FUTURE YEAR EMISSION INVENTORY DEVELOPMENT TO SUPPORT ATMOSPHERIC MODELING OF FINE PARTICULATE MATTER AND OZONE IN THE SOUTHEASTERN US

DRAFT
QUALITY ASSURANCE PROJECT PLAN

Effective Date: March 2006

ASSOCIATION FOR SOUTHEASTERN INTEGRATED PLANNING

ASIP

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APPROVED BY

(ASIP Technical Director)	(ASIP Emission Inventory Tech. Advisor)
(MACTEC Program Manager	(MACTEC Quality Assurance Coordinator)
(MACTEC Task Manager)	(MACTEC Task Manager)

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Distribution List:
Pat Brewer, ASIP (Technical Director)
Greg Stella, Alpine Geophysics, Inc. (ASIP Emission Inventory Technical Advisor)
Douglas Toothman, MACTEC (Quality Assurance Coordinator)
William Barnard, MACTEC (Program Manager, Area and Nonroad Source Task Leader)
Edward Sabo, MACTEC (Point Source Task Leader)
Dan Meszler, MESZLER Engineering Services, Inc. (Mobile Source Task Leader)

1.0 PROJECT MANAGEMENT

1.1 Problem Definition/Background

The Southeastern States Air Resource Managers (SESARM) has been designated by the United States Environmental Protection Agency (EPA) as the entity responsible for coordinating and implementing regional planning for the eight SESARM states (Alabama, Florida, Kentucky, Georgia, Mississippi, North Carolina, South Carolina and Tennessee) plus Virginia, West Virginia, and Tribes. Through a memorandum of understanding, these parties are collaborating in the organization Visibility Improvement State and Tribal Association of the Southeast (VISTAS) on the technical analysis and planning activities that support state implementation plans for regional haze. The participating agencies have concluded that a collaborative regional process is also the most efficient approach for the states to develop the technical analyses supporting attainment demonstrations for the fine particulate matter (PM2.5) and eight-hour ozone standards. Along with the local air regulatory agencies for Jefferson County, AL, Jefferson County, KY, Mecklenberg County, NC, Forsythe County, NC, Knox County, TN, and Shelby County, TN, these agencies have become signatory parties to the collaborative effort called the Association for Southeastern Integrated Planning (ASIP). SESARM will coordinate among participating agencies and oversee the performance of the ASIP inventory and modeling tasks in parallel with the VISTAS regional haze project tasks. Emissions inventory efforts include the development of emissions inventories and forecasts to be utilized in ASIP modeling efforts.
At least one area in seven states (Alabama, Georgia, North Carolina, Kentucky, Tennessee, Virginia, and West Virginia) has been designated as nonattainment for the $PM_{2.5}$. In addition, South Carolina has one three-county area that was designated as unclassifiable. The $PM_{2.5}$ compliance date is April 2010 unless a state demonstrates that more time is necessary in which case up to five additional years may be granted. State implementation plans (SIPs) will be due in April 2008 and the modeling year for the $PM_{2.5}$ attainment demonstration will be 2009.

The States of Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia have one or more nonattainment areas for the eight hour ozone standard. Basic nonattainment areas are required to attain the 8-hour ozone standard by June 15, 2009, while moderate nonattainment areas are required to attain by June 15, 2010. This will require states with basic 8-hour ozone nonattainment areas to demonstrate attainment for the year 2008 and moderate areas will require 2009 as the modeling year

The objective of this project is to compile future year emission inventories to support fine particulate matter and ozone modeling efforts in the ASIP region for all source categories. This project has the following overall design specifications:

- Pollutant Coverage - primary and precursor annual and seasonal emissions necessary to accurately model fine particulate matter and ozone, including primary PM2.5 and

PM10, ammonia (NH3), oxides of sulfur (SOx), volatile organic compounds (VOCs), oxides of nitrogen (NOx) and carbon monoxide (CO)

