UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 12 2004

Mr. Forest M. Mims III
Geronimo Creek Observatory
433 Twin Oak Road
Sequin, TX 78155

Re: Response to Request for Correction (RFC) Regarding Monitoring Information Pursuant to the Environmental Protection Agency (EPA) Information Quality Guidelines (IQGs) Request for Correction (RFC#12856)

Dear Mr. Mims:

This is in response to your request dated September 25, 2003, in which you raise concerns about the quality of 2002 ozone data reported from the CAMS 23, AIRS ID 480290032 monitoring site (herein referred to as "CAMS 23"), the U.S. Environmental Protection Agency (EPA) standards for accepting CAMS 23 data for use, and EPA presentation of CAMS 23 data on the EPA web site. Due to what you characterize as "erroneous data" and "misleading visualizations on EPA AIRNow web page," you request that EPA "assign an independent panel of scientists to review the current calibration tolerance standard at the earliest possible date" and "immediately remove. . .all data from CAMS 23 that was known to be deficient." Following a thorough review, we believe that EPA has met the principles outlined in *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency* (EPA Information Quality Guidelines or IQGs) and therefore we are not granting your request.

However, EPA is initiating a public process in the near future to address concerns about our acceptance criteria. I invite you to participate in that process when it commences and encourage you to share your views at that time.

Please visit the Office of Air Quality Planning and Standards (OAQPS) Monitoring Strategy web site http://www.epa.gov/ttn/amtic/monitor.html to find out when that is happening in the Ambient Air Quality Assurance Program. The enclosure with this letter describes the existing relevant quality programs at EPA and the Texas Commission on Environmental Quality (TCEQ).

Data from all monitoring sites, including the CAMS 23, are estimates which contain some degree of uncertainty. In response to your concerns, EPA has included disclaimer language on the AIRNow "Where You Live" web page to ensure the public is aware of quality considerations. The CAMS 23 site was determined to meet the uncertainty acceptance levels for both the calibration tolerances and precision probability limits found in the TCEQ quality assurance project plan approved by EPA Region 6, consistent with EPA guidance.

If you are dissatisfied with EPA's decision to deny your request, you may submit a Request for Reconsideration (RFR). EPA recommends that this request be submitted within 90 days of the date on this letter. To do so, send a written request to the EPA's Information Quality Guidelines Processing Staff via mail (Information Quality Guidelines Staff, Mail Code 2822T, USEPA, 1200 Pennsylvania Ave., N.W., Washington, DC, 20460), electronic mail (quality.guidelines@epa.gov) or fax (202) 566-0255. The RFR should reference the request number assigned to the original request for correction (identified in the heading of this response). Additional information that should be included in the request is listed on the EPA Information Quality Guidelines web site (http://www.epa.gov/oei/qualityguidelines).

Sincerely yours,

Jeffrey R. Holmstead
Assistant Administrator
Office of Air and Radiation

Richard E. Greene
Regional Administrator
Region 6

Enclosure

Enclosure

The EPA Information Quality Guidelines apply to information the Agency disseminates to the public that is prepared by the Agency to support or represent an EPA viewpoint or to formulate or support a regulation, guidance or other Agency decision or position. In your request, you suggest that information EPA presents (CAMS 23 data) "from various EPA web sites", including the EPA AIRNow web page, are not in compliance with the Information Quality Guidelines. In order to evaluate whether or not the Information Quality Guidelines were satisfied in this case, we had to more specifically identify the disseminated information of concern to you. To that end, we identified all EPA web sites where the public may obtain the CAMS 23 data in question. Our review for Information Quality Guidelines purposes assumed that the "various EPA web sites" you refer to were the :

1. Air Quality Index (AQI) AIRNow web site: (http://www.epa.gov/airnow)
2. Technology Transfer Network (TTN) Air Quality System (AQS) (http://www.epa.gov/ttn/airs/airsaqs)

At those sites, the public may obtain the calendar year 2002 CAMS 23 data that you characterize as "erroneous".

AIRNow provides air quality maps, animations, forecasts, and links to State, Local and Tribal monitoring web sites. The AQS database contains measurements of "criteria air pollutant" concentrations in the 50 United States, the District of Columbia, Puerto Rico, and the Virgin Islands. Since Ozone is a Clean Air Act (CAA) "criteria air pollutant" and therefore relevant to air quality forecasts, monitoring results regarding ozone are available on both EPA web sites. Our detailed findings are outlined below.

