U. S. EPA Ambient Air Monitoring Protocol Gas Verification Program

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U. S. EPA Ambient Air Protocol Gas Verification Program
Annual Report for Calendar Year 2010

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
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Acronyms and Abbreviations

AA-PGVP	Ambient Air Protocol Gas Verification Program
AQS	Air Quality System
CAMD	Clean Air Markets Division
CFR	Code of Federal Regulations
COC	chain-of-custody
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
GMIS	Gas Manufacturer's Internal Standard
ICAC	Institute of Clean Air Companies
NACAA	National Association of Clean Air Agencies
NBS	National Bureau of Standards
NERL	National Exposure Research Laboratory
NIST	National Institute of Standards and Technology
NMi	Netherlands Measurement Institute
NPAP	National Performance Audit Program
NTRM	NIST Traceable Reference Material
OAQPS	Office of Air Quality Planning and Standards
OAP	Office of Atmospheric Programs
ORD	Office of Research and Development
PQAO	Primary Quality Assurance Organization
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RAVL	Regional Analytical Verification Laboratory
RO	Reporting Organization (subcomponent of PQAO)
SOP	standard operating procedure
SRM	Standard Reference Material

1.0 Introduction

Background and Program Goals

The basic principles of the U.S. Environmental Protection Agency's (EPA) *Traceability Protocol for the Assay and Certification of Gaseous Calibration Standards* (EPA, 1997)[1] were developed jointly by EPA, the National Bureau of Standards (now National Institute of Standards and Technology [NIST]), and specialty gas producers over 30 years ago. At the time, commercially-prepared calibration gases were perceived as being too inaccurate and too unstable for use in calibrations and audits of continuous source emission monitors and ambient air quality monitors[2]. The protocol was developed to improve their quality by establishing their traceability to NIST Standard Reference Materials (SRMs) and to provide reasonably priced products. This protocol established the gas metrological procedures for measurement and certification of these calibration gases for EPA's Acid Rain Program under 40 Code of Federal Regulations (CFR) Part 75, for the Ambient Air Quality Monitoring Program under 40 CFR Part 58, and for the Source Testing Program under 40 CFR Parts 60, 61, and 68. EPA required monitoring organizations implementing these programs ("the regulated community") to use EPA Protocol Gases as their calibration gases. EPA revised the protocol to establish detailed statistical procedures for estimating the total uncertainty of these gases EPA's Acid Rain Program developed acceptance criteria for the uncertainty estimate [3].

Specialty gas producers prepare and analyze EPA Protocol Gases without direct governmental oversight. In the 1980s and 1990s, EPA conducted a series of EPA-funded accuracy assessments of EPA Protocol Gases sold by producers. The intent of these audits was to:

- increase the acceptance and use of EPA Protocol Gases as calibration gases;
- provide a quality assurance (QA) check for the producers of these gases; and
- help users identify producers who can consistently provide accurately certified gases.

Either directly or through third parties, EPA procured EPA Protocol Gases from the producers, assessed the accuracy of the gases' certified concentrations through independent analyses, and inspected the accompanying certificates of analysis for completeness and accuracy. The producers were not aware that EPA had procured the gases for these audits.

The accuracy of the EPA Protocol Gases' certified concentrations was assessed using SRMs as the analytical reference standards. If the difference between the audit's measured concentration and the producer's certified concentration was more than +/- 2.0 percent or if the documentation was incomplete or inaccurate, EPA notified the producer to resolve and correct the problem.

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[1] EPA-600/4-77-027b

[2] Decker, C.E. et al., 1981. "Analysis of Commercial Cylinder Gases of Nitric Oxide, Sulfur Dioxide, and Carbon Monoxide at Source Concentrations," *Proceedings of the APCA Specialty Conference on Continuous Emission Monitoring-Design, Operation, and Experience*, APCA Publication No. SP-43.

[3] "Continuous Emission Monitoring," *Code of Federal Regulations*, Title 40, Part 75.

The results of the accuracy assessments were published in peer-reviewed journals and were posted on EPA's Technology Transfer Network website.

The accuracy assessments were discontinued in 1998. In 2002, there was interest by the specialty gas producers and EPA to reestablish this program. EPA worked together along with the specialty gas producer community to develop a producer funded program but during the final stages in 2008, the program ran into some difficulties and was never implemented.

In 2009, the Office of the Inspector General (OIG) published the report EPA *Needs an Oversight Program for Protocol Gases*[4]. One of the report's findings suggested that EPA "does not have reasonable assurance that the gases that are used to calibrate emissions monitors for the Acid Rain Program and continuous ambient monitors for the nation's air monitoring network are accurate". OIG recommended that OAR implement oversight programs to assure the quality of the EPA Protocol Gases that are used to calibrate these monitors. It also recommended that EPA's ORD update and maintain the document *Traceability Protocol for Assay and Certification of Gaseous Calibration Standards* to ensure that the monitoring programs' objectives are met.

In order to address the OIG findings for ambient air monitoring, OAQPS, in cooperation with EPA Region 2 and 7 developed an Ambient Air Protocol Gas Verification Program (AA-PGVP). The program establishes gas metrology laboratories in Regions 2 and 7 to verify the certified concentrations of EPA Protocol Gases used to calibrate ambient air quality monitors. The program is expected to:

- ensure that producers selling EPA Protocol Gases participate in the AA-PGVP, and
- provide end users with information about participating producers and verification results.

The EPA Ambient Air Quality Monitoring Program's QA requirements 40 CFR Part 58, Appendix A require:

> *2.6 Gaseous and Flow Rate Audit Standards. Gaseous pollutant concentration standards (permeation devices or cylinders of compressed gas) used to obtain test concentrations for CO, SO_2, NO, and NO_2 must be traceable to either a National Institute of Standards and Technology (NIST) Traceable Reference Material (NTRM), NIST Standard Reference Materials (SRM) and Netherlands Measurement Institute (NMi) Primary Reference Materials (valid as covered by Joint Declaration of Equivalence) or a NIST-certified Gas Manufacturer's Internal Standard (GMIS), certified in accordance with one of the procedures given in reference 4 of this appendix. Vendors advertising certification with the procedures provided in reference 4 of this appendix and distributing gases as "EPA Protocol Gas" must participate in the EPA Protocol Gas Verification Program or not use "EPA" in any form of advertising.*

This program is considered a verification program because its current level of evaluation does not allow for a large enough sample of EPA Protocol Gases from any one specialty gas producer to yield a statistically rigorous assessment of the accuracy of the producer's gases. It will not provide end users with a scientifically defensible estimate of whether gases of acceptable quality

[4] http://www.epa.gov/oig/reports/2009/20090916-09-P-0235.pdf

can be purchased from a specific producer. Rather, the results provide information to end users that the specialty gas producer is participating in the program and the information in the verification report may be helpful when selecting a producer.

