Development of the Point Source Emission Inventory for 2007 in the SESARM Region

(Version 1.8)

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Acronyms and Abbreviations

Acronym	Description
CAMD	Clean Air Markets Division of EPA
CAP	Criteria Air Pollutant
CEM	Continuous Emission Monitoring System
CE	Control Equipment (NIF table)
CERR	Consolidated Emission Reporting Rule
CO	Carbon Monoxide
EGU	Electric Generating Unit
EM	Emission (NIF table)
EP	Emission Process (NIF table)
EPA	U.S. Environmental Protection Agency
ER	Emission Release (NIF table)
EU	Emission Unit (NIF table)
LATLON	Latitude / Longitude
MANE-VU	Mid-Atlantic/Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
NAAQS	National Ambient Air Quality Standards
NEI	National Emission Inventory
NH3	Ammonia
NIF3.0	National Emission Inventory Input Format Version 3.0
nonEGU	Non Electric Generating Unit
NOx	Oxides of Nitrogen
PE	Period (NIF table)
PM	Particulate Matter
PM-CON	Primary PM, Condensable portion only (all < 1 micron)
PM-FIL	Primary PM, Filterable portion only
PM-PRI	Primary PM, includes filterables and condensables PM-PRI= PM-FIL + PM-CON
PM10-FIL	Primary PM10, Filterable portion only
PM10-PRI	Primary PM10, includes filterables and condensables, PM10- PRI = PM0-FIL + PM-CON
PM25-FIL	Primary PM2.5, Filterable portion only
PM25-PRI	Primary PM2.5, includes filterables and condensables PM25-PRI= PM25-FIL + PM-CON

Acronym	Description
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
SCC	Source Classification Code
SEMAP	Southeastern Modeling, Analysis, and Planning
SESARM	Southeastern State Air Resource Managers, Inc.
SMOKE	Sparse Matrix Operator Kernel Emissions (modeling system)
SI	Site (NIF Table)
SIC	Standard Industrial Classification code
SIP	State Implementation Plan
S/L	State/Local
SO2	Sulfur Dioxide
TR	Transaction (NIF Table)
TSD	Technical Support Document
UTM	Universal TransMercator
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile Organic Compounds

1.0 ANNUAL 2007 INVENTORY FOR POINT SOURCES

1.1 INTRODUCTION

In 2009, the Southeastern State Air Resource Managers, Inc. (SESARM) initiated a new Southeastern Modeling, Analysis, and Planning (SEMAP) project. The SEMAP project addresses the next phase of ozone, fine particle, and regional haze assessment obligations through funding from two grants awarded by the U.S. Environmental Protection Agency (EPA).

This technical support document (TSD) explains the data sources, methods, and results for preparing the 2007 criteria air pollutant (CAP) and ammonia (NH3) emission inventory for point sources for the Southeastern U.S. The region includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. In general, point sources in this inventory are sources classified as major sources under the Title V permitting program and sources required to submit hourly emissions data to EPA under various Clean Air Act programs. Some State and local agencies included smaller sources in the point source inventory. The inventory includes annual emissions for sulfur dioxide (SO2), oxides of nitrogen (NOx), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH3), and five components of particulate matter (PM).

The inventory also includes particulate matter (PM) emissions, categorized as filterable, condensable, or total. Filterable emissions are generally considered to be the particles that are trapped by the glass fiber filter in the front half of a Reference Method 5 or Method 17 sampling train. Vapors and particles less than 0.3 microns pass through the filter. Condensable particulate matter is material that is emitted in the vapor state which later condenses to form homogeneous and/or heterogeneous aerosol particles. The PM species in the inventory are categorized as: all filterable and condensable particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., PM10-PRI and PM25-PRI); filterable particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., PM10-FIL and PM25-FIL); and condensable particles (PM-CON). Note that PM10-PRI equals the sum of PM10-FIL and PM-CON, and PM25-PRI equals the sum of PM25-FIL and PM-CON.

The EPA has provided guidance on developing emission inventories to be used with models and other analyses for demonstrating attainment of air quality goals for ozone, fine particles, and regional haze (EPA 2005, EPA 2007). According to the EPA guidance, there are potentially two different base year emissions inventories. One is the base case inventory which represents the actual emissions for the meteorological period that is being modeled. This inventory is generally used for model performance evaluations. The

second potential base year inventory is called the baseline inventory, which is generally used as the basis for projecting emissions to the future. The base case inventory may include day specific information (e.g. hourly continuous emission monitoring data for point sources) that USEPA considers not appropriate for using in future year projections. Therefore, the baseline inventory may need to replace the day specific emissions with average or "typical" emissions (for certain types of sources). For the 2007 SEMAP inventory, the base case and baseline inventories are one in the same.

The inventory went through several rounds of quality assurance (QA) reviews by State and local (S/L) agencies, as well as a review by stakeholders. Numerous corrections and improvements were made to the inventory. Updated versions of the inventory were released throughout the inventory development process to facilitate S/L agency and stakeholder review. The following summarizes the different versions of the inventory:

- Version 1.1, released April 2010. S/L agency submittals were compiled into this initial version of the inventory, emissions for units reporting to EPA's Clean Air Markets Division (CAMD) were analyzed, and the PM emissions were augmented to provide a complete set of PM species. Sections 1.2, 1.3, and 1.4 of this report describe the work done to prepare Version 1.1.
- Version 1.2, not released. This version was used internally and included updates to stack parameters as described in Section 1.5 of this report.
- Version 1.3, released May 18, 2010. This version contained the updates and corrections to the inventory specified by S/L agencies as described in Section 1.6. This version was released for Stakeholder review.
- Version 1.4, not released. This version was used internally and included updates to classify units into electric generating units (EGUs) and nonEGUs according to the classification scheme discussed in Section 1.7. It also included updates and corrections based upon stakeholder review, as well as additional review by S/L agencies, as described in Section 1.8.
- Version 1.5, released September 2, 2010. This version removed extraneous or incomplete information that was not needed for air quality modeling, such as emissions of hazardous air pollutants and emissions for non-annual averaging times. This version was provided to SEMAP for use in preparing emission density maps and bubble plots that were provided to S/L agencies for final QA of source locations and emission values.