AQI AIRNow Web Site

In your request, you maintain that EPA uses misleading visualizations on the AIRNow web page. Although the AIRNow web site is supported by EPA to inform the public in a "real-time manner" of health conditions in the areas where they live and work, EPA neither prepares the information nor uses it to support or represent EPA's viewpoint. This information is not used to formulate or support a regulation, guidance or other Agency decision or position. Therefore, the information quality guidelines do not apply to this site. This information is considered preliminary and is measured and distributed by the State, Local or Tribal monitoring organizations and presented on the AIRNow website in a consistent manner. As noted above, the AIRNow site displays air quality maps. The site provides the following description of the data used to generate maps and provide forecasts.

"The air quality data used in these maps and to generate forecasts are collected using either Federal reference or equivalent monitoring techniques or techniques

approved by the State, Local, or Tribal monitoring agencies. Since the information needed to make maps must be as "real-time" as possible, the data are displayed as soon as practical after the end of each hour. Although some preliminary data quality assessments are performed, the data as such are not fully verified and validated through the quality assurance procedures monitoring organizations use to officially submit and certify data on the EPA AQS. Therefore, data are used on the AIRNow web site only for the purpose of reporting the AQI. Information on the AIRNow web site is not used to formulate or support regulation, guidance or any other Agency decision or position."

Since the information needed to make maps and forecasts must be as "real-time" as possible, the data presented in AIRNow for the aforementioned purposes go through preliminary data quality checks but are not fully verified and validated through the quality assurance procedures monitoring organizations use to submit and certify data on the AQS (described below). EPA believes in ensuring an appropriate level of quality because this is integral to ensuring the success of the Agency missions and providing useful information to the public. EPA does not believe that full verification and validation is necessary for this data when used for "real-time" forecasting and mapping purposes since hourly ozone data are normally reported to AQI within 20-60 minutes from measurement. EPA also believes that the practice of relating quality to the intended application is consistent with the Information Quality Guidelines. As mentioned in the EPA Information Quality Guidelines: "It is EPA's policy that all information it distributes meets a basic standard of information quality, and that its utility, objectivity and integrity be scaled and appropriate to the nature and timeliness of the planned and anticipated uses." We believe that the potential uncertainty in the data from the CAMS 23 site would not have significantly affected the visualizations of the health conditions described for the City of San Antonio for 2002.

Lastly, you mention erroneous tabulated data on the AIRNow site. EPA does not provide tabulated data on AIRNow but does provide links to State, Local or Tribal monitoring organizations where tabulated data can be found. These links can be found in the "Where You Live" area on the AIRNow website. The following statement is made on the AIRNow web page:

"Most links on this page are pointers to other hosts and locations in the Internet. This information is provided as a service; however, the U.S. Environmental Protection Agency does not endorse, approve, or otherwise support these sites"

As described in the EPA Information Quality Guidelines, these hyperlinks and other references to information distributed by others are not considered EPA information and, as such, the Information Quality Guidelines do not apply.

US EPA Technology Transfer System (TTN) Air Quality System (AQS)

The Air Quality System (AQS) is the information management system that stores the ambient air quality criteria pollutant data for the EPA. With regards to AQS, EPA believes that the information is presented and distributed in an objective manner, consistent with the Information Quality Guidelines. The AQS database technical area is designed primarily for AQS users (State, Local and Tribal monitoring organizations, Agency management, EPA Regional Offices, consultants, and environmental groups). It provides information about the use of the AQS application, software downloads, file formats, background project information, and events of special interest to personnel working with data in the AQS. It does allow users to download individual measurements but only for data that has been certified by the monitoring organizations.

Certification is a formal process described in CFR (Part 58 Appendix F) in which the monitoring organization submits a letter to EPA, usually in July, declaring that the previous calendar year's information submitted to AQS is "accurate to the best of their knowledge." The certification memo from the Texas Commission on Environmental Quality (TCEQ) for the 2002 data was submitted to EPA Region 6 on June 30, 2003. Data submitted to AQS for specific purposes, such as comparison the National Ambient Air Quality Standards, are identified by specific variable names and must meet the quality system requirements defined in 40 CFR Part 58, Appendix A. These quality system requirements help to provide data of adequate quality for their intended use and therefore achieves the information quality guidelines for objectivity, utility and integrity. A discussion of some of the quality system procedures in place at EPA and TCEQ follows.