- Source Coverage – all source categories except biogenic.
- Geographic Areas – the ASIP states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia)

The inventories created under this contract will be used in creating future year modeling inventories (modeled under other ASIP work tasks) to support chemical transport modeling of fine particulate matter and ozone in the southeastern U.S. and to evaluate potential control strategies for the National Ambient Air Quality Standards (NAAQS) for fine particulate and ozone. Two future year inventories will be prepared along with evaluations of various controls for those inventories. In addition, updates of the 2002 base year inventory will be performed under this contract as necessary to develop the projection years.
The purpose of this Quality Assurance Project Plan (QAPP) is to outline and guide the process for quality assuring the inventory development to ensure the development of complete, accurate, and consistent emission inventories. The QAPP is consistent with the recommendations in the EPA quality assurance requirements[1] and the Emission Inventory Improvement Program's QA guidance[2]. The QAPP includes tasks associated with obtaining State data, merging and augmenting State submittals with available EPA databases, improving the activity data and emission factors for important source categories, obtaining and developing growth and control factors, obtaining State and stakeholder review of the emission inventory, and providing documentation of the maintenance (revisions, updates, corrections) of the inventory.

1.2 Project/Task Description

EPA[3] has specified that calendar year 2002 be used as the base year for emission inventories to support planning efforts under the 8-hour ozone, PM2.5, and Regional Haze programs. ASIP has planned an iterative process to use and enhance the 2002 base inventory prepared by MATEC for the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) as part of regional haze planning, that incorporates improved information as it becomes available. In addition, work on the PM2.5 and ozone NAAQS calls for continued measures of progress. As a consequence, emissions inventories for 2008 and 2009 will be required to assess such progress.

- A revised 2009 Base G future year inventory based off of the 2009 projections developed previously for VISTAS (Base G due May 2006). This inventory will be developed using the final version of the 2002 VISTAS base year. The revised 2009 inventory is designed to support modeling runs for fine particulate and ozone. It will be created using readily available growth and control information from the Clean Air Interstate Rule (CAIR), the Heavy Duty Diesel Rule (HDD Rule), the DOE's Annual Energy Outlook 2006, and other EPA rules. In addition, control programs under these rules as well as State Implementation Plans (SIP) will be incorporated. The growth and control factors will be those developed for the VISTAS 2009 regional haze and PM2.5 inventory development effort augmented by updated information from other regional inventory development work and modifications based on State

comments. Typical year emissions for electric generating units (EGUs), wildfire and prescribed burning sources will be revised as necessary to incorporate new data. Control programs that are "on-the-books" and "on-the-way" will be incorporated into the estimates. Three control strategy inventories will also be developed for 2009.

- A 2008 Inventory Base G (available Spring/Summer 2006). This inventory will be created using information developed for the 2009 inventory with revised growth and control factors to account for a 2008 projection rather than a 2009 projection. The inventory will still include "on-the-books" and "on-the-way" control programs as well as any SIP or other State specific controls.

This QAPP focuses on the tasks associated with developing these inventories.

Projection Inventory Activities. The effort includes the following area source activities:

1. Assemble data needed to update the 2009 VISTAS inventory to account for Base G changes to the base year 2002 inventory and any changes to growth or control factors for 2009 based on State/workgroup review.
2. Prepare the 2009 inventory using data received as part of step 1.
3. Assemble data needed to develop the 2008 ASIP inventory. This includes development of growth and control factors for 2008 which are not currently available.
4. Prepare the 2008 ASIP projection inventory using data developed in step 3.
5. Recommend methods for control strategies for 2009.
6. Prepare 2009 control strategy inventories.
7. Revise the 2002 "typical year" inventory for electric generating units (EGUs) with any updated data.
8. Revise the "typical year" inventory for wild and prescribed fires with any updated data.

Other Activities. In addition to the above tasks related to projecting emissions, a report detailing the methods used to develop the projections will be prepared.