- Version 1.6, released October 20, 2010. This version included updates provided by S/L agencies after their review of the emission density maps and bubble plots.
- Version 1.7, released December 7, 2010. This version included emission updates to two facilities in Kentucky and replaced geographic coordinates with latitude and longitude for all sources (in previous versions, the geographic coordinates were a mixture of latitude/longitude and UTM coordinates, depending on the agency).
- Version 1.8, released January 26, 2001. This version included revisions to the documentation and data files to respond to comments from EPA Region 4 dated November 10, 2011. The main revision to the data files was to delete facilities in North Carolina that had permanently shutdown prior to 2007 but were inadvertently included in the 2007 inventory with non-zero emissions.

State-level emission summaries of the 2007 point source inventory, referred to as Version 1.7, are provided in Section 1.10. Final deliverables are described in Section 1.11.

1.2 INITIAL DATA SOURCES AND QA REVIEW

Version 1.1 of the 2007 point source inventory was developed using data submitted by State and local agencies in the region, as well as data the CAMD hourly emission monitoring database.

1.2.1 State Submittals and Conversion into a NIF Database

Each S/L agency collects point source data according to EPA approved procedures that are included in each State's point source emission inventory quality assurance project plan with accompanying standard operating procedures. These plans and procedures are updated on a continuing basis and are available upon request.

States were requested to submit 2007 data for those major sources that they would normally submit to EPA during the 3-year requirements of the Consolidated Emission Reporting Rule (CERR). Some S/L agencies were able to submit a complete set of data representing 2007. Other S/L agencies were only able to submit 2007 data for very large sources. In this case, inventories for other years were used to create a complete 2007 point source inventory. In a few other cases, the S/L agency submittal was supplemented with data from EPA's 2005-based modeling platform (EPA 2009c). S/L agencies prepare point source emission inventory files in a variety of formats – some use the NEI Input Format (NIF) while others used different formats. Exhibit 1 summarizes the data sources and formats for the S/L agency point source submittals with additional explanatory notes provided in the following sections.

As noted in Exhibit 1, a few S/L agencies provided emissions data for a year other than 2007. Georgia was the only State that requested that a linear projection from 2005/2008 to 2007 be made when both 2005 and 2008 were available. There result of this interpolation for Georgia showed that for sources where 2007 were not available, the emissions changed very little between 2005 and 2007. Other S/L agencies indicated that 2005, 2006, or 2008 emissions data should be considered representative of 2007 for modeling purposes. This recommendation appears to be reasonable, given the small amount of emissions associated with the facilities where 2007 were not available (i.e., 97 percent of the point source NOx emissions and 99 percent of the SO2 emissions are 2007 data). It was decided that spending limited resources to obtain and apply appropriate growth factors to project these emissions from 2005/2006/2008 to 2007 would provide an almost unnoticeable improvement to the SEMAP 2007 inventory.

Also note that some S/L agencies submitted many more facilities than were included in the 2002 VISTAS inventory, while others submitted fewer facilities. An explanation of the reason why the number of facilities differs between 2002 and 2007 is provided for each S/L agency in the following sub-sections. SESARM's area source contractor has developed procedures to reconcile the point and area source inventories to both (1) ensure that emissions minor point sources that are included the point source inventory are not double counted in the area source inventory and (2) that emissions from minor point source sources that are not in the point source inventory are included in the area source inventory.

After the each S/L submittal was formatted into a standard NIF database, MACTEC performed an initial review of the S/L inventories using EPA's Basic Format and Content Checker tool (EPA 2004). The tool was used to verify the data was in the correct format, to check for referential integrity and duplicate record issues, and to check certain fields for proper valid codes and ranges. Only minor issues were identified and were resolved by MACTEC without the need for assistance from the S/L agencies. Following this initial QA review, these individual inventory files were consolidated into a single data set. Additional QA activities identified in the Quality Assurance Project Plan (SESARM 2009) were carried out and documented in the remainder of this document.

Exhibit 1 – Summary of Point Source Data Sources

Agency	# of Facilities in VISTAS 2002 Inventory	# of Facilities in SEMAP 2007 V_1_8 Inventory	Submittal Format	Data Used for 2007 Inventory
AL	319	910	NIF ACCESS	2007 data for 328 major facilities; 2007 data for 613 minor facilities; 31 facilities had only HAP emissions and were removed from the 2007 CAP inventory
AL Jefferson	243	237	NIF ACCESS	2007 data for 37 very large facilities; 2005 S/L data for 237 facilities, which also included the 37 very large facilities
FL	1,050	1,136	NIF Text	2007 data for 1,136 facilities
GA	234	268	NIF ACCESS	2007 S/L data for 74 facilities 2007 CAMD data for 19 facilities not in S/L submittal 2008 S/L data for 109 additional facilities 2005 S/L data for 66 additional facilities
KY	1,581	2,306	NIF xml	2007 data for 2,780 facilities 474 facilities had only HAP emissions and were removed from the 2007 CAP inventory 781 facilities were included in the 2007 SEMAP inventory but were not included in the 2002 VISTAS inventory
KY Jefferson	76	154	NIF ACCESS	2007 data for 154 facilities
MS	640	282	NIF Text	2007 data for 46 facilities 2005 NEI data for 236 facilities
NC	994	1,908	ORL xls	2007 data for 2,145 facilities See Section 1.1.1.8 for more information regarding the increase in the number of facilities
NC Buncombe	6	65	NIF ACCESS	2007 data for 9 Title V facilities 2006 S/L data 65 facilities, which also included the 9 Title V facilities
NC Forsyth	30	84	EIS ACCESS	2007/08 data for 84 facilities See Section 1.9.3 for discussion
NC Mecklenburg	242	221	Quasi-ORL xls	2007 data for 221 facilities
SC	802	291	NIF xml	2007 data for 291 facilities