Monitoring Organization Quality System Development

As described in the EPA Information Quality Guidelines, "the collection, use and dissemination of information of known and appropriate quality are integral for ensuring that EPA achieves its mission." The term "appropriate quality" is used because EPA recognizes that all estimates or data contain uncertainty. EPA QA policy and guidance, as defined in EPA Order 5360.1, and the QA policies for assistance agreements (40 CFR 30, 31, and 35) have been developed to ensure that data can be used for the intent in which it was initially collected. Within both the time and resource constraints of the Ambient Air Quality Monitoring Program, the EPA QA requirements, as defined in 40 CFR Part 58, Appendix A, provide the balance required to produce data of appropriate quantity and quality for the decisions which are made for those sites defined as State and Local Air Monitoring Sites (SLAMS). The CAMS 23 site is a SLAMS site. In addition to regulations, EPA provides a host of guidance documents that provide additional detail and information to help monitoring organizations develop their quality system. State, Local and Tribal stakeholder groups have always participated in the development and peer review of these guidance documents. Guidance particular to the ozone criteria pollutant include:

- Guideline on the Meaning and Use of Precision and Accuracy Data Required by 40 CFR part 58, Appendices A and B. EPA-600/4-83/023.
- Special Report. Issues Concerning The Use of Precision and Accuracy Data EPA-450/4-84-006.
- Technical Assistance Document for the Calibration of Ambient Ozone Monitors. EPA-600/4-79-057.
- Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II-Ambient Air Specific Methods. EPA-454/R-98-004. This document is referred to as the *QA Handbook* throughout this response

These guidance documents provide monitoring organizations with information on the acceptance criteria for calibration tolerances. Many monitoring organization incorporate the guidance document information into their QA project plans, which are reviewed and approved by the EPA Regions.

As mentioned above, monitoring organizations are required to develop a quality system which they describe in quality assurance project plans and standard operating procedures, and have the quality assurance project plan reviewed and approved by the EPA Regional Offices. All air monitoring quality assurance project plans submitted by monitoring organizations within the EPA Region 6 geographic coverage are logged in the EPA Region 6 Quality Assurance Tracking (QTRAK) system managed by the EPA Region 6 Quality Assurance Officer. Once logged in, the quality assurance project plan, with a QTRAK number, is sent to the appropriate grant project officer or program manager for review and approval. The TCEQ is required to submit the quality assurance project plan to EPA Region 6 for review and approval at least once every year and also whenever there is a change in the program. The quality assurance project plan titled "NAMS/SLAMS Network and U.S./Border Support Activities for Air Monitoring in Texas" was reviewed and approved on March 26, 2002, with QTRAK number Q-02-165 and on March 17, 2003, with QTRAK number Q-03-171. TCEQ stated in these quality assurance project plans that the calibration of ozone analyzers were to be performed at the beginning of sampling and every 28 days thereafter. TCEQ provided additional calibration information in their SOPs as attachments to the quality assurance project plan. Based on approval of the quality assurance project plan, EPA approves of the quality system and the quality control criteria used the verify and validate data for submission to AQS.

Due to concerns specifically about the calibration tolerances of the ozone system, more details on this quality control check are described below.

Calibration Tolerance

Calibration of an analyzer establishes the quantitative relationship between actual pollutant concentration input (in ppm, ppb, ug/m^3, etc.) and the analyzer's response (chart recorder reading, output volts, digital output, etc.). This relationship is used to convert subsequent analyzer response values to corresponding pollutant concentrations and also serves to

establish and/or verify the linearity of analyzers. 40 CFR Part 50 App D provides the measurement principle and calibration procedure for Ozone. More detailed instructions are included in a document titled "Technical Assistance Document for the Calibration of Ozone Monitors" (EPA600/4-79-057). This guidance suggests multi-point calibrations (at least 5-points) upon receipt of a new instrument and once every 6 months. Since the response of most analyzers has a tendency to change somewhat with time (drift), the calibration must be checked or updated (or the analyzer's response must be adjusted) periodically to maintain a high degree of accuracy. The RFC suggests that the +/- 20% calibration tolerance encourages sloppy practices by instrumentation technicians. The calibration tolerance mentioned in the request for correction may be in reference to either of 2 types of QC checks, each of which will be briefly discussed:

1. the zero/span check, or
2. the precision check

Zero/Span Check

Zero/span checks are used to determine instrument drift and ensure the calibration equation used to calculate data concentrations is appropriate. EPA *QA Handbook* (EPA-454/R-98-004) suggests that zero and span checks be performed at a minimum of every two weeks. Many monitoring organizations, including TCEQ, perform this check every night. Based on how a monitoring organization updates their calibrations, the *QA Handbook* describes two sets of suggested acceptance criteria as depicted in Figure 12.2 in the *QA Handbook*. If the calibration is updated at each zero/span then drifts of up to +/- 20 -25% may be considered acceptable prior to adjustment. If a fixed calibration system is used, then drifts to 15% could be cause for data invalidation to the last calibration. Based on this guidance, a monitoring organization could use the acceptance limits described in the *QA Handbook* and incorporate them into their quality assurance project plan (see the quality assurance project plan approval process). TCEQ incorporated a similar acceptance criteria into their quality assurance project plan which, as mentioned earlier, was approved by EPA Region 6.

From a phase-in period in 2001 until October 2002, TCEQ used a procedure in which they ran a 5-point calibration routinely every 28 days, a 3-point span once a week, and a 2-point span (SPZ) daily. TCEQ procedures required the implementation of the 2-point span procedure lasting 30 minutes and to perform this check over a two hour period so that they would not lose a valid hour of data. A check that took longer than 30 minutes would invalidate at least one hour of data. TCEQ used the 2-point span procedure as described in their quality assurance project plan to adjust the y- intercept in the formula used to calculate the ozone concentration. This procedure was used on all ~60 ozone sites operated by TCEQ. For some reason, the ozone instrument at the CAMS 23 site was not equilibrating properly to the zero-gas used in the 2-point span check and when the y-intercept adjustment was made, it caused a bias to the concentration values. This bias resulted in the warning flags mentioned in the RFC. TCEQ institutes warning flags and failure flags in their quality system. A warning flag would allow data to be accepted. Therefore, the data corresponding to these warning flags were not invalidated or corrected. TCEQ also has a policy which calls for consistency in operating procedures, meaning that

changing a procedure would require a change in all 60 ozone instruments. Since the majority of the ozone instruments were operating properly with the current procedure, they worked to discover ways to improve the performance of the CAMS 23 instrument. However, in October 2002, following their principle of uniform operations across their network, TCEQ stopped using the 2-point span procedure to adjust the intercept at all sites and went back to an earlier acceptable procedure. TCEQ also felt that the bias resulting from the 2-point span procedure was within acceptable levels of data uncertainty and did not attempt to correct the data.

Bi-Weekly One Point Precision Checks

40 CFR Part 58, Appendix A requires implementation of biweekly precision checks. Precision can be defined as a measure of mutual agreement among individual measurements of the same property. Since the precision checks are implemented by introducing a audit gas of known concentration, it can also be used to identify instrument drift and calibration issues. Precision data is submitted to AQS for review by the Office of Air Quality Planning and Standards (OAQPS). Current OAQPS requirements aggregate the precision information to the reporting organization level (e.g., TCEQ) and is computed as a 95% probability limit. The probability limits are expected to include 95% of all individual measurements of the reporting organization. Additional details on the precision and accuracy information can be found in two documents: "Guideline on the Meaning and Use of Precision and Accuracy Data Required by 40 CFR part 58, Appendices A and B" (EPA-600/4-83/023), and "Special Report: Issues Concerning the Use of Precision and Accuracy Data" (EPA-4 50/4-84-006). In the Special Report, the issue was raised as to what data quality was necessary for trend or attainment determinations. The recommendation stated: " Provided the measurement error for an instrument is within +/- 20 percent, measurement imprecision is not currently believed to adversely influence attainment determinations." The Special Report then went on to recommend probability limit determinations as the following: "It is recommended that the organization-wide measurement error, reflected by an upper and lower probability limit for precision and accuracy, be held within the range of +/- 25% for automated analyzers." In 1998, the *QA Handbook* was revised to include a suggested precision acceptance criteria of 15%.