1.3 Project Organization

Figure 1 and Table 1 identify the individuals and organizations participating in the project. Their specific roles and responsibilities include:

- Ms. Pat Brewer, Technical Coordinator, will plan, conduct, and supervise technical and managerial aspects of the project. She will facilitate communications among State/local agencies, MACTEC, and the SESARM Executive Director.
- Mr. Greg Stella, Emission Inventory Technical Advisor, will work with the Technical Coordinator to define the emission inventory development activities needed to support PM2.5 and ozone modeling and planning activities.

- State/local Agency Coordinators will compile and submit data to MACTEC, participate in QA/QC reviews, and help revise, update, and correct the inventory.
- William Barnard, MACTEC Program Manager, will direct and monitor technical and financial performance throughout the project and will serve as a senior primary contact with ASIP on contract and project management issues. Mr. Barnard will also direct aspects of the projection inventory development related to area and mobile sources. He will plan and conduct the technical aspects of the development of the area and mobile source inventories, supervise daily activities, identify effective QC procedures and make recommendations on needed QC procedures.
- Edward Sabo, MACTEC Point Source Task Leader, will plan and manage all point source activities. He will plan and conduct the technical aspects of the development of the point source inventory, supervise daily activities, identify effective QC procedures and make recommendations on needed QC procedures.
- Dan Meszler, MACTEC Mobile Source Task Leader, will plan and manage all mobile source activities. He will plan and conduct the technical aspects of the development of input files for the MOBILE and NONROAD models and for nonroad sources not covered by the NONROAD model. He will help identify effective QC procedures and make recommendations on needed QC procedures.
- Douglas Toothman, MACTEC QA Coordinator, will help ensure that adequate QA/QC procedures are incorporated into the inventory development process. He will work independent of the inventory development Task Leaders to assist in the conduct of project QA/QC assessments.

