1 Verification Procedure for Systems Audit

Pollutant	Responsible Party
SO ₂	R7 Laboratory
CO	R7 Laboratory
NO ₂	R7 Laboratory
O ₃	R7 Laboratory

C1.3 Audit of NPAP

The EPA NPAP Manager will arrange an independent management system review of the total NPAP program once every two years (in odd years). This could be done at the same time as the TSA.

C1.4 Corrective Action

When results of the internal quality control checks or the external quality assurance audits exceed the limits specified in the Quality Assurance Project Plan or in the individual SOPs, appropriate action will be instituted by the EPA NPAP Manager and/or the contractor manager for problems that are determined to be in the implementation of the NPAP TTP Program. For those problems that are determined to be in the implementation of the auditee's program, Regional Program oversight staff will prepare and send the audit workbook reports, with a cover letter that may be made from one of the SOP template versions in section 7 of the TTP SOP Compendium. This cover letter includes requests for any recommended corrective action.

Note: If the auditor detects a problem or potential problem, at the beginning of an audit, that audit is to be completed without any corrective action by the Agency staff. After the audit is completed, agency staff may do corrective action and request that the auditor carry out some additional activities. If the auditor is authorized to do this, that may be done. However, the initial audit results must stand, and be reported, communicated, and distributed.

Follow up and corrective action will be documented in the annual summary reports and /or tables. In an appropriate amount of time after a corrective action plan has been implemented, a follow up audit should be done. For exceedances, especially of more than one audit point, and for the higher level range points, a follow up audit should be performed after completing corrective action required by an initial audit. For corrective action of questionable results, see B10.5. *Note: Repeat or re-audits at the same site for the same pollutant will be reported, communicated, and distributed.*

C1.5 Reports

OAQPS and Regional NPAP TTP Managers will receive copies of the reports of all systems and performance audits, MSRs, and follow-up activities, if any.

C2. REPORTS TO MANAGEMENT

The EPA NPAP Manager and the EPA NPAP Contractor will prepare a comprehensive yearly quality assurance summary report by March 15 for the previous CY, depending on the size of the program and the resources available. The report will include the internal quality control reviews and assessments and will incorporate any

independent (non-contractor) quality audit reports of the latest independently performed audits on the entire NPAP system.

Table C2-1. List of Reports Required of Contractor

Types of Reports	Frequency	Authors / Recipients	Due Date
Progress Report	Monthly	Contractor/EPA	3/15/20_
QA Summary Report	Annually	Contractor/EPA NPAP Manager	3/15/20_
NPAP Data Summary	Annually	OAQPS / EPA Regional NPAP Contacts	4-5/20_
AIRS Sites Report	Annually	Contractor/NPAP participants/EPA Regions/NPAP points of contact/NPAP Manager	9/31/20

If requested, the contractor will submit:

Written recommendations to the EPA Manager for the manager to use in preparing the audit report, and comments on the NPAP Program Manager’s draft report for a TSA, in particular of Region 7 or 2 audit support lab(s), and any recommendations for modifications to the current Technical Systems Audit checklist prior to the trip, within one week following the trip.

Three copies of the combined monthly technical and financial progress report on or before the 15th of each month, following the first complete reporting period of the contract should be sent to the EPA Administrative Contract Specialist, EPA Project Officer, and the EPA Work Assignment Manager.

Contractors may be tasked to support the following work by the OAQPS NPAP TTP National program manager:

An Annual Update of the AQS Sites Report for EPA’s National Performance Audit Program for the year just completed. The contractor shall prepare and distribute this report to all NPAP participants, EPA Regional NPAP points of contact, and the EPA NPAP Work Assignment Manager.

An annual NPAP Data Summary Report or Table(s) of all the NPAP data to all NPAP participants, EPA Regional NPAP points of contact, and the NPAP Manager by May 31 or each year. The contractor may be asked to support

presentation of the NPAP Data Summary Report at the National Air (Management) Meetings.

National schedule for the coming calendar year, incorporating participant requests with EPA Regional and OAQPS scheduled agency site lists, based on when last audited and approved criteria queries from AQS.

In addition, the contractor and the EPA Work Assignment Manager shall also communicate by phone and/or in person on an as needed basis.