Figure 1 provides precision data for 2002 for a number of ozone sites for the reporting organization responsible for the CAMS 23 site. The CAMS 23 site (0290032) is the first site in the top graph. For 2002, the reporting organization's precision probability limit was ~ +/-7% which is represented by the dark horizontal line on each graph. For each monitoring site, a box and whisker plot is presented. The extreme values for each site are represented by the ends of the vertical lines. The 95% precision probability interval estimate for the CAMS 23 site in 2002 was -4.5% to 2.3%. Probability limits aggregated at the reporting organization level can be influenced by a few extreme values at a few sites or a few extreme sites. This is part of the reasoning why the original guidance allowed a +/- 25% range since individual sites would have to produce better precision than the overall reporting organization acceptance value. The majority of the TCEQ sites had all their precision values within the +/- 7% probability limit, well within the 15% suggested in the *QA Handbook*.

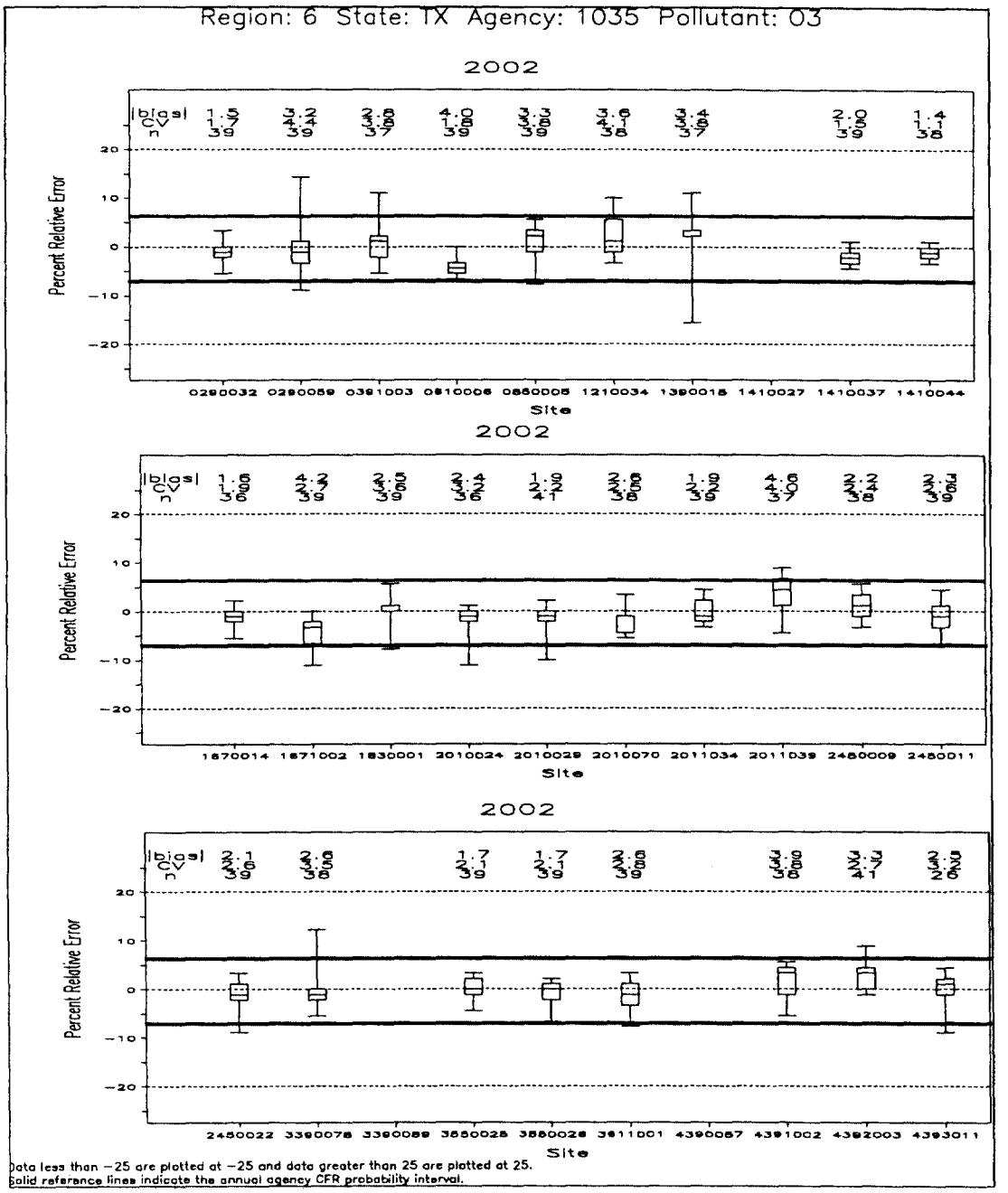

Figure 1 CY 2002 Precision Estimates For Reporting Agency 1035

Ozone Instrumentation- Federal Reference and Equivalency Process

In your request, you state that "at least 7 States complained to EPA about operational problems with the EPA-recommended Dasibi ozone analyzer. . ."

Thirty percent of the monitoring sites, representing 29 States, report ozone data to AQS using one of two Dasibi instruments currently listed as a reference or equivalent method. Complaints about all types of monitoring instruments are common. OAQPS has set up a question and answer forum on Ambient Monitoring Technology Information Center (AMTIC) in order to help monitoring organizations overcome instrumentation issues. The Dasibi complaints are a normal part of the monitoring process, not an anomaly and therefore do not indicate a particular problem with this type of instrument.

EPA OAQPS does not recommend any specific instrument for measuring criteria pollutants to the State, Local or Tribal monitoring organizations. Any instrument that meets the Federal Reference and Equivalency Requirements, as specified in 40 CFR Part 53, are designated as such and then added to the list that is distributed on AMTIC (http://www.epa.gov/ttn/amtic/criteria.html). Only designated Federal reference or equivalent methods can be used in State and Local Ambient Air Monitoring and National Ambient Air Monitoring Networks (SLAMS/NAMS). These instruments, when operated in accordance with standard operating procedures and the quality system requirements/guidance should provide data of acceptable quality for the SLAMS/NAMS networks.