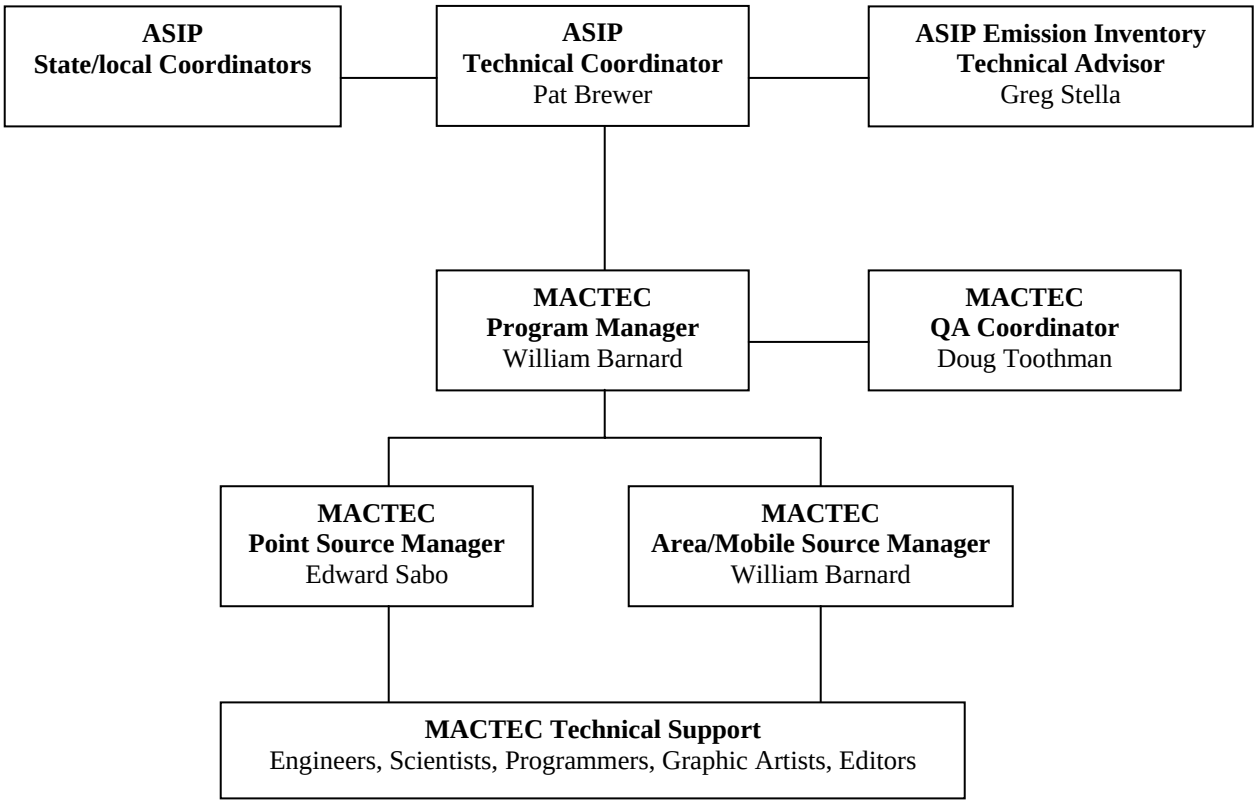

FIGURE 1 – PROJECT ORGANIZATION CHART

1.4 Quality Objectives and Criteria

The goal of the inventory process is to provide the best possible inventory under given resource constraints. Data Quality Objectives (DQO) are statements about the level of acceptable uncertainty or error. Their purpose is to ensure that the final data will be sufficient for the intended use of the inventory. A well-developed and implemented quality assurance program fosters confidence in the inventory and any resulting regulatory program. It also gives the end user important information about the limitations of the emission estimates in order to avoid misuse of data.

Table 1 summarizes the Data Quality Objectives for the ASIP inventories that will be compiled for this contract. The first column of Table 1 defines four data quality objectives: accuracy, completeness, comparability and representativeness. The second column identifies the procedures that will be used to achieve each objective. The third column identifies Data Quality Indicators (DQI), which are qualitative and quantitative descriptors used in interpreting the degree of acceptability or utility of data.

1.5 Special Training/Certification

All staff performing data review and analysis are air quality professionals and have sufficient education/experience to perform emission estimation calculations and work with emission inventory databases. Most staff have received specific emission inventory training through conferences, workshops, self-study programs, and on-the-job work experiences. There are no specifically mandated training requirements for work performed on this project.

1.6 Documents and Records

QAPP Control. Any changes to this QAPP will be initiated either by the Program Manager, the Task Leaders, or the QA coordinator. Each change will be given a revision number and date in the document control block in the upper corner of the affected pages. It will be the responsibility of the initiating person to distribute copies of the changed pages to all the persons on the Distribution List and to the appropriate project team members.

Data Collection Records. Clear documentation of the data collected from the State/local agencies, EPA, and other agencies is integral to the quality analysis review. Records will be maintained containing a description of the data received, the name of the person and agency submitting the data, the date of the submission, and other relevant information about the data submission. The following types of data will be collected during this project:

- EPA's 1999 National Emission Inventory (Version 2 Final)
- State CERR submittals
- State/local agency data submittals in NIF 3.0 format
- Growth factors assembled by EPA

- EPA's Final Summary Emission Reports for 2002 with CEM information for electric utilities regulated by the Acid Rain Program
- EPA's Toxic Release Inventory for 1999/2000 with ammonia emissions data
- Point source surveys for target facilities to obtain missing information
- State/local agency submittals of updated activity data related to fugitive dust sources, primarily paved and unpaved roads, livestock activities and agricultural activity (tilling).
- State agency submittals of information necessary to calculate fire emissions and geographically locate where these fires occurred in 2002.
- State agency submittals of updated activity data for animal operations for use with the Carnegie Mellon University ammonia model.
- State/local agency revisions, updates, corrections in response to various QA/QC checks. These may be provided in a variety of formats depending on the nature of the response.
- Department of Energy fuel efficiency data
- EGAS growth factors
- VMT data