Purpose of This Document

The purpose of this document is to report the activities that occurred in the first year of the program and provide the results of the verifications performed.

This document will not explain the implementation of the AA-PGVP, the quality system or the verification procedure. That information has been documented in the Implementation Plan, QAPP and SOPs that can be found on the AA-PGVP Web Page on AMTIC[5].

[5] http://www.epa.gov/ttn/amtic/aapgvp.html

2.0 Implementation Summary

The first year of the AA-PGVP was a year of planning and implementation. The following activities occurred in 2010.

Development of the AA-PGVP Advisory Group- A Protocol Gas Advisory Group was developed and composed of OAQPS personnel, personnel from EPA Regions 2 and 7, one representative from the National Association of Clean Air Agencies (NACAA), and a tribal representative from the Tribal Air Monitoring Support (TAMS) Center Steering Committee. The Groups main goal was to assist in program development and provide information and feedback to and from the user community.

Development on AA-PGVP Website on the Ambient Monitoring Technical Information Center (AMTIC) [6]- OAQPS added a web page for the AA-PGVP program on AMTIC in order to house important documents and information pertaining to the program.

Development of the AA-PGVP Implementation Plan- In April, 2010 the AA-PGVP Implementation Plan was completed and posted on the AA-PGVP web page. The Plan provides the necessary technical, logistical, and administrative information to successfully implement the program.

Development of the Information Collection Request (ICR). In order for EPA to survey the monitoring organizations, an ICR had to be developed. The ICR was published in the Federal Register on July 8, 2010[7].

Development and Implementation of the Survey- The program developed a simple survey that was provided to all monitoring organizations. It asked each primary quality assurance organizations/reporting organization (PQAO/RO) to identify the specialty gas producer they use and whether they would like to participate in the program. The survey was sent to a point of contact in each PQAO/RO for completion. The survey can be found in the AA-PGVP Implementation Plan. Results of this survey are discussed in Section 3.

Procurement of DOT Hazardous Materials Training/Certification- Since new, unused gas cylinders are sent from the monitoring organizations to EPA, monitoring organizations needed to be DOT certified to ship these cylinders. EPA worked with KPA[8] to develop an on-line training program specifically for the shipment of these cylinders. EPA started working with KPA in January, 2010 and had the course ready for use by May, 2010. We procured 55 certifications and in 2010 we had 31 monitoring organization personnel take the course and 29 complete it. Certifications are valid for 3 three years.

Regional Analytical Verification Laboratory (RAVL) Testing- In Feb, 2010 Region 2 and 7 RAVLs ran verification tests with new protocol gas cylinders. The test was implemented to ensure that standard operating procedures (SOPs) were correct and could be followed as written,

[6] http://www.epa.gov/ttn/amtic/aapgvp.html
[7] EPA ICR No. 2375.01, OMB Control Number 2060 http://edocket.access.gpo.gov/2010/pdf/2010-16694.pdf
[8] http://www.kpaonline.com/

and that the equipment was operating as anticipated. The test cylinders passed verification and any necessary modifications made to the verification process.

Development of QA Project Plan (QAPP) and SOPs- While EPA Regions 2 and 7 worked on the SOPS, OAQPS worked on the QAPP. The SOP was then incorporated into the QAPP and both were approved April, 2010 and posted on AA-PGVP web page on AMTIC.

Development of Measurement Data Workbook- At the same time the QAPP and SOPs were completed, Region 2 and 7 completed an Excel measurement data workbook (MDW) that captures the pertinent verification and supporting QA data and produces the final verification certificates. The verification SOPs are written specifically for use with the MDW.

Technical System Audits of the RAVLS- Upon review and approval of the QAPP and SOPs, Joe Elkins, the OAQPS QA Manager and Robert Wright from the EPA Office of Research and Development, were asked to conduct a technical systems audit of both laboratories. The Region 2 TSA was conducted on April 13, 2010 and the Region 7 TSA was conducted on April 15, 2010. For both audits, the audit team concluded there were no findings that indicated a quality problem requiring corrective action and the audit team found that all phases of the implementation that were reviewed during the TSA to be acceptable and to be performed in a manner consistent with the program's data quality goals. TSA finding reports are posted on the AA-PGVP Web.

AA-PGVP Implementation –Since program development and the collection of survey information from the monitoring organizations occurred in the first part of the calendar year, verifications did not begin until June of 2010. Table 1 provides the 2010 verification dates.

Table 1- RAVL Verification Dates.

Region 2	Region 7
6/2- 6/10	7/6-7/8
10/4-10/15	9/7-9/17
12/6-12/17	12/1-12/15

RAVL Open House - Based on the information gained from monitoring organization surveys, EPA developed a list of the specialty gas producers being used by the monitoring organizations. From this list, EPA identified at least one point of contact for each producer. In September, EPA contacted the producers by email to invite them to visit the RAVLs. The Region 2 open house was Nov 16-18, 2010 and received 3 specialty producers. The Region 7 open house was Dec 15-17, 2010 and also received 3 specialty gas producers.

Flow of the AA-PGVP

Figure 1 below provides a flow of the AA-PGVP. The major activities in these steps are explained below. More details of these steps are found in the AA-PGVP Implementation Plan, QAPP and SOPs.