Agency	# of Facilities in VISTAS 2002 Inventory	# of Facilities in SEMAP 2007 V_1_8 Inventory	Submittal Format	Data Used for 2007 Inventory
TN	373	232	NIF xls	2007 data for 166 Type A and other facilities 2005 NEI data for 66 facilities
TN Davidson	201	205	NIF Text	2007 data for 205 facilities
TN Hamilton	220	177	Quasi-ORL xls	2007 data for 177 facilities
TN Knox	11	9	NIF ACCESS	2007 data for 9facilities
TN Shelby	35	29	NIF xls	2008 S/L data for 29 facilities
VA	762	801	NIF ACCESS	2007 data for 801 facilities
WV	192	177	NIF ACCESS	2007 data for 177 facilities

1.2.1.1 Alabama

Alabama's initial submittal contained two National Emission Inventory (NEI) Input Format (NIF) ACCESS database files. The first contained 2007 emissions data for 328 major sources, while the second contained 2007 emission data for 613 minor sources. MACTEC merged the major source file with the minor source found and identified 10 facilities that were in both files. We used the data from the 2007 major source file and deleted the data from the minor source file to ensure that there was no double counting of emissions for these 10 facilities. Alabama ensured that the minor source emissions that were included in the point source file were not double counted in the area source file. Another contractor reconciled the point and area source inventories and Alabama reviewed the results on a per category basis to ensure that double counting did not occur.

There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity. These cases are discussed later in this document. A large increase in VOC and PM emissions from 2002 to 2007 was identified. Alabama investigated this problem and identified a serious problem in their data conversion process. New Emission (EM) and Control Equipment (CE) tables were provided in May 2010 to correct this problem.

1.2.1.2 Alabama – Jefferson County

Jefferson County submitted two NIF ACCESS database files. The first contained 2007 emissions data for 37 very large sources, while the second contained 2005 emission data for 237 sources. MACTEC merged the 2007 very large source file with the 2005 file and identified that the 37 very large facilities were in both files. We used the data from the 2007 file and deleted the corresponding facilities from the 2005 file to ensure no double counting of emissions. MACTEC did not project 2005 emission data to 2007, as the 2005 data was considered to be representative of 2007.

Jefferson County submitted emissions data for a large number of hazardous air pollutants. Since these pollutants are not needed for regional ozone and fine particle modeling, they were stripped from the EM and CE tables.

The EPA's Basic Format and Content Checker identified several relational widow/orphan issues. These were caused by the Emission Unit ID and Emission Release Point ID being reversed in the EP table for some records. MACTEC made the necessary corrections to the NIF EP table to ensure that all NIF EM records had a match in the NIF Emission Unit (EU), Emission Process (EP), and EM tables.

The flow rates provided in the NIF Emission Release (ER) table were reported in cubic feet per minute. The NIF specifications require that this field be reported in cubic feet per second. MACTEC recalculated the flow rate by dividing the flow rate provided by Jefferson County by 60.

1.2.1.3 Florida

Florida submitted NIF tables in ASCII text format with 2007 emissions data for 1,139 facilities. There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

1.2.1.4 Georgia

Georgia submitted three NIF ACCESS database files. The first contained 2007 emissions data for 74 very large sources. The second file contained 2008 emission data for 109 additional facilities. And the third file contained 2005 data for 69 additional facilities. MACTEC merged the three files using the 2007 data when available, the 2008 data where 2007 data were not available, and 2005 data as a last resort. We used the data from the 2007 file and deleted the corresponding facilities from the 2008/2005 files to ensure no double counting of emissions. No significant issues were identified by EPA's Basic

Format and Content Checker. No projecting of 2005 emissions to 2007 or back casting of 2008 emissions to 2007 was done during the initial processing of the submittals. See Section 1.6.4 for a discussion of how 2007 emissions were subsequently estimated for the final SEMAP inventory when only 2005 or 2008 data were available.

1.2.1.5 Kentucky

Kentucky submitted an xml file that was loaded into an ACCESS database with NIF tables with 2007 emissions data for 2,780 facilities. There were approximately 474 facilities in Kentucky's submittal that had only HAP emissions (i.e., emissions were zero for all criteria air pollutants at the facility) and were removed from the 2007 inventory. An additional 781 facilities were included in the 2007 SEMAP inventory but were not included in the 2002 VISTAS inventory. These additional facilities in the 2007 SEMAP inventory were generally very small sources, and the aggregate NOx emissions from these 781 small facilities totaled only 805 tons per year.

The EPA's Basic Format and Content Checker identified several relational widow issues, that is, there were SI, ER, EU, EP, PE and CE records with no corresponding emissions data in the EM file. These widow records were removed from the SI, ER, EU, EP, PE, and CE tables.

The flow rates provided in the ER table were reported in cubic feet per minute. The NIF specifications require that this field be reported in cubic feet per second. MACTEC recalculated the flow rate by dividing the flow rate provided by Kentucky by 60.

There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document.

1.2.1.6 Kentucky – Jefferson County

Jefferson County submitted two NIF ACCESS databases containing 2007 emissions data – one file contained criteria air pollutants and the other file contained hazardous air pollutants. Only the criteria air pollutant file was processed. Jefferson County's submittal passed all of checks made by the EPA's Basic Format and Content Checker.

1.2.1.7 Mississippi

Mississippi submitted NIF tables in ASCII text format with 2007 emissions data for 45 facilities. Mississippi's submittal passed all of checks made by the EPA's Basic Format and Content Checker.