Data Comparisons

Your request spoke of a data comparison with another monitoring site in close proximity to the CAMS 23 site in order to identify an apparent bias that was suspected to be at the CAMS 23 site. Data comparisons are appropriate for use as quality control procedures especially if a predictable and stable relationship is expected. However, while this procedure can identify a data quality issue, it is not used to quantify an actual bias since there is no information that would tell an analyst which site was providing the correct value. For example, if the CAMS 23 site was biased 10% high in relation to another site there is a possibility that the CAMS 23 was actually biased 5% high from the true value and the comparison site was 5% low from the true value which would create the 10% difference between the two sites. Therefore, the data comparison approach is another QA tool for assessing potential data quality issues but has limited utility in quantifying or correcting data. Comparisons become more effective if several sites can be compared, thus allowing for the isolation of a problematic monitor.

References

Requirements

1. 40 CFR Part 50, Appendix D - Measurement Principle and Calibration Procedure for the Measurement of Ozone in the Atmosphere

2. 40 CFR Part 53, Ambient Air Monitoring Reference and Equivalent Methods

3. 40 CFR Part 58, Appendix A - Quality Assurance Requirements for State and Local Air Monitoring Stations (SLAMS)

4. 40 CFR Part 58, Appendix F Annual SLAMS Air Quality Information

Technical Assistance and Supporting Guidance

5. A.D. Thrall and C. S. Burton: Special Report. Issues Concerning The Use of Precision and Accuracy Data EPA-450/4-84-006. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, February, 1984.

6. Guidelines for Ensuring and Maximizing the Quality, Utility, Objectivity, Utility, and Integrity, of Information Disseminated by the Environmental Protection Agency. EPA/260R-02-008. U.S. Environmental Protection Agency. Oct, 2002 http://ww.epa.gov/oei/qualityguidelines

7. List of Designated Reference and Equivalent Methods. Available at Ambient Air Monitoring Technology Information Center website (AMTIC) http://www.epa.gov/ttn/amtic/criteria.html

8. Paur, R.J. and F.F. McElroy. Technical Assistance Document for the Calibration of Ambient Ozone Monitors. EPA-600/4-79-057. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, September, 1979.

9. Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II-Ambient Air Specific Methods EPA-454/R-98-004.

10. Rhodes, R.C. Guideline on the Meaning and Use of Precision and Accuracy Data Required by 40 CFR part 58, Appendices A and B. EPA-600/4-83/023. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, June, 1983.