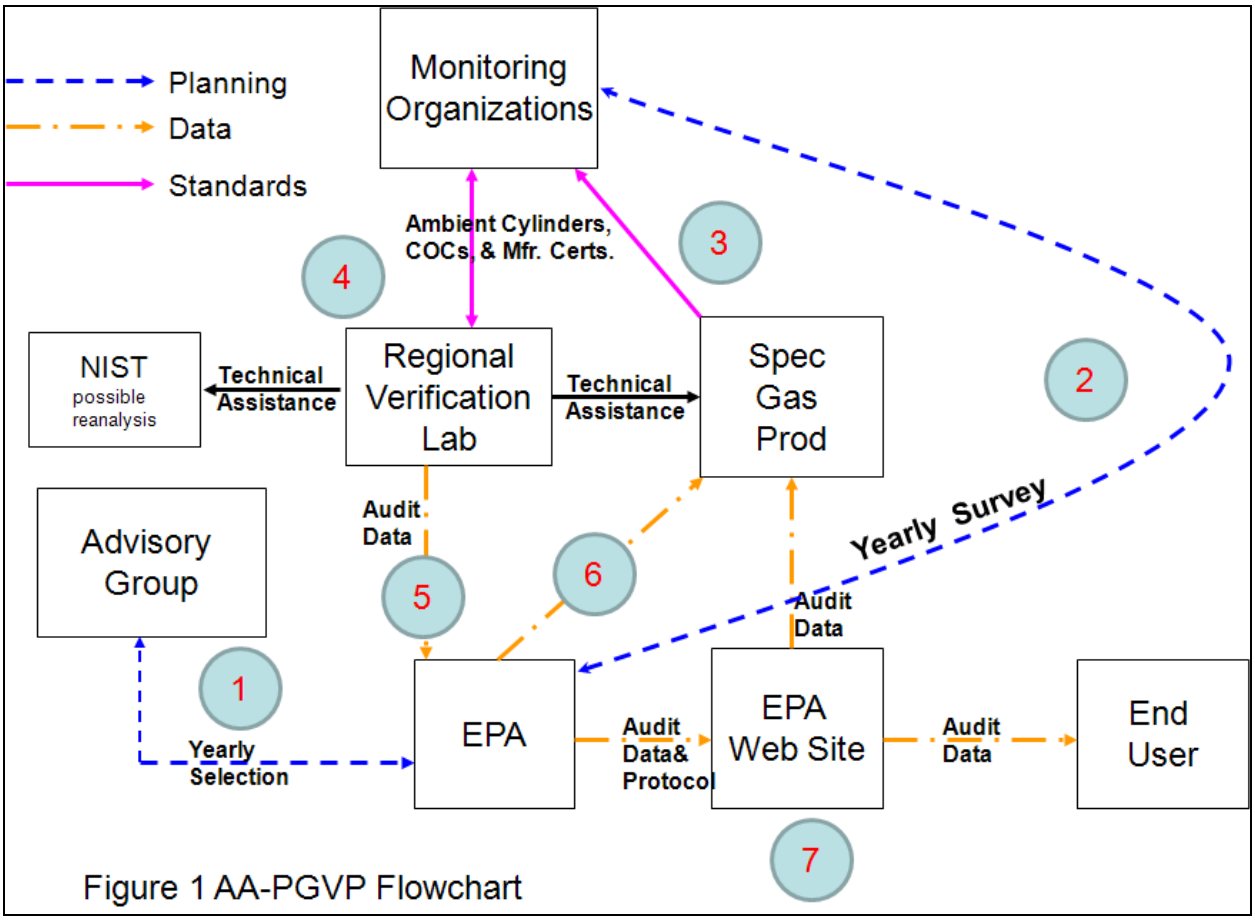

Figure 1 AA-PGVP Flowchart

1. The AA-PGVP Advisory Group discusses program implementation and any necessary improvements for the following year.
2. EPA sends emails to PQAO/RO points of contact to complete the AA-PGVG Survey. EPA compiles information on specialty gas producers and the monitoring organizations that plan to participate. EPA tries to schedule the monitoring organization in an appropriate verification quarter based on delivery of standards from the specialty gas producer.
3. The monitoring organizations order gas standards from specialty gas producers during the normal course of business.
4. The monitoring organizations send a new/unused standard, specialty gas certification and chain of custody form to the RAVLs.
5. The RAVLS analyze the cylinders and provide the validated results to OAQPS and the monitoring organizations.
6. OAQPS reviews the data and sends verification results to the specialty gas vendors.
7. At the end of the year OAQPS compiles final results into a report, sends the report out to the specialty gas vendors and posts it on the AA-PGVP AMTIC web page.

3.0 Survey and Verification Results

Monitoring Organization Survey

Based upon the maximum capability of 40 gas cylinders per RAVL per year, the AA-PGVP selection goal, in the following order, is:

1) One gas standard from every specialty gas producer being used by the monitoring community
2) Three standards per specialty gas producer
3) Weight additional standards by producer market share in ambient air monitoring community

In order to determine what specialty gas producers were being used by monitoring organizations, EPA asked each monitoring organization to complete a survey. For the 2010 AA-PGVP, EPA received surveys from 88 of a possible 118 PQAO/ROs, which is about a 75% response rate. EPA did receive emails from some PQAO/ROs informing EPA that they did not implement gaseous monitoring and therefore did not complete the survey, but this number does not account for the difference. EPA plans to make improvements in 2011 to try and achieve a 100% data capture. Not receiving complete survey information can result in non-inclusion of some specialty gas producers in the AA-PGVP.

Survey Results

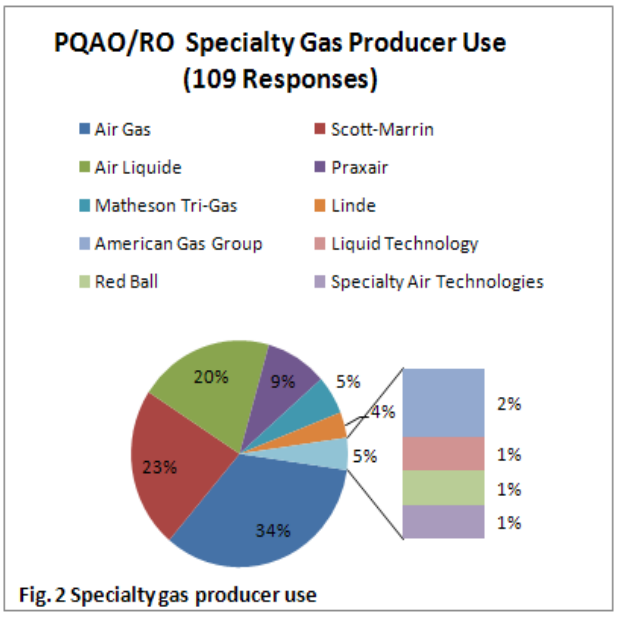

Fig. 2 Specialty gas producer use

Out of the 88 survey respondents, EPA received 109 responses for specialty gas producers since some surveys listed multiple specialty gas producers. Figure 2 identifies, as a percentage of the total responses, how often the PQAO/ROs listed a particular specialty gas producer. As mentioned above, only about 75% of the PQAO/ROs responded so this cannot be considered a complete survey.

Figure 2 also indicates that 10 specialty gas producers were identified in the survey. However, some gas producers have more than one production facility and it was the intent of the AA-PGVP to try and receive one gas cylinder from every facility being used by the PQAO/RO (see Table 2).

Participation in the AA-PGVP is voluntary. The survey asked whether a PQAO/RO was receiving new gas standards during the year and also whether they would like to participate by sending a cylinder to one of the RAVLs. Of the 88 PQAO respondents, 29 either did not want to participate or were not receiving a cylinder during the year. This narrowed the participants down to 59. Based upon the survey response, EPA did not have a volunteer that used Linde or Red Ball (these producers had one survey response each).