TABLE 1

DATA QUALITY OBJECTIVES, PROCEDURES, AND INDICATORS

Data Quality Objective	Procedures	Example Indicators
Accuracy - reduce uncertainty in emission estimates where possible, validate that data elements needed for modeling are within accepted parameters, and verify that emission estimates agree with accepted reference values.	1. Identify weaknesses in existing inventories, identify new methods/data to reduce uncertainty, and obtain new activity/emission factor data where available. 2. Use EPA's NIF QA tool and ad-hoc reports to perform computerized checks of valid codes/data ranges and to identify outliers. 3. Conduct senior technical review of pollutant totals by facility, source category, state, and region. 4. Compare to other published data.	1. Qualitative assessment of the inventory's strengths and weaknesses. 2. 100% of stack data and temporal factors in valid ranges for > 100 tpy sources. 3. 100% of sources have valid geographic coordinates. 4. 100% correction of significant outliers. 5. Agreement of ASIP emissions and EPA CEM data and EPA TRI data. 6. Compare projection emissions to base year emissions to ensure that values are within expected ranges.
Completeness – include all major point sources, include emission estimates for PM2.5 and ammonia, verify that all important areas source categories are included for all counties and all mobile source categories are accounted for.	1. Compare ASIP utility data to EPA CEM data. 2. Compare ASIP point source ammonia data to EPA TRI data. 3. State/local agencies compare facility list to their Title V permit lists. 4. Compare small point source emissions to area source emissions. 5. Compare PM10 and PM2.5 emissions. 6. Plot area source spatial distributions by source category and county.	1. 100% of all utilities accounted for in database. 2. 100% of large ammonia sources in TRI accounted for in database. 3. 100% of Title V sources accounted for in database 4. Small point sources included as either small point sources or as area sources. 5. PM2.5 and ammonia emissions included in inventory 6. Area source emissions for important source categories for all counties in region. 7. All mobile sources accounted for. 8. Explanation of any missing data or sources.
Comparability – verify that emission estimates are similar to other peer-reviewed inventories and that any major deviations are explained.	1. Compare emission totals by source category, pollutant, geographic region, and year with previous emission inventories.	1. Explanation for large discrepancies in emissions
Representativeness – use emission estimation methods that reflect local conditions and the time period of interest.	1. Identify where national defaults used instead of local activity data. 2. Identify where emissions were grown for base year 2002 data were not available. 3. Identify growth factors for projection years.	1. Explanation for use of national defaults. 2. Determination of representative values for "typical years" for some sources for projections (i.e., fires, utility emissions).

Data Handling Records. Another key element of the QA program is maintaining written documentation of calculations, assumptions, and all other activities associated with incorporating the State/local agency submittals and other data with the projection and base year inventories. Nearly all data being developed and/or compiled will use computerized databases or other electronic files. For many of these databases, we will use blank fields in the database tables to keep track of the source of the data. We will also maintain a log of activities to document how the data described above were incorporated to create the ASIP inventories. The log will include complete descriptions of the data sources used, the procedures used to incorporate the data, the approach used to determine the completeness, and any contacts made with data submitters to resolve questions. A file will be maintained to ensure that the data handling records are retained and easily located.

QA/QC Records. We will perform a variety of quality control reviews of the inventory. For example, we will check stack parameters, source classification codes, and geographic coordinates for point sources that emit at least 100 tons of any pollutant per year. Reports containing the results of these checks will be transmitted to the State/local agencies for investigation and correction. Documentation of each finding will include a description of the action or data reviewed that led to the quality concern and will provide recommendations for corrective actions.

Corrective Action Records. Records of corrective and follow-up actions identified during the quality review process will be maintained. Both the corrective action identified and the results of the actions taken in response will be documented for inclusion in the final report. If no corrective action can be made, we will document the implications on the overall quality of the inventory.