GROUP D - DATA VALIDATION AND USABILITY

D1. DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

The criteria used to validate the data entered into the initial EXCEL NPAP TTP data forms (workbooks) is listed in the EPA NPAP TTP SOP Compendium section addressing data validation. The criteria used to validate data for the NPAP TTP database (EPA developed, tested, operated and maintained) have been in development along with the database. Many of the criteria, and guidance for using audit and other QC/QA data are contained in the data validation templates that are now included in the most recent update of the 1998 Vol II of the EPA *QA Handbook for Ambient Air Monitoring Measurements*, posted on www.epa.gov/ttn/amtic/qa.html

D2. VALIDATION AND VERIFICATION METHODS

The process for the NPAP TTP program is found in the NPAP TTP SOP Compendium. These SOPs are accessible through the Ambient Air QA menu choices at the TTN website at <http://www.epa.gov/ttn/amtic/QA/> page. Audit support data custody follows standard QA procedures to ensure all data generated or received can be tracked and retrieved as needed. This includes the tracking of data results from transport and delivery of audit system materials and devices to the audit participants; receiving data results from the participants, or from Regional EPA, contractor lab or field audit support staff. It also includes the validation of data results, and storing results in the EPA NPAP and AQS data bases. The TTP audit result reports are, in part, checked automatically (for example, for non-existing AQS codes) when the auditors enter the Audit Workbook's AQS transaction Worksheet into AQSQA.

Records are also kept on acceptance testing and initial and recertification of all the Regional and RTP audit system materials and calibration of audit devices. These records allow for the tracking of an audit system's materials and devices from their acceptance testing or calibration through to the storage of the audit results in the data base. Additional details on tracking audit results data, acceptance test data and calibration results are contained in the NPAP TTP SOP Compendiums posted on AMTIC.

Verification of participant's data occurs during data entry. The data in the reporting data systems are checked for completeness and that they are in the proper units. However, data validation, which is a formally defined process, involves checking the accuracy of the data entry and is conducted following the sections in the NPAP TTP SOP Compendium that address audit work book pre-audit preparation (section 2 and 3), use (section 5 & 6) and audit data validation (section 7 and 10).

D3. RECONCILIATION WITH USER REQUIREMENTS

The contractor or EPA field and/or lab audit staff will examine all data prior to submitting them to EPA data reviewers and managers to ensure that the requirements defined are met. Procedures in the section in the NPAP TTP SOP Compendium that address data validation will be followed. The EPA QA Work Group has created a data validation template for each NAAQS criteria pollutant. They have been put into the QA Handbook revision that is on AMTIC at <http://www.epa.gov/ttn/amtic/QA>

APPENDIX A

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THROUGH-THE-PROBE (TTP) PROCEDURES FOR EPA'S NATIONAL PERFORMANCE EVALUATION (PE) PROGRAM (NPEP) FOR GASEOUS CRITERIA POLLUTANTS

<u>SECTION</u>	<u>SOP Number</u>
1.0 Overview of Performance Evaluation (PE) Field Activities 1.01	NPEP TTP
 <u>PE PROCEDURES</u>	
2.0 Planning and Preparing for Site Visits	
2.1. Equipment Inventory and Storage	NPEP TTP
2.01	
2.2. Communications	NPEP TTP
2.02	
2.3 Site Visit Preparation	NPEP TTP
2.03	
 <u>PRE/POST PE PROCEDURES</u>	
 <u>NOTE:</u> From Sections 3 to 10, the Procedure Sub-Section heading numbers and titles are given below the SOP Section title.	
3.0 Calibration Checks (Verifications) and Procedures 3.01	NPEP TTP
3.7.0 <u>PROCEDURE</u>	
3.7.1. Quarterly "OZONE LINE LOSS" Start-up Procedure	
3.7.2. Quarterly "OZONE LINE LOSS" Test	
3.7.3. Quarterly Ozone Instrument and Semi-Annual Gas Cylinder Re-certification	
3.7.4. Annual (to Quarterly, if needed, & Resources) Cross-check with Standards or Mobile Laboratory	
3.7.5. Annual Recertification Procedures	
4.0 Mobile Lab Start-up Procedures 4.01	NPEP TTP
4.7.0 <u>PROCEDURE</u>	
4.7.1. Mobile PE Lab Exterior	
4.7.2 Mobile PE Lab Interior	