Specialty Gas Producers

EPA contacted all the specialty gas producers in the survey to:

- make them aware that EPA was starting the AA-PGVP,
- describe the details of the program and the website where they could find additional information,
- ask them to identify all of their production facilities so we could determine how to select cylinders from each production facility used, and
- make them aware that EPA would be scheduling an open house toward the end of the year.

Table 2 lists the production facilities for the 10 specialty gas producers that were identified in the survey. Despite repeated attempts to get production facility information from Air Liquide, EPA was unsuccessful. Plumsteadville, PA is identified because EPA received this information from the certificate of analysis of an Air Liquide cylinder that was sent in for verification.

Table 2. Specialty Gas Producer Production Facilities.

Producer	Facility 1	Facility 2	Facility 3	Facility 4	Facility 5	Facility 6
Air Liquide	Plumsteadville, PA					
Air Gas	Chicago, IL	Durham NC	Los Angeles, CA	Port Allen, LA	Riverton, NJ	Royal Oak, MI
American Gas Group	Toledo, OH					
Liquid Technology	Apopka, FL					
Matheson Tri-Gas	Joliet, IL	Morrow, GA	Pasadena, TX	Twinsburg, OH		
Praxair	Bethlehem, PA	Los Angeles, CA				
Red Ball	Shreveport, LA.					
Scott-Marrin	Riverside, CA					
Linde	Alpha, NJ					
Specialty Air Technologies	Long Beach, CA					

EPA was not able to determine the accuracy of production facility information from the survey. Many respondents received their cylinders from a local vendor and they included the local address rather that the address of the production facility. This issue will be corrected for future surveys.

The production facilities highlighted in yellow in Table 2 had cylinders verified by the RAVLS in 2010.

As mentioned earlier, survey respondents using Linde or Red Ball did not wish to participate in the AA-PGVP in 2010. On 10/25/2010, Red Ball and Linde were contacted by email and extended an invitation to send a cylinder directly to EPA for verification during the last quarter. EPA did not receive a cylinder from either gas producer but Linde is in contact with EPA to make arrangements in 2011.

In summary, for 2010 EPA provided verifications to all but 2 specialty gas producers providing gas standards to monitoring organizations that responded to the survey. The two gas producers that were not verified were only providing standards to one PQAO/RO survey respondent. EPA may not have verified all production facilities used by the PQAO/RO but it was difficult to accurately identify this based on the information provided in the survey. The conclusion section will provide some information on how EPA plans to receive more accurate information regarding this issue for future surveys. In addition, the RAVLs had less participation than expected from the PQAO/ROs. Although we were not ready to begin in the first quarter of 2010, the RAVLs were capable of auditing 30 cylinders (10 per quarter) in quarters 2-4. Table 3 provides the final tally for the verifications occurring each quarter. Some cylinders were multi-pollutant which is why the pollutant total is different from the cylinder total.

Each quarter, after the verification results were validated, the RAVLS sent OAQPS the measurement data worksheets which contained the verification certificates for the quarter. OAQPS sent the certificates to each specialty gas vendor that had cylinders verified in the quarter.

Table 3. Cylinders and Pollutants Analysed by RAVL by Quarter.

Region	Quarter 2		Quarter 3		Quarter 4		Total CY2010	
	Cylinders	Pollutants	Cylinders	Pollutants	Cylinders	Pollutants	Cylinders	Pollutants
2	4	6	6	12	0	0	10	18
7	6	10	4	5	4	9	14	24

Verification Results

As indicated in 40 CFR Part 75 Appendix A, EPA Protocol Gases must have a certified uncertainty (95 percent confidence interval) that must not be greater than plus or minus (±) 2.0 percent of the certified concentration (tag value) of the gas mixture. This acceptance criterion is for the Acid Rain Program. The AA-PGVP adopted the criteria as its data quality objective and developed a quality system to allow the RAVLs to determine whether or not an individual protocol gas standard concentration was within ± 2% of the certified value. The Ambient Air Program has never identified an acceptance criterion for the protocol gases. Since the AA-PGVP has not been established to provide a statistically rigorous assessment of any specialty gas producer, the RAVLs report all valid results as analyzed but it is suggested that any difference greater than 4-5% is cause for concern. Information related to the analytical reference standards, analytical instruments and methods used, the data reduction procedures and the data assessment procedures are all found in the AA-PGVP QAPP and SOP and are not repeated in this report[9]. Table 4 is the measurement quality objectives table that is included in the AA- PGVP QAPP (Table 7-1 in QAPP). The acceptance criteria in Table 4 were met for each day of verification. In addition, conformance to these requirements can be found in the measurement data

[9] http://www.epa.gov/ttn/amtic/aapgvp.html

worksheets (MDW) that are generated for each comparison run and are available upon request. Appendix A provides a report of the QC checks associated with each verification.

Table 4 Measurement Quality Objectives for the AA-PGVP

Requirement	Frequency	Acceptance Criteria	Protocol Gas Doc. Reference	Comments
Completeness	All standards analyzed	95%		The goal is based on an anticipated 40 cylinders per lab per year.
Quarterly Flow Calibration	Quarterly -no more than 1 mo. before verification	Calibration flow accuracy within ± 1%	2.3.7	Using flow primary standard
Calibrator Dilution Check	Quarterly -within 2 weeks of assay	± 1% RD	2.3.5.1	Second SRM. Three or more discrete measurements
Analyzer Calibration	Quarterly - within 2 weeks of assay	± 1% RPD (each point) Slope 0.89 – 1.02	2.1.7.2	5 points between 50-90% of upper range limit of analyzer + zero point
Zero & Span Verifications	Each day of verification	SE mean ≤ 1% and accuracy ± 5% RD	2.1.7.3 , 2.3.5.4	Drift accountability. 3 discrete measurements of zero and span
Precision Test [1]	Day of Verification	± 1% RD standard error of the mean	2.3.5.4	SRM at conc. >80% of analyzer URL
Routine Data Check	Any Standard with Value >2% Tag Value	NA		Sample run three times to verify value.
Lab Comparability	2/year	± 2 % RPD	NA	Sample run three average value used.
Standards Certification				
Primary flow standard	Annually-Certified by NVLAP certified lab	1.0 %	**NA**	Compared to NIST Traceable
NIST SRMs	Expiration date SRM pressure > 150 psig			Will follow NIST recertification requirements

[1] The precision test does not need to accomplished if analyzer calibrated on same day as analysis

Table 5 provides the verification results for CO and SO2 and Table 6 provides the NOx results.