Data Reporting Package. The final data reporting package will contain four elements:

- An emission summary report that describes the emissions inventory by pollutant and source category, summarizes the methods and data used to compile the inventory, assesses the limitations and appropriate uses of the inventory data, and contains any other information pertinent to the inventory;
- A quality assurance summary report that describes the quality assurance efforts completed, summarizes the corrective actions taken, and provides suggestions for further inventory improvement based on the results of the quality assurance process;
- Electronic data files containing the ASIP inventories in NIF 3.0 format; and
- Electronic and paper files containing all original data submittals and all backup documentation will be stored on file at MACTEC for a period of no less than three years.

2.0 DATA ACQUISITION

The projection year ASIP inventories will rely primarily on air emission information from existing databases. The data collection, handling, and management process is described below, along with the associated quality control procedures and methods. The QC system is designed to:

- Provide routine and consistent checks and documentation points in the inventory development process to verify data integrity, correctness, and completeness;
- Identify and reduce errors and omissions;
- Maximize consistency within the inventory preparation and documentation process;
- Facilitate internal and external inventory review processes.

The data acquisition process should be viewed as an iterative process. As decisions are made, new questions will surface that require solutions, until the iterations are complete.

2.1 Projection Year Inventory Procedures

For the projection inventories, the following procedures will be used to compile and quality assure the inventory:

1. Use the final version (Base G) of the 2002 VISTAS Base/Typical Year inventory as a starting point.
    a. Back calculate uncontrolled emissions for 2002 Base/Typical Year inventory to use as starting point for sources that will be grown for the projection inventory. (unclear)
2. Prepare/Obtain Growth and Control files
    a. Obtain growth factor files from EGAS for use with categories that will be grown with EGAS growth factors; incorporate Annual Energy Outlook 2006 information into EGAS to replace the AEO 2004 data currently embedded in EGAS.
    b. Obtain control factors for “on-the-book” and “on-the-way” controls as well as any controls for control strategy evaluations. Controls will be obtained from recent EPA rulemakings, proposed rules (e.g., Clean Air Interstate Rule [CAIR]), and State SIPs. For EGUs, control information will be obtained from VISTAS-sponsored IPM runs, supplemented with state-supplied adjustments as to where future controls will be installed.
    c. Determine/obtain growth factors for non-EGAS sources (e.g., agricultural crops, fertilizers, etc.). Growth factors for these sources will be calculated from existing projection inventories prepared by EPA (e.g., EPA Ammonia Inventory). Growth factors will be calculated using linear interpolation of projected emissions if the actual year is not available.
3. Project sources using growth and control factors

a. For sources to be grown using EGAS growth factors, apply growth and control factors.
b. For sources not using EGAS growth factors, apply non-EGAS growth factors.
c. Identify and resolve any errors/discrepancies from the use of EGAS growth factors or other growth factor data
d. Track comments/concerns received and corrective actions taken

4. Determine emissions for sources requiring "typical" year emission updates.
    a. These sources include EGUs and fires
    b. For fires make any modifications needed including incorporating the long-term effects of prescribed burning programs. Update and revise the typical emissions based on changes submitted by State air and forestry personnel and to include future year projections of prescribed burning.
    c. Update the typical year emission data from EGU sources based on State comments and any revised CEM or IPM data.

5. Develop mobile source emission inventories

    a. Prepare projected VMT for review by States/stakeholders for onroad mobile sources.

    b. Prepare SMOKE ready MOBILE input files for review by States/stakeholders. MOBILE input files will contain required control programs either "on-the-books" or "on-the-way". (my understanding is this subtask is not MACTEC's responsibility)

    c. Prepare NONROAD model input files for review by States/stakeholders. NONROAD input files will contain required control programs either "on-the-books" or "on-the-way".

    d. Run the NONROAD 2005 model, develop emission summaries and provide to States/Stakeholders for review/comment.

    e. Develop growth factors and projected emissions for nonroad sources not in the NONROAD model. Growth factors will be based on existing estimates from EPA rulemaking projections (e.g., Heavy Duty Diesel and other rules). Provide growth factors for review by States/Stakeholders.

    f. Prepare non-NONROAD model emission estimates. Provide for States/Stakeholder review/comment.