Mississippi's 2007 submittal was supplemented with data from EPA's 2005-based modeling platform (EPA 2009c). The data were provided in SMOKE ORL format, converted into a NIF database, and merged with Mississippi's submittal. We used the data from Mississippi's 2007 file and deleted the corresponding facilities from the 2005 EPA file to ensure no double counting of emissions. Mississippi decided to include 236 facilities from the 2005 NEI from the 2007 SEMAP inventory. At this time, MACTEC did not perform any projecting of 2005 data to 2007. No significant issues were identified by EPA's Basic Format and Content Checker.

1.2.1.8 North Carolina

North Carolina submitted a SMOKE one-record-per-line (ORL) file with 2007 data for 2,145 facilities. MACTEC converted the ORL file to a NIF database. There was no control information in the ORL file, so we were not able to create a NIF CE table.

There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

A large increase in VOC emissions from 2002 to 2007 was identified. North Carolina investigated this problem and identified a serious problem in their data conversion process. New EM and CE tables were provided in May 2010 to correct this problem.

The 2007 SEMAP inventory contains many more sources than were included in the 2002 VISTAS inventory. There are three reasons to explain the large increase in the number of facilities in the 2007 inventory versus the 2002 inventory:

- There are some new permit sources added since 2002;
- There were about 163 facilities in NC's initial submittal that were permanently closed between 2002 and 2006 that were inadvertently left in the 2007 inventory with non-zero emissions. These facilities were removed from the 2007 SEMAP inventory; and
- Most the new facilities in 2007 are due to the following reason: 2002 was the year NC changed the emission reporting system. From 1993 to 2002, all non-title V sources reported their emission once every three years (1993, 1996, 1999, and 2002). Since 2002, NC changed the emission reporting system from once every three years to once every five year and each facility reports their emission the year their permit expired. So the 2007 point source emission inventory is much more inclusive compared to 2002 emission inventory, which only included the facilities reported during the year of 2002, not all facilities that operated in 2002.

1.2.1.9 North Carolina – Buncombe County

Buncombe County submitted two NIF ACCESS database files. The first contained 2007 emissions data for 9 Title V facilities, while the second contained 2006 emission data for 65 facilities. MACTEC merged the 2007 Title V source file with the 2006 file and verified that the 9 Title V facilities were in both files. We used the data from the 2007 file for the Title V facilities and deleted the corresponding facilities from the 2006 file to ensure no double counting of emissions. We also deleted all records for Snider Tire (Facility ID 0861) which ceased operation in 2006 and did not operate in 2007. MACTEC did not project the 2006 emissions to 2007, as the 2006 emissions are considered to be representative of 2007.

There were several records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

1.2.1.10 North Carolina – Forsyth County

Forsyth County provided 2008 data for 84 facilities in an EIS-formatted ACCESS database. The data is actually a mix of 2008, 2007 and previous year data, but Forsyth County indicated that the submittal is representative of calendar year 2007. MACTEC performed data reformatting a number of data augmentation steps to create reasonably complete NIF tables, as follows:

- SI Table – relevant fields from the "FacilitySite" ACCESS table were mapped to NIF SI table fields.

- ER Table – relevant fields from the "ReleasePoint" ACCESS table were mapped to NIF ER table fields. The flow rate in the "Release Point" table was in cubic feet per minute. The NIF specifications require that this field be reported in cubic feet per second. MACTEC recalculated the flow rate by dividing the flow rate provided by 60. There were no stack-level geographic coordinates in the "ReleasePoint GeographicCoordinates" ACCESS table. However, there were facility-level coordinates for some facilities in the "FacilitySiteGeographicCoordinates" ACCESS table, and these were used for all emission release points associated with the facility. Where a facility match could not be made, we substituted the county centroid for the geographic coordinates (longitude -80.24, latitude 36.114).

- EU Table – relevant fields from the "EmissionUnit" ACCESS table were mapped to NIF EU table fields.

- EP Table – relevant fields from the "EmissionProcess" ACCESS table were mapped to NIF EP table fields. The emission release point identifier was obtained from the "ReleasePointApportionment" ACCESS table.

- PE Table – relevant fields from the "EmissionProcess" ACCESS table were mapped to NIF PE table fields.

- CE Table – no information on control equipment was provided.

- EM Table – relevant fields from the "Emissions" ACCESS table were mapped to NIF ER table fields. The emission release point identifier was obtained from the "ReleasePointApportionment" ACCESS table.

There were several records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

1.2.1.11 North Carolina – Mecklenburg County

Mecklenburg County provided 2007 emissions data for 539 facilities in a spreadsheet that contained a limited number of NIF fields. MACTEC performed data reformatting and a number of data augmentation steps to create reasonably complete NIF tables, as follows:

- SI Table – only the facility id# and facility name were provided; we obtained the SIC code from the VISTAS 2002 B&F inventory where we were able to match facilities.

- ER Table – the submittal did not contain any stack parameters and the geographic coordinates were in NC State Planar coordinates, not UTM coordinates or latitude/longitude as required by the NIF specification. To fill in the geographic coordinates, we obtained the latitude and longitude from the VISTAS 2002 B&F inventory where we were able to match facilities. Where a facility match could not be made, we substituted the county centroid for the geographic coordinates (longitude -80.789, latitude 35.252). Stack parameters for the Stage I gasoline distribution facilities were assigned a fugitive release height of 10 feet. Stack parameters for all other sources will be filled in according to the gap-filling procedures discussed later in Section 1.5 of this document.

- EU Table – the submittal only contained the unit description, all other EU non-key data elements were left blank.

- EP Table – the submittal only contained SCC and the process description, all other EP non-key data elements were left blank.
- PE Table – we filled in the PE table with the PE key identifiers, and added the startdate of 20070101 and end date of 20071231. All other PE non-key data elements were left blank.
- CE Table – no control information was provided, so the CE table is blank.
- EM Table – the submittal contained annual emissions for all criteria air pollutants and ammonia.