Table 5. Ambient Air Protocol Gas Verification Program 2010 CO/SO2 Verifications

Region 2 CO

Date	Lab	Producer	Facility	Cylinder ID	Pollutant	Assay Conc	Producer Conc	% Bias	95% Uncertainty (%)
7/9/2010	2	Air Liquide	Plumsteadville, PA	ALM04475	CO	4476.94	4570	-2.04	0.6
7/9/2010	2	Scott-Marrin	Riverside, CA	CC86399	CO	40.1992	40.7	-1.23	0.61
7/9/2010	2	Praxair*	Bethlehem, PA	SA6140	CO	5020.75	5007	0.27	0.14
10/13/2010	2	Scott-Marrin	Riverside, CA	JB02815	CO	10272.1	10310	-0.37	0.14
10/13/2010	2	Matheson	Twinsburg, OH	SV-13540	CO	1521.57	1515	0.43	0.14
10/13/2010	2	Scott-Marrin	Riverside, CA	JJ712	CO	3078.73	3060	0.61	0.14
10/15/2010	2	Scott-Marrin	Riverside, CA	FB03100	CO	272.36	270	0.98	0.17

Region 2 SO2

7/8/2010	2	Air Liquide	Plumsteadville, PA	ALM04475	SO2	50.75	40.9	-0.3	0.08
7/8/2010	2	Air Gas	Port Allen, LA	CC216707	SO2	44.43	45.44	-2.23	0.09
10/7/2010	2	Praxair*	Bethlehem, PA	SA6140	SO2	45.95	46.73	-1.67	0.27
10/7/2010	2	AirGas	Chicago IL	SG9150433BAL	SO2	50.09	50.91	-1.6	0.26
10/7/2010	2	Scott-Marrin	Riverside, CA	JB02815	SO2	101.93	102.7	-0.75	0.26
10/7/2010	2	Scott-Marrin	Riverside, CA	FB03100	SO2	12.98	13.22	-1.82	0.28

Region 7 CO

Date	Lab	Producer	Facility	Cylinder ID	Pollutant	Assay Conc	Producer Conc	% Bias	95% Uncertainty (%)
6/2/2010	7	AirGas	Durham, NC	FF43334	CO	5046.08	5033	0.26	0.23
6/2/2010	7	AirGas	Chicago, IL	LL29698	CO	2812.61	2843	-1.07	0.27
6/2/2010	7	Scott-Marrin	Riverside, CA	CA07721	CO	40.09	40.1	-0.02	0.24
6/2/2010	7	Scott-Marrin	Riverside, CA	JA02404	CO	5081.45	5100	-0.36	0.23
9/8/2010	7	Praxair*	Bethlehem, PA	SA6140	CO	5006.45	5007	-0.01	0.19
9/8/2010	7	Scott-Marrin	Riverside, CA	CAO8660	CO	5063.5	5070	-0.13	0.19
9/8/2010	7	AirGas	Durham, NC	LL54481	CO	39.61	39.28	0.85	0.2
12/2/2010	7	Praxair	Los Angeles, CA	FF3881	CO	4092	4060	0.8	0.29
12/2/2010	7	Liquid Technology	Apopka, FL	EB-0026497	CO	4937	4948	-0.21	0.26
12/2/2010	7	Specialty Air	Long Beach, CA	SA10635	CO	5672	5760	-1.53	0.28

Region 7 SO2

6/8/2010	7	AirGas	Port Allen, LA	FF24487	SO2	48.33	49.03	-1.43	0.19
6/8/2010	7	AirGas	Chicago, IL	LL29698	SO2	27.49	27.37	0.43	0.18
6/8/2010	7	Scott-Marrin	Riverside, CA	JA02404	SO2	102.93	103.2	-0.26	0.18
9/10/2010	7	Praxair *	Bethlehem, PA	SA6140	SO2	46.51	46.73	-0.46	0.3
9/10/2010	7	Scott-Marrin	Riverside, CA	CC327237	SO2	50.32	50.4	-0.17	0.29
12/7/2010	7	Specialty Air	Long Beach, CA	SA10635	SO2	59.61	52.64	13.25	0.2
12/7/2010	7	Liquid Technology	Apopka, FL	EB-0026497	SO2	51.06	50.8	0.51	0.2
12/7/2010	7	Airgas	Durham, NC	CC274221	SO2	40.5	40.57	-0.17	0.21

Praxair Cylinder SA6140 (with asterisk *) was an internal QC cylinder that was verified by both laboratories as a QC check. Although it is shown here, it is not part of the totals in Table 3. The Internal QC results for CO and NOx showed very good agreement and although SO2 was a bit more variable is was also within the ±2%.

Table 6. Ambient Air Protocol Gas Verification Program 2010 NOx Verifications

Region 7 Verifications

Date	Lab	Producer	Facility	Cylinder ID	Pollutant	NO Assay Conc	NO Producer Conc	% Bias	95% Uncertainty (%)	NOx Assay Conc.	NOx Prod. Conc	% Bias	95% Uncertainty
6/10/2010	7	AirGas	Chicago, IL	FF41904	NOx	50.06	50.28	-0.44	0.18	50.16	50.4	-0.47	0.21
6/10/2010	7	AirGas	Chicago, IL	LL29698	NOx	30.42	30.27	0.51	0.17	30.4	30.39	0.04	0.21
6/10/2010	7	Scott-Marrin	Riverside, CA	JA02404	NOx	50.91	51.2	-0.56	0.18	50.79	51.2	-0.81	0.21
9/14/2010	7	Praxair*	Bethlehem, PA	SA6140	NOx	51.57	51.98	-0.78	0.19	51.48	51.94	-0.89	0.18
9/14/2010	7	Scott Marin	Riverside, CA	CC327233	NOx	49.84	49.6	0.47	0.19	49.73	49.60	0.25	0.18
9/14/2010	7	Airgas	Durham, NC	LL9253	NOx	48.92	49.06	-0.28	0.19	48.88	49.19	-0.63	0.18
12/9/2010	7	Praxair	Los Angeles, CA	FF3881	NOx	112.56	113	-0.39	0.13	112.97	113	-0.03	0.15
12/9/2010	7	Liquid Technology	Apopka, FL	EB-0026497	NOx	51.33	50.7	1.25	0.13	51.31	51	0.62	0.15
12/9/2010	7	Specialty Air	Long Beach, CA	SA10635	NOx	115.25	114.8	0.39	0.13	115.43	114.9	0.46	0.15