6. Conduct QA/QC to identify errors and inconsistencies
    a. Prepare ad-hoc reports to identify gaps and logical inconsistencies.
    b. Ask States/local agencies to provide feedback on large scale inconsistencies and on missing sources.
    c. Update database with State/local supplied revisions.
    d. Track comments/concerns received and corrective actions taken

7. Provide inventory for review by stakeholders

a. Prepare an emission summary report that describes the emissions inventory by pollutant and source category, summarizes the methods and data used to compile the inventory, assesses the limitations and appropriate uses of the inventory data, and contains any other information pertinent to the inventory
b. Prepare a quality assurance summary report that describes the quality assurance efforts completed, summarizes the corrective actions taken, and provides suggestions for further inventory improvement based on the results of the quality assurance process
c. Provide electronic data files containing the ASIP inventories in NIF 3.0 format
d. Track comments/concerns received and corrective actions taken

8. Incorporate feedback from stakeholders and prepare final reports and electronic files

3.0 ASSESSMENT AND OVERSIGHT

The subsections in this group address the activities for assessing the effectiveness of project implementation and associated QA and QC activities. The purpose of the assessment is to ensure that the QA Project Plan is implemented as prescribed. The assessment consists of external activities that include a planned system of review and audit procedures by personnel not actively involved in the inventory development process. The key concept of this component is independent objective review by a third party to access the effectiveness of the internal Quality Control program and the quality of the inventory, and to reduce or eliminate any inherent bias in the inventory process.

3.1 Assessments and Response Actions

The MACTEC Quality Assurance Coordinator will conduct technical systems audits throughout the project. Audits are managerial tools used to evaluate how effectively the emission inventory team complies with predetermined specifications for developing an accurate and complete inventory. The MACTEC QAC will conduct audits at the initiation of each project to review the Work Plan and QAPP, at the 50% complete and 75% complete levels to review the technical aspects of each project and at the 95% completion level to review the data submittal package. This provides assessment of the project during the planning stage, the data collection stage, the emissions calculations stage, and the report preparation stage. An example audit checklist for point sources is presented in Figure 2.

3.2 Reports to Management

Audit reports will be distributed within two weeks of the conduct of each audit to the persons interviewed and the MACTEC Task Leaders. A summary of the types of quality concerns found will be periodically forwarded to the MACTEC Program Manager to keep him informed of the quality issues found and actions being taken to resolve them. Audit reports will be retained in a file and used to conduct subsequent audits and plan follow-up activities. When an audit team finds items that require immediate action, they will inform the MACTEC Program Manager of the necessary corrective actions.

AUDIT CHECKLIST

Auditor: _____

Date: _____

Data/Procedure Reviewed: _____
_____

Project Personnel Involved in Work: _____
_____

Instructions: Select a facility or source category with high emissions and evaluate the quality of the data and adequacy of the data handling procedures. Record the findings and recommendations for corrective actions, if any, on this checklist and comment sheet. If recommendations for corrective actions are made, discuss them with the Project Manager immediately following the audit. Conduct follow-up activities to determine if the actions taken in response to the recommendations appropriately resolved the quality issues identified.