After reformatting the spreadsheet into NIF tables, we ran the EPA's Basic Format and Content Checker and did not detect any QA issues other than the missing stack parameters.

Mecklenburg County initially included 319 Stage I gasoline stations in the point source inventory. For consistency with other counties in North Carolina (where Stage I emissions are included in the area source inventory) and to avoid double counting, these gasoline stations were removed from the point source inventory.

1.2.1.12 South Carolina

South Carolina submitted an xml file that was loaded into an ACCESS database with NIF tables with 2007 emissions data for 293 facilities.

The EPA's Basic Format and Content Checker identified that certain EM records associated with facility ID 2320-0034 (NAN YA Plastics) were assigned to FIPS 45041 (Florence County) while other NIF records associated with this plant were associated with FIPS 45089 (Williamsburg County). MACTEC changed the FIPS to 45089 for the records in the EM table to resolve this orphan issue. Geographic coordinates in the ER table were not changed.

The flow rates provided in the ER table were reported in cubic feet per minute. The NIF specifications require that this field be reported in cubic feet per second. MACTEC recalculated the flow rate by dividing the flow rate provided by South Carolina by 60.

South Carolina's 2007 submittal included many fewer facilities than were in the VISTAS 2002 inventory. South Carolina reviewed data from EPA's 2005-based modeling platform. South Carolina decided that the sources that were included in the 2002 but not in the 2007 inventory were predominantly minor sources, and that the use of EPA's 2005 NEI data was not appropriate for use in the 2007 SEMAP inventory.

1.2.1.13 Tennessee

Tennessee submitted two spreadsheets with NIF tables for all counties except the four local program counties. The first file contained 2007 emissions data for 45 very large sources (i.e., Type A sources), while the second contained 2007 emission data for additional smaller facilities. MACTEC merged the two files and checked for duplicate facilities. One facility – JW Aluminum (Facility ID 47113-0010) – was found in both submittals. Only the Type A submittal for this facility was used to avoid double counting of emissions.

Tennessee submitted emissions data for a large number of hazardous air pollutants. Since these pollutants are not needed for regional ozone and fine particle modeling, they were stripped from the EM and CE tables.

The EPA's Basic Format and Content Checker identified several relational widow/orphan issues. MACTEC made the necessary corrections to the NIF tables to ensure that all EM records had a match in the EU, EP, PE and EM tables.

Tennessee's 2007 submittals were supplemented with data from EPA's 2005-based modeling platform. These data were downloaded from EPA's ftp site (file name: 2005v4CAPHAP_orl_point.zip). The data were provided in SMOKE ORL format, converted into a NIF database, and merged with South Carolina's submittal. We used the data from Tennessee's 2007 files and deleted the corresponding facilities from the 2005 EPA file to ensure no double counting of emissions. At this time, MACTEC did not perform any projecting of 2005 data to 2007. No significant issues were identified by EPA's Basic Format and Content Checker. An additional 280 facilities were added during this augmentation process.

1.2.1.14 Tennessee – Davidson County

Davidson County submitted NIF tables in ASCII text format with 2007 emissions data for 205 facilities. There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

1.2.1.15 Tennessee – Hamilton County

Hamilton County provided data representative of 2007 for 177 facilities in a spreadsheet that contained the NIF fields needed for regional air quality modeling. MACTEC performed data reformatting to create reasonably complete NIF tables. The data passed all of the QA checks.

1.2.1.16 Tennessee – Knox County

Knox County submitted a NIF ACCESS database containing 2007 emissions data for 9 facilities. There were a few records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic Format and Content Checker. These cases are discussed later in Section 1.5 of this document. Otherwise the data passed all of the QA checks.

1.2.1.17 Tennessee – Shelby County

Shelby County submitted a spreadsheet with NIF tables for 29 facilities with 2008 emissions data. The 2008 was considered representative of 2007 for all sources except the TVA Allen Plant (Facility ID 47157-00528), for which we used the 2007 annual SO2 and NOx emissions as reported in EPA's CAMD database.

Shelby County submitted emissions data for a large number of hazardous air pollutants. Since these pollutants are not needed for regional ozone and fine particle modeling, they were stripped from the EM and CE tables.

The EPA's Basic Format and Content Checker identified several relational widow/orphan issues. MACTEC made the necessary corrections to the NIF tables to ensure that all EM records had a match in the EU, EP, PE and EM tables.

1.2.1.18 Virginia

Virginia submitted a NIF ACCESS database containing 2007 emissions data for 801 facilities. Since Virginia is participating with MARAMA in developing a regional modeling inventory for the northeastern States, Virginia's data has already undergone considerable QA review and updating. As part of the MARAMA inventory development process, Virginia provided emissions data for a number of additional distributed generation units. Virginia's submittal to MARAMA was subjected to the QA and PM augmentation procedures described in this report. Virginia has accepted the MARAMA 2007 point source inventory for use in the SEMAP 2007 point source modeling inventory.

1.2.1.19 West Virginia

West Virginia submitted a NIF ACCESS database containing 2007 emissions data for 177 facilities. West Virginia's submittal passed all of checks made by the EPA's Basic Format and Content Checker with the exception of some of the stack parameter values. There were numerous records flagged for out-of-range values for stack parameters or location coordinates, or inconsistencies between the flow rate and velocity by the EPA's Basic

Format and Content Checker. These cases are discussed later in Section 1.5 of this document.

1.3 EPA CAMD HOURLY EMISSION DATA

The second source of data was the hourly emission data reported to EPA by facilities to comply with various provisions of the Clean Air Act. MACTEC downloaded the 2007 CAMD annual inventory containing NOx and SO2 emissions, heat input data and other information from the CAMD web site (EPA 2009a).