Region 2 Verifications

Date	Lab	Producer	Facility	Cylinder ID	Pollutant	NO Assay Conc	NO Producer Conc	% Bias	95% Uncertainty (%)	NOx Assay Conc.	NOx Prod. Conc	% Bias	95% Uncertainty
7/6/2010	2	Air Liquide	Plumsteadville, PA	ALM04475	NOx	50.17	50.2	-0.06	0.12	50.19	50.2	-0.02	0.31
7/6/2010	2	American Gas Group	Toledo, OH	EB0022542	NOx	29.82	29.7	0.39	0.12	30.22	30.1	0.41	0.32
10/14/2010	2	Praxair*	Bethlehem, PA	SA6140	NOx	51.9	51.98	-0.16	0.36	51.68	51.94	-0.5	0.21
10/14/2010	2	AirGas	Chicago IL	SG9150433BAL	NOx	50.59	51.29	-1.37	0.37	50.39	51.3	-1.77	0.21
10/14/2010	2	Scott-Marrin	Riverside, CA	JB02815	NOx	100.81	100.9	-0.09	0.37	100.41	100.9	-0.49	0.21
10/14/2010	2	American Gas Group	Toledo, OH	EB0006064	NOx	19.25	19.3	-0.23	0.38	20.48	20.2	1.4	0.21
10/14/2010	2	Scott-Marrin	Riverside, CA	FB03100	NOx	12.79	12.8	-0.07	0.38	12.8	12.8	-0.02	0.21
10/14/2010	2	Scott-Marrin	Riverside, CA	JJ712	NOx	30.53	30.4	0.44	0.38	30.41	30.4	0.04	0.21

Out of the 42 verification results, three were greater than the ±2% Acid Rain Program criteria and only one value was greater than AA-PGVP 4-5% criteria. The cylinder that failed for SO_2 was from a multi-pollutant standard that passed verification for CO and NOx. On 12/23/2010, EPA sent the results of the verification to the specialty gas producer and gave the producer an opportunity to send a second standard to EPA for verification. The second verification values could be added to the 2010 results but it would not eliminate the original cylinder verification results. EPA had not received a response from the producer at the time this report was published.

Summary and Conclusions

In general, for the first year of planning and implementation, the AA-PGVP has been successful. The quality system, standard operating procedures, analytical equipment and standards maintained the data quality of the program. Results show that of the 42 standards that were verified, 41 were within the ± 4-5% AA-PGVP criteria, and 39 (92%) were within the ± 2% Acid Rain Program criteria.

As with the start up of any program, there are a few improvements that can be made based on lessons learned. The following are improvements that will be implemented in 2011.

Survey Improvement- We did not get a 100% completeness on surveys and production facilty names and locations were misrepresented. In order to correct both issues, EPA developed a web-based survey. This survey has a point of contact email address for all 118 PQAO/ROs. The survey lists the ten 2010 specialty gas producers along with their multiple production facilities. The point of contact must select one of those facilities (or mutiples) from the pick list (avoiding misnaming) or add a new production facility. If a new facilty is added, EPA will ensure it is a legitimate facility and will them add it to the pick list for other points of contact to use. This should cut down on entry errors. Every two weeks, EPA will determine which points of contact have not completed the survey and send a reminder email to them indicating that the survey has

not been complete. EPA hopes this will inspire all PQAO/RO to complete the survey. EPA may have to resort to individual phone calls at some point to meet the completness goals.

Participation Improvement- Since the program is voluntary, EPA we can not force particiption. EPA hopes that the PQAO/ROs will see the benefit in getting an independent verification of their cylinder and we will get at least 10 cylinders per RAVL per quarter. PQAO/ROs did have difficulties with some shippers (in particular UPS) in the transport of these cylinders to the RAVL and in some cases they were never shipped. EPA has worked with UPS to develop a set of shipping instructions that may help the PQAO/ROs in the future.

Verification of Each Production Facility- Since the intent of the AA-PGVP is to be a blind verification, meaning the gas standard used for the verification is unknown to the producer, we rely on the PQAO/ROs for particpation. However, with some specialty gas producers being used by only a few PQAO/ROs, EPA will inform those specialty gas producers earlier in the year that they may want to provide the RAVL with a gas standard. At a minimum, EPA will make sure there is capacity in the last verification quarter for those production facilities to send the RAVL a gas standard when a standard representing that producer has not been sent by a PQAO/RO.

Quarterly Interlaboratory QC Checks- The analysis of the same standard by both RAVLs proved to be a useful tool for checking the quality of the AA-PGVP results. In 2011, these interlaboratory QC checks will be conducted in two quarters along with the routine QC activities associated with each verification run.

Appendix A

Ambient Air Protocol Gas Verification Program
QA Reports from Measurement Data Worksheets for 2010

During the verification process, the Regional Air Verification Laboratories perform a number of quality control checks that are recorded on the Measurement Data Worksheets. This information is reported and saved along with the verification reports. The following sheets represent the quality control for all verifications that were implemented in 2010.

It may be noticed that the CO QC checks for points 4 and 5 were outside specification for the quarter 2, Region 2 results. The CO analyzer(s) were insufficiently linear in the concentration range of 24.5 ppm to 36.32 ppm (points 4-5). However, in the range of 36.32 ppm to 47.64 ppm the instrument is sufficiently linear. This is in keeping with the original G2 method requirement that the analyzer only be used "in the well characterized portion of its range". The 1% QA criterion is the definition of "well characterized". Since all CO assays (and the dilution check) were done at concentrations in the range of 39.55 ppm to 42.7 ppm (points 1-3), all assays were done in the well characterized range of the analyzer.

Region 2 QC Data

CO QA Requirements Summary- Region 2-Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	18-Jan-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	2080	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	18-Jan-12	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1400	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	28-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999964	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999999	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	29-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.84%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.87%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.95%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	1.12%	Assay is invalid at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	1.41%	Assay is invalid at this concentration
	Analyzer slope is within 0.98-1.02	0.9975	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	29-Jun-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.735%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-2.04%	Challenge Std. #1 vendor certificate bias between 2-4%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-1.23%	Challenge Std. #2 vendor certificate bias < 2%

SO2 QA Requirements Summary-Region 2-Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	11-Dec-15	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1700	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1890	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	28-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999964	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999999	Low MFC OK
Sulfur Dioxide Gas Analyzer	Analyzer Calibration within 2 weeks of assay	30-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.11%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.11%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.12%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.19%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0007	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Jul-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.907%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.30%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-2.23%	Challenge Std. #2 vendor certificate bias between 2-4%