<u>SECTION</u>	<u>SOP Number</u>
5.0 Site Set-Up	NPEP TTP
5.01	
5.7.0 <u>PROCEDURE</u>	
5.7.1. Initial Site Set-up	
5.7.2. Mobile PE O ₃ Instrument Operational Check	
5.7.3. Final Site Set-up	
6.0 Through-the-Probe (TTP) or Back-Of-the-Analyzer	NPEP TTP
6.01	
(BOA-If necessary) Performance Evaluation (PE)	
6.7.0 <u>PROCEDURE</u>	
6.7.1. Mobile Lab/Station Data Retrieval/Recording	
6.7.2. O ₃ PE Procedure	
6.7.3. CO Analyzer Pre-Calibration Procedure	
6.7.4. CO, SO ₂ , NO/NO _x PE Procedure	
6.7.5. Carbon Monoxide Analyzer Post-Calibration Procedure	
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6.7.6. Calculations of Converter Efficiency/True Pollutant	
Concentrations	
6.7.7. PE Failures/Troubleshooting	
Alternative Procedure for 7.3 - CO Pre Calibration	
Alternative Procedure for 7.5 - CO Post Calibration	
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APPENDICES

D. Glossary

APPENDIX B

QA Project Plan For EPA Region 7 Verification Lab Support for NPAP

Will be posted on AMTIC; until then, request from EPA NPAP Manager.

Appendix C

NPAP TTP QA/QC Summary Tables:

% of Complete TTP PE out of 100% in 5 Years, and Most Recent Year

Regional Exceedance Summaries for 5 years and Most Recent Year

NPAP TTP Whole System Certification 2004 - 2014
(Table, as of 2/10/2014)

Blended Gas Cylinder Certifications

Ozone Analyzer Certifications

Annual NPAP TTP Certification/Recertification Training, Remote and
Hands-on Sessions:

Power Point SOP slides

Powerpoint Critical Highlights

Hands-On Checklists:

a) Ozone, b) Blended gas and c) “Everything Else”

Appendix D

NPAP SOP-Data Validation for Data bases of the National Performance
Audit Program:

Procedure for Checking the Data in the Excel Workbook:

- 1) Check to be sure all of the following information is included or
selected on the information (1st) page of the workbook;
 - a) AQS site ID (for correctness: i.e., missing digits, too many 0s,
remove dashes if included)
 - b) date of audit
 - c) NPAP TTP or Certification Audit
 - d) Method Code/POC

2) Check AQS transactions page (last page) for data

Directions for Entering Audit Data into the Intermediate TTP Database

Intermediate Access Data Base:

- 1.0) Processes (Audit and Verification results)
- 1.1) Load New Data via Spreadsheets to AQS Staging Area
- 1.2) Enter Staging Area Data by Hand
- 1.3 Process Staging Area Data
- 1.4) Edit Cylinder Assays
- 1.5) Edit Processed Audits
- 2) Report (Query)
 - 2.1) Audit Details → Query by Region; view 1 page at a time
 - 2.2) Audit Summaries → (Query by Region; Summary of Regions audits)
 - 2.3) Failed Audits Report → (Query by Date)
 - 2.4) Certification Report → (Query by date, beginning and ending date)
 - 2.5 Tank Certifications → (Query by beginning and ending date)

Procedure to Follow for Checking Data in the Excel Workbook:

- 1) Check to be sure all of the info is included or selected on the info (1st) page of the workbook
- 2) Always check the AQS transaction page for data and concentration separators, and that they are in right places.

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 - 1.2 O₃ Photometers Classified
 - 1.3 EPA's SRP Network
- 2.0 NIST Standard Reference Photometer (SRP) History
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- 3.0 Theory of Photometric Measurement
 - 3.1 Physical Basis of the Photometry Equation
 - 3.2 Sources of Error in the Photometry Principle
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- 4.0 SRP-07 Initial Setup
 - 4.1 Receiving and Setting Up SRP-07
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- 5.0 SRP-07 Standard Operating Procedure
 - 5.1 Procedure and SRP Control Software
 - 5.1.1 QA/QC Checks
 - 5.1.2 Qualifications
 - 5.1.3 Verification
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 - 5.1.5 Audit Level Comparisons
 - 5.1.6 Calibrations for Scientific Research
 - 5.1.7 Zero-Span Check
 - 5.1.8 Running Multiple Guests at One Time

Appendix F: NPAP TTP Audit EXCEL Workbook

Link: <http://www.epa.gov/ttn/amtic/QA/>

Appendix G:

Excerpt from the TTP SOP, Section 6
Link: <http://www.epa.gov/ttn/amtic/QA/>

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