MACTEC prepared an initial crosswalk file to match facilities and units in the CAMD inventory to facilities and units in the 2007 SEMAP inventory. In the CAMD inventory, the Office of Regulatory Information Systems (ORIS) identification (ID) code identifies unique facilities and the unit ID identifies unique boilers and internal combustion engines (i.e., turbines and reciprocating engines).

MACTEC also downloaded the 2007 CAMD hourly inventory containing hourly NOx and SO2 emissions and heat input data from the CAMD website (EPA 2009b). MACTEC summed the hourly emissions to the annual level (or 6-month level for 6-month reporting units) by emission unit. The summed hourly data was compared to the annual summary data, which matched in virtually all cases. This check was made because MARAMA is considering using the actual 2007 hourly data rather than average temporal profiles in the next round of regional air quality modeling.

As a starting point for developing the CAMD-to-NIF crosswalk, MACTEC obtained and used the CAMD-to-NIF crosswalk that was developed for the VISTAS Best & Final inventory (VISTAS, 2007). This file was useful for matching many facilities and units. However, in many other cases either the CAMD unit identifier changed or the facility and unit identifiers in the S/L database changed. For example, the facility IDs in West Virginia's 2002 VISTAS database were a 4-digit field, while the facility IDs in the 2007 SEMAP inventory are a 5-digit field. In Kentucky, the facility IDs in the 2002 VISTAS database consisted of the five-digit FIPS code followed by a 5-digit facility ID, while the facility IDs in the 2007 SEMAP inventory consisted of only the 5-digit facility ID. In North Carolina, nearly all unit IDs changed between 2002 and 2007.

MACTEC prepared an Excel Workbook file for each S/L agency with linkages between the CAMD identifiers and the S/L agency identifiers and a comparison between the CAMD annual summary emissions, the annual emissions summed from the hourly CAMD database, and annual emissions reported in the S/L inventory. This spreadsheet matched the CAMD unit-level IDs (ORISID and UNITID) with corresponding NIF table IDs (FIPS,

SITE ID, EU ID, EP ID, ER ID). Emissions were shown as obtained from (1) the CAMD unit level file, (2) the sum of the CAMD hourly emission file, and (3) the State submitted NIF tables. Note that the CAMD Emissions are reported at the unit level while the NIF emissions are reported at the Unit/Process/Stack level.

MACTEC added three fields to the NIF EP table to facilitate the linkage to the CAMD database. We added fields to store the CAMD ORISID, CAMD Unit ID, and CAMD number of reporting months.

MACTEC prepared a CAMD-to-NIF crosswalk spreadsheet for each State. S/L agencies were asked to review this list and verify that (1) the linkages are correct, (2) there are no large sources missing from the CAMD-to-NIF crosswalk, and (3) there are not any large discrepancies between the emissions reported to CAMD and the emissions reported in the SEMAP database.

There are three types of possible linkages:

- CAMD facility has no match in NIF SI facility table. The emissions from these facilities reported to CAMD are small, and initially accounted for about 0.5% of the NOx and 0.07% of the SO2 emissions in the CAMD database.
- CAMD unit could not be matched in NIF. The emissions from these facilities reported to CAMD were small, accounting for about 0.9% of the NOx and 0.007% of the SO2 emissions in the CAMD database. Most of the units that could not be matched at the unit level are either peaking units or industrial sources such as paper mills or chemical plants. In addition, there were several instances where multiple CAMD units match to a single NIF record (i.e., units are grouped in the NIF tables but reported individually in the CAMD database).
- CAMD unit matches with a single NIF record or CAMD unit matches with multiple NIF records (in many cases, the NIF tables include multiple records for different fuel types). The emissions from these units reported to CAMD account for about 98.6% of the NOx and 99.9% of the SO2 emissions in the CAMD database. In most cases the sum of the emissions from the matching NIF records are generally very close to the CAMD unit level emissions; and S/L agencies verified that linkages were correct.

As another QA check, MACTEC compiled a list of sources with EGU SCCs of 1-01-xxx-xx and 2-01-xxx-xx in the S/L agency NIF tables that could not be linked to the CAMD CEM table to help resolve some of the linkage issues noted above. S/L agencies made

significant efforts to improve the crosswalk between the CAMD identifiers and the S/L agency identifiers.

1.4 PM AUGMENTATION

PM compounds may be reported in several forms, as identified in Exhibit 2. Exhibit 3 provides a count of the number of annual NIF EM table records in each agency's NIF Submittal by type of PM compound. The PM augmentations process gap-fills missing PM pollutant complements. We generated emission estimates for filterable and primary PM-2.5, filterable and primary PM-10 and condensable PM if emission estimates for those species were missing from the S/L agency submittal .For example, if a S/L agency provided only PM10-PRI emissions, the PM augmentation process filled in estimates for PM-CON, PM10-FIL, PM25-PRI, and PM25-FIL.

The PM augmentation process is essentially the same process used in developing the 2002 VISTAS Best and Final inventory and is virtually identical to the EPA methodology used for the 2002 NEI (EPA 2006a). The steps in the PM augmentation process were as follows:

- Step 1: Initial QA and remediation of S/L provided PM pollutants;
- Step 2: Updating of PM factor ratios previously developed for MARAMA based on factors from the Factor Information and Retrieval Data System and the EPA PM Calculator;
- Step 3: Implementation of the ratios developed in step 2;
- Step 4: Presentation of PM augmentation results to S/L agencies for review and comment; and
- Step 5: Updates to augmented values in cases where the S/L agency was able to obtain source-specific data.