NOx QA Requirements Summary- Region 2 - Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Sep-11	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1300	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2050	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	28-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999964	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999999	Low MFC OK
Oxides of Nitrogen Gas Analyzer NO Portion	Analyzer Calibration within 2 weeks of assay	1-Jul-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.21%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.25%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.32%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9988	Analyzer Slope is acceptable
Oxides of Nitrogen Gas Analyzer NOx Portion	Analyzer Calibration within 2 week of assay	1-Jul-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.05%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.04%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.05%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.07%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.09%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0015	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Jul-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	0.196%	Dilution Check RSD is OK
Day of Assay Zero/Span Check NO Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Day of Assay Zero/Span Check NOx Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 NO Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.06%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #1 NOx Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.02%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 NO Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.39%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #2 NOx Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.41%	Challenge Std. #2 vendor certificate bias < 2%

CO QA Requirements Summary- Region 2- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	18-Jan-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1880	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	18-Jan-12	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1375	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	4-Oct-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999970	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999977	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	13-Oct-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.16%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.16%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9973	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	5-Oct-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.464%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.27%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.37%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	0.43%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #4 Assay	Challenge Standard #4 Std. Error < 1%	The standard error is okay.	Challenge Standard #4 Std. Error is OK
	Challenge Standard #4 vendor certificate bias	0.61%	Challenge Std. #4 vendor certificate bias < 2%

CO QA Requirements Summary-Region 2-Data Set 2- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	18-Jan-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1900	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	18-Jan-12	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1375	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	4-Oct-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999970	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999977	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	6-Oct-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.20%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.21%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.22%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9935	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	5-Oct-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.464%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.98%	Challenge Std. #1 vendor certificate bias < 2%

NOx QA Requirements Summary- Region 2- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Sep-11	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1250	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2000	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	4-Oct-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999970	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999977	Low MFC OK
Oxides of Nitrogen Gas Analyzer NO Portion	Analyzer Calibration within 2 weeks of assay	5-Oct-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.25%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.26%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.28%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.32%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.41%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0038	Analyzer Slope is acceptable
Oxides of Nitrogen Gas Analyzer NOx Portion	Analyzer Calibration within 2 week of assay	5-Oct-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.22%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.23%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.25%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.29%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.37%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0007	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	5-Oct-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.464%	Dilution Check RSD is OK
Day of Assay Zero/Span Check NO Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Day of Assay Zero/Span Check NOx Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 NO Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.16%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #1 NOx Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.50%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 NO Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-1.37%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #2 NOx Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-1.77%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 NO Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.09%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #3 NOx Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.49%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #4 NO Assay	Challenge Standard #4 Std. Error < 1%	The standard error is okay.	Challenge Standard #4 Std. Error is OK
	Challenge Standard #4 vendor certificate bias	-0.23%	Challenge Std. #4 vendor certificate bias < 2%
Challenge Standard #4 NOx Assay	Challenge Standard #4 Std. Error < 1%	The standard error is okay.	Challenge Standard #4 Std. Error is OK
	Challenge Standard #4 vendor certificate bias	1.40%	Challenge Std. #4 vendor certificate bias < 2%
Challenge Standard #5 NO Assay	Challenge Standard #5 Std. Error < 1%	The standard error is okay.	Challenge Standard #5 Std. Error is OK
	Challenge Standard #5 vendor certificate bias	-0.07%	Challenge Std. #5 vendor certificate bias < 2%
Challenge Standard #5 NOx Assay	Challenge Standard #5 Std. Error < 1%	The standard error is okay.	Challenge Standard #5 Std. Error is OK
	Challenge Standard #5 vendor certificate bias	-0.02%	Challenge Std. #5 vendor certificate bias < 2%
Challenge Standard #6 NO Assay	Challenge Standard #6 Std. Error < 1%	The standard error is okay.	Challenge Standard #5 Std. Error is OK
	Challenge Standard #6 vendor certificate bias	0.44%	Challenge Std. #5 vendor certificate bias < 2%
Challenge Standard #6 NOx Assay	Challenge Standard #6 Std. Error < 1%	The standard error is okay.	Challenge Standard #5 Std. Error is OK
	Challenge Standard #6 vendor certificate bias	0.04%	Challenge Std. #5 vendor certificate bias < 2%

SO2 QA Requirements Summary- Region 2- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	11-Dec-15	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1425	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1700	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	7-May-11	Standard OK
	Low Flow Standard Expiration Date	7-May-11	Standard OK
	Flow Standard Base Unit Expiration Date	7-May-11	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	4-Oct-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999970	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999977	Low MFC OK
Sulfur Dioxide Gas Analyzer	Analyzer Calibration within 2 weeks of assay	6-Oct-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.37%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.38%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.42%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.48%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.62%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9980	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	5-Oct-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.464%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-1.67%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-1.60%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.75%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #4 Assay	Challenge Standard #4 Std. Error < 1%	The standard error is okay.	Challenge Standard #4 Std. Error is OK
	Challenge Standard #4 vendor certificate bias	-1.82%	Challenge Std. #4 vendor certificate bias < 2%

CO QA Requirements Summary-Region 7-Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	18-Jan-12	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1250	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	9-Nov-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2100	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999785	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999964	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	1-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.35%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.36%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.39%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.46%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.59%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9969	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Jun-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.412%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.26%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.02%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-1.07%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #4 Assay	Challenge Standard #4 Std. Error < 1%	The standard error is okay.	Challenge Standard #4 Std. Error is OK
	Challenge Standard #4 vendor certificate bias	-0.36%	Challenge Std. #4 vendor certificate bias < 2%

SO2 QA Requirements Summary- Region 7-Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1900	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	11-Dec-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1700	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999785	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999964	Low MFC OK
Sulfur Dioxide Gas Analyzer	Analyzer Calibration within 2 weeks of assay	7-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.22%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.23%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.25%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.29%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.37%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0014	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Jun-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.412%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-1.43%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.43%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.26%	Challenge Std. #3 vendor certificate bias < 2%

NOx QA Requirements Summary- Region 7- Quarter 2, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	2000	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2000	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Jun-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999785	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999964	Low MFC OK
Oxides of Nitrogen Gas Analyzer NO Portion	Analyzer Calibration within 2 weeks of assay	9-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.12%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.12%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.13%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.20%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0022	Analyzer Slope is acceptable
Oxides of Nitrogen Gas Analyzer NOx Portion	Analyzer Calibration within 2 week of assay	9-Jun-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.07%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.08%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.08%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.10%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.12%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0013	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Jun-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.412%	Dilution Check RSD is OK
Day of Assay Zero/Span Check NO Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Day of Assay Zero/Span Check NOx Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 NO Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.51%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #1 NOx Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.04%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 NO Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.56%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #2 NOx Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.81%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 NO Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.44%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #3 NOx Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.47%	Challenge Std. #3 vendor certificate bias < 2%

CO QA Requirements Summary- Region 7- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-17	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1175	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	9-Nov-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2000	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	7-Sep-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999954	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999895	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	7-Sep-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.30%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.31%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.34%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.39%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.50%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9998	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	7-Sep-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.164%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.01%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.13%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	0.85%	Challenge Std. #3 vendor certificate bias < 2%