I. DATA

A. Identify the source category evaluated: _____

B. Describe the data included in the master file for the facility or source category.
_____
_____

C. Are the data documented in a manner that will not have the potential to be misinterpreted? Y/N
Were the instructions for documenting the data followed? ..... Y/N

D. Are there missing data fields? ..... Y/N
What procedures are taken by the Task Leaders to ascertain missing?
_____
_____

At what point in the inventory process are requests for missing data made?
_____
_____

How is the receipt of the missing data handled?
_____
_____

Is the procedure followed to ascertain missing data efficient and adequate? ..... Y/N

E. How do emissions compare to other inventories?
1999 NEI Version 2 Final _____
2000 TRI _____
2002 ETS/CEM _____
Are differences in emissions understandable and explainable? ..... Y/N
If any of the values are incorrect, explain how the emissions data were corrected.
_____

Figure 2 Audit Check Form

II. EMISSIONS DATABASE

A. Who provided the data for incorporation into the database? _____
_____

B. Was there evidence that the data were reviewed for accuracy and completeness prior to incorporation in the database? ..... Y/N

C. Were data logs maintained to describe how the data was incorporated? ..... Y/N

D. Ask the data incorporation personnel to explain the QC procedures followed to ensure data quality. Do they agree with the procedures described in the QAPP? ..... Y/N

E. Does the computer system appear to be adequate for its intended use? (Ask the data processing personnel about the problems they have experienced with the system.) ..... Y/N

F. Is the data entry progressing as expected and are the procedures followed adequate to ensure data quality? ..... Y/N

III. RECOMMENDATIONS FOR CORRECTIVE ACTIONS

_____
_____
_____
_____
_____

IV. COMMENTS

_____
_____
_____
_____
_____

V. SIGNATURES

_____ _____
(QA Auditor) (QA Coordinator)

_____ _____
(Program Manager) (Task Manager)

_____ _____
(Project Participant) (Project Participant)

Figure 2 Audit Check Form (Concluded)

4.0 DATA VALIDATION AND USABILITY

Section 4 addresses the QA activities that occur after the data collection phase of the project is completed. Implementation of these subsections determines whether or not the data conform to the specified criteria, thus satisfying the project objectives.

4.1 Accuracy Assessment

A qualitative discussion of accuracy will include an assessment of the extent to which the initially identified weaknesses in the inventory have been remedied through the use of improved activity data, emission factors, or other sources of information. Remaining weaknesses will be assessed.

The accuracy assessment will include a summary of whether any data identified as outside of its valid range remained outside of the valid range in the final inventory. If any data remained outside of its valid range, an explanation will be given. The qualitative discussion will also include a summary of errors or discrepancies identified in the QA/QC process.

A final semi-quantitative discussion of accuracy will consist of pollutant summaries for individual facilities, industry types, source categories, and statewide totals. The ASIP inventory will be compared to other peer-reviewed inventories, and where major discrepancies exist, we will provide an assessment of the reasons for the differences in emission estimates.

4.2 Completeness Assessment

A statement will be prepared assessing whether all required facilities, source categories, pollutants, and data elements were included in the inventory. If any facilities or source categories were not included, an explanation of the omission will be provided. If any individual data elements were not provided, we will discuss the elements, frequency of omissions, and overall impact on the quality of the inventory.

4.3 Comparability Assessment

Several summations of emissions data will be made to address comparability. Overall percentage differences for individual facilities (current year to prior year), industry types, processes, and statewide inventory will be calculated. Explanations of any large differences will be made.

4.4 Representativeness Assessment

A statement will be prepared describing where national defaults have been used instead of local activity data.

5.0 REFERENCES

1. U.S. Environmental Protection Agency. March 2001. *EPA Requirements for Quality Assurance Project Plans* (EPA/240/B-01/003). http://www.epa.gov/quality/qs-docs/r5-final.pdf
2. Emission Inventory Improvement Program (EIIP) Document Series - Volume VI Quality Assurance Procedures and DARS Software. EPA | TTN CHIEF | EIIP | Technical Reports | Volume VI Quality Assurance Procedures
3. U.S. Environmental Protection Agency. November 18, 2002. 2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM2.5 and Regional Haze Programs. http://www.4cleanair.org/members/committee/criteria/EPA200211181.pdf