Exhibit 2 – PM Compound Descriptions

Pollutant Code	Pollutant	Pollutant Description
PM-CON	Primary PM Condensable portion only (all < 1 micron)	Material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack.
PM-FIL	Primary PM, Filterable portion only	Particles that are directly emitted by a source as a solid or liquid at stack or release conditions and captured on the filter of a stack test train.
PM-PRI	Primary PM, includes filterables and condensables PM-PRI= PM-FIL + PM-CON	Particles that enter the atmosphere as a direct emission from a stack or an open source. It is comprised of two components: Filterable PM and Condensable PM.
PM10-FIL	Primary PM10, Filterable portion only	Particles with an aerodynamic diameter equal to or less than 10 micrometers that are directly emitted by a source as a solid or liquid at stack or release conditions and captured on the filter of a stack test train.
PM10-PRI	Primary PM10, includes filterables and condensables, PM10- PRI = PM0-FIL + PM-CON	Particles with an aerodynamic diameter equal to or less than 10 micrometers that enter the atmosphere as a direct emission from a stack or an open source. It is comprised of two components: Filterable PM and Condensable PM. (As specified in § 51.15 (a)(2), These two PM components are the components measured by a stack sampling train such as EPA Method 5.)
PM25-FIL	Primary PM2.5, Filterable portion only	Particles with an aerodynamic diameter equal to or less than 2.5 micrometers that are directly emitted by a source as a solid or liquid at stack or release conditions and captured on the filter of a stack test train.
PM25-PRI	Primary PM2.5, includes filterables and condensables PM25-PRI= PM25-FIL + PM-CON	Particles with an aerodynamic diameter equal to or less than 2.5 micrometers that enter the atmosphere as a direct emission from a stack or an open source. It is comprised of two components: Filterable PM and Condensable PM. (As specified in § 51.15 (a)(2), These two PM components are the components measured by a stack sampling train such as EPA Method 5.)

Exhibit 3 – PM Compounds Reported in Initial State Submittals

	Number of Annual EM Records in S/L Agency's Initial NIF Submittal						
Agency	**PM-CON**	**PM-FIL**	**PM-PRI**	**PM10-FIL**	**PM10-PRI**	**PM25-FIL**	**PM25-PRI**
AL	0	4,748	0	2,918	0	2,035	0
AL Jefferson	0	318	0	631	0	626	0
FL	0	3,576	0	3,672	0	0	0
GA	0	137	2,912	0	1,869	0	1,285
KY	0	0	29,856	0	29,859	0	99
KY Jefferson	20	0	222	20	222	20	214
MS[1]	413	56	3,073	429	3,251	429	3,251
NC	0	0	0	0	9,120	0	5,800
NC Buncombe	26	40	63	40	63	40	58
NC Forsyth	12	4	408	23	381	5	210
NC Mecklenburg	0	0	0	0	613	0	309
SC[1]	1,241	409	6,645	1,439	5,992	1,422	4,224
TN[1]	2,274	3,175	1,258	2,811	2,560	2,641	2,441
TN Davidson	0	0	0	0	775	0	649
TN Hamilton	0	0	394	0	279	0	332
TN Knox	0	0	0	0	15	0	1
TN Shelby	57	189	79	70	279	63	99
VA[2]	5,238	0	0	5,238	5,241	5,238	5,241
WV	167	2,138	802	1,814	737	1,586	691

1) Includes PM records from EPA's 2005-based modeling inventory, which have already been augmented by EPA

2) Virginia's PM augmentation was previously performed using an identical augmentation process during the development of the 2007 regional emission inventory for the Northeast/Mid-Atlantic States

1.4.1 Initial QA and Remediation of PM Pollutants

Prior to executing the PM augmentation process, we first reviewed the data for inconsistencies. If values are found to be inconsistent, they were replaced. The consistency checks and replacement actions are as follows:

1. If PM10-PRI >0 and PM25-PRI > PM10-PRI (and PM10-FIL, PM25-FIL and PM-CON are null or 0), then set PM25-PRI = PM10-PRI.
2. If PM10-FIL > 0 and PM25-FIL > PM10-FIL (and PM10-PRI, PM25-PRI and PM-CON are null or 0), then set PM25-FIL = PM10-FIL.
3. If PM10-PRI >0 and PM10-FIL > PM10-PRI (and PM25-PRI, PM25-FIL and PM-CON are null or 0), then set PM10-FIL = PM10-PRI.
4. If PM25-PRI > 0 and PM25-FIL > PM25-PRI (and PM10-PRI, PM10-FIL and PM-CON are null or 0), then set PM25-FIL = PM25-PRI.

The consistency checks revealed very few occurrences of inconsistencies, and when inconsistencies did occur, the emission values were very small. As a result, S/L agencies were not asked to review this information and provide corrections because the inconsistencies did not involve significant emission sources. The replacement actions above were appropriate for an inventory used for regional air quality modeling.

1.4.2 Updating of PM Factor Ratios

The augmentation steps require the use of ratios developed from available emissions and particle size distribution data. These ratios are needed when only one PM term is available, and two or more terms need to be augmented. Examples of how we used the PM ratios are shown below:

PM-FIL × RatioCON/FIL = PM-CON
PM-PRI × RatioCON/PRI = PM-CON
PM-CON × RatioFIL/CON = PM-FIL
PM-CON × RatioPRI/CON = PM-PRI

A table of PM compound ratios was developed utilizing the table developed for the MANE-VU 2002 inventory (MARAMA, 2006). This table is keyed by SCC, primary control device, and secondary control device and provides the ratios listed in the above equations. We updated this table to include SCC, primary control device, and secondary control device codes found in the 2007 SEMAP inventory that were not contained in the 2002 MANE-VU inventory.

1.4.3 PM Emission Calculations

The gap-filling requires that the data be analyzed and separated into cases. The cases determine which math steps and ratios of PM terms will be applied. Exhibit 4 shows the various cases and the augmentation method that was applied.