SO2 QA Requirements Summary- Region 7 - Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1750	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	11-Dec-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1700	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	7-Sep-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999954	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999895	Low MFC OK
Sulfur Dioxide Gas Analyzer	Analyzer Calibration within 2 weeks of assay	9-Sep-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.21%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.24%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.31%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0009	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	7-Sep-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.164%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.46%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.17%	Challenge Std. #2 vendor certificate bias < 2%

NOx QA Requirements Summary - Region 7- Quarter 3, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	2000	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2000	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	9-Nov-10	Standard OK
	Low Flow Standard Expiration Date	30-Dec-10	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	7-Sep-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999954	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999895	Low MFC OK
Oxides of Nitrogen Gas Analyzer NO Portion	Analyzer Calibration within 2 weeks of assay	13-Sep-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.27%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.27%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.30%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.35%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.45%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0016	Analyzer Slope is acceptable
Oxides of Nitrogen Gas Analyzer NOx Portion	Analyzer Calibration within 2 week of assay	13-Sep-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.14%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.15%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.16%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.24%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0020	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	7-Sep-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	-0.164%	Dilution Check RSD is OK
Day of Assay Zero/Span Check NO Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Day of Assay Zero/Span Check NOx Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 NO Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.78%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #1 NOx Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-0.89%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 NO Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.47%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #2 NOx Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.25%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 NO Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.28%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #3 NOx Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.63%	Challenge Std. #3 vendor certificate bias < 2%

CO QA Requirements Summary- Region 7- Quarter 4, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-17	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1100	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	9-Nov-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	2000	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	11-Nov-11	Standard OK
	Low Flow Standard Expiration Date	8-Nov-11	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Dec-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999881	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999907	Low MFC OK
Carbon Monoxide Gas Analyzer	Analyzer Calibration within 2 week of assay	1-Dec-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.41%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.42%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.46%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.54%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.69%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	0.9978	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Dec-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	0.052%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	-1.53%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	0.80%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	-0.21%	Challenge Std. #3 vendor certificate bias < 2%

SO2 QA Requirements Summary- Region 7- Quarter 4, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1700	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	11-Dec-15	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1700	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	11-Nov-11	Standard OK
	Low Flow Standard Expiration Date	8-Nov-11	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Dec-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999881	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999907	Low MFC OK
Sulfur Dioxide Gas Analyzer	Analyzer Calibration within 2 weeks of assay	6-Dec-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.20%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.21%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.22%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.26%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.34%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0016	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Dec-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	0.052%	Dilution Check RSD is OK
Day of Assay Zero/Span Check	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	13.25%	Challenge Std. #1 vendor certificate bias is 4% or greater
Challenge Standard #2 Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.17%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	0.51%	Challenge Std. #3 vendor certificate bias < 2%

NOx QA Requirements Summary-Region 7- Quarter 4, 2010

	QA Requirement	Result	Status
SRM Gas Standards	Primary SRM Cylinder Expiration Date	1-Jun-16	Primary SRM Gas Standard OK
	Primary SRM Cylinder Pressure >150 psi	1925	Primary SRM cylinder pressure is OK
	SRM Dilution Check Cylinder Expiration Date	1-Jun-16	Dilution Check SRM Gas Standard OK
	Dilution Check SRM Cylinder Pressure >150 psi	1900	Dilution check SRM cylinder pressure is OK
Laboratory Flow Standard	High Flow Standard Expiration Date	11-Nov-11	Standard OK
	Low Flow Standard Expiration Date	8-Nov-11	Standard OK
	Flow Standard Base Unit Expiration Date	N/A	Standard OK
Calibrator (mass flow controllers)	Calibrator Flow Calibration within 2 weeks of assay	1-Dec-10	Calibrator flow calibration within 2 weeks of assay
	Calibrated High Flow MFC Slope Range = 0.99 - 1.01	0.9999881	High MFC OK
	Calibrated Low Flow MFC Slope Range = 0.99 - 1.01	0.9999907	Low MFC OK
Oxides of Nitrogen Gas Analyzer NO Portion	Analyzer Calibration within 2 weeks of assay	8-Dec-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.20%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.21%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.23%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.26%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.34%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0002	Analyzer Slope is acceptable
Oxides of Nitrogen Gas Analyzer NOx Portion	Analyzer Calibration within 2 week of assay	8-Dec-10	Analyzer calibration within 2 weeks of assay
	Estimate of Uncetainty < 1% at point #1 (>80% URL)	0.17%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #2	0.17%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #3	0.19%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #4	0.22%	Assay may be conducted at this concentration
	Estimate of Uncetainty < 1% at point #5 (~50% URL)	0.28%	Assay may be conducted at this concentration
	Analyzer slope is within 0.98-1.02	1.0002	Analyzer Slope is acceptable
Dilution Check	Dilution Check Date within 2 weeks of assay	1-Dec-10	Dilution check within 2 weeks of assay
	Dilution Check Relative % Difference < 1%	0.052%	Dilution Check RSD is OK
Day of Assay Zero/Span Check NO Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Day of Assay Zero/Span Check NOx Portion	Day of Assay Zero Check - Std. Error < 1%	Std. Error is okay.	Zero Gas Std. Error is OK
	Day of Assay Zero Check - Relative Difference < 5%	RD is okay.	Zero Gas RD is OK
	Day of Assay Span Check - Std. Error < 1%	Std. Error is okay.	Span Gas Std. Error is OK
	Day of Assay Span Check - Relative Difference <5%	RD is okay.	Span Gas RD is OK
Challenge Standard #1 NO Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.39%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #1 NOx Assay	Challenge Standard #1 Std. Error < 1%	The standard error is okay.	Challenge Standard #1 Std. Error is OK
	Challenge Standard #1 vendor certificate bias	0.46%	Challenge Std. #1 vendor certificate bias < 2%
Challenge Standard #2 NO Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.39%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #2 NOx Assay	Challenge Standard #2 Std. Error < 1%	The standard error is okay.	Challenge Standard #2 Std. Error is OK
	Challenge Standard #2 vendor certificate bias	-0.03%	Challenge Std. #2 vendor certificate bias < 2%
Challenge Standard #3 NO Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	1.25%	Challenge Std. #3 vendor certificate bias < 2%
Challenge Standard #3 NOx Assay	Challenge Standard #3 Std. Error < 1%	The standard error is okay.	Challenge Standard #3 Std. Error is OK
	Challenge Standard #3 vendor certificate bias	0.62%	Challenge Std. #3 vendor certificate bias < 2%

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