Exhibit 4 – PM Cases and Required Steps to Augment PM Emissions

Case	PM Reported	Augmentation Methodology
1	PM25-PRI	PM-CON = PM25-PRI * CON_P25 ratio PM25-FIL = PM25-PRI - PM-CON PM10-FIL = PM25-FIL * F10_F25 ratio PM10-PRI = PM-CON + PM10-FIL
2	PM10-PRI	PM-CON = PM10-PRI * CON_P10 ratio PM10-FIL = PM10-PRI - PM-CON PM25-FIL = PM10-FIL / F10_F25 ratio PM25-PRI = PM-CON + PM25-FIL
3	PM25-PRI PM10-PRI	PM-CON = PM10-PRI * CON_P10 ratio PM10-FIL = PM10-PRI - PM-CON PM25-FIL = PM25-PRI - PM-CON
4	PM10-FIL	PM-CON = PM-CON * CON_F10 ratio PM10-PRI = PM-CON + PM10-FIL PM25-FIL = PM10-FIL / F10_F25 ratio PM25-PRI = PM-CON + PM25-FIL
5	PM10-FIL PM25-FIL	PM-CON = PM10-FIL * CON_F10 ratio PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL
6	PM10-FIL PM10-PRI	PM-CON = PM10-PRI - PM10-FIL PM25-FIL = PM10-FIL * F25_F10 ratio PM25-PRI = PM-CON + PM25-FIL
7	PM25-FIL	PM-CON = PM25-FIL * CON_F25 ratio PM10-FIL = PM25-FIL * F10-F25 ratio PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL
8	PM10-FIL PM10-PRI PM25-FIL PM25-PRI	PM-CON = PM25-PRI - PM25-FIL
9	PM-PRI	PM-CON = PM-PRI * CON_PRI ratio PM-FIL = PM-PRI - PM-CON PM10-FIL = PM-FIL * F10_FIL ratio PM10-PRI = PM-CON + PM10-FIL PM25-FIL = PM10-FIL / F10_F25 ratio PM25-PRI = PM-CON + PM25-FIL

Case	PM Reported	Augmentation Methodology
10	PM25-FIL PM25-PRI	PMCON = PM25-PRI - PM25-FIL PM10-FIL = PM25-FIL * F10_F25 ratio PM10-PRI = PM-CON + PM10-FIL
11	PM-CON PM10-FIL PM25-FIL	PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL
12	PM-CON	PM10-FIL = PM-CON * F10_CON ratio PM25-FIL = PM10-FIL * F25_F10 ratio PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL
13	PM-CON PM10-FIL PM10-PRI	PM25-FIL = PM10-FIL / F10_F25 ratio PM25-PRI = PMCON + PM25-FIL
14	PM-CON PM10-FIL PM10-PRI PM25-FIL PM25-PRI	None required; all PM compounds present
15	PM-CON PM-FIL	PM10-FIL = PM-CON / CON_F10 ratio PM25-FIL = PM10-FIL / F10_F25 ratio PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL
16	PM-CON PM10-PRI PM25-PRI	PM10-FIL = PM10-PRI - PM-CON PM25-FIL = PM25-PRI - PM-CON
17	PM-FIL	PM10-FIL = PM-FIL * F10_FIL ratio PM_CON = PM10-FIL * CON_F10 ratio PM25-FIL = PM10-FIL / F10_F25 ratio PM10-PRI = PM-CON + PM10-FIL PM25-PRI = PM-CON + PM25-FIL

After completing the calculations, the data was QA checked to ensure that the calculations resulted in consistent values for the PM complement. On a few occasions, the mix of ratio value and the pollutants and values provided by the S/L agency resulted in negative values when FIL was back-calculated. In this case the negative FIL value was set to zero and the PRI value was readjusted. In a few cases the appropriate combination of ratios, SCC, and control efficiencies were not available to calculate the PM10-PRI and PM25-PRI values. In these cases, PM10-PRI and PM25-PRI were set equal.

1.4.4 PM Emission Results

Exhibit 5 compares the original PM emission estimates from the S/L submittals and the 2007 SEMAP emissions estimates calculated using the above methodology. This table is

intended to show that we took whatever States provided in the way of PM and filled in gaps to add in PM-CON where emissions were missing in order to calculate PM_{10}-PRI and $PM_{2.5}$ -PRI for all processes to get a complete set of particulate data. A spreadsheet (PM State SCC Sums.xls) shows the results obtained from the PM augmentation process by State and SCC.

Exhibit 5 Comparison of PM Emissions from the Initial S/L Data Submittals and Version 1.1 of the SEMAP 2007 Point Source Inventory

State	Database	PM-CON	PM10-PRI	PM10-FIL	PM25-PRI	PM25-FIL
AL	S/L Data	0	0	57,285	0	29,173
	SEMAP	9,511	87,779	78,268	62,878	53,367
FL	S/L Data	0	0	26,234	0	0
	SEMAP	10,218	36,707	26,489	29,033	18,785
GA	S/L Data	0	20,066	0	9,426	0
	SEMAP	668	27,359	26,691	19,251	18,858
KY	S/L Data	0	24,699	206	2,019	196
	SEMAP	325	24,986	24,662	15,435	15,110
MS	S/L Data	883	18,871	5,986	11,071	1,739
	SEMAP	1,784	18,900	17,116	11,289	9,505
NC	S/L Data	18	46,852	28	30,055	16
	SEMAP	2,982	46,909	43,926	36,881	33,899
SC[1]	S/L Data	81	30,602	910	21,488	416
	SEMAP	909	31,904	30,995	24,235	23,326
TN[1]	S/L Data	11,177	26,708	12,826	19,734	7,048
	SEMAP	11,270	30,240	18,971	23,742	12,491
VA[2]	S/L Data	4,783	19,203	14,419	14,888	10,105
	SEMAP	4,783	19,203	14,419	14,875	10,092
WV	S/L Data	129	6,444	7,507	4,462	3,398
	SEMAP	3,904	13,736	9,833	9,173	5,269

1) Includes PM records from EPA's 2005-based modeling inventory, which have already been augmented by EPA

2) Virginia's PM augmentation was previously performed using an identical augmentation process during the development of the 2007 inventory for the Northeast/Mid-Atlantic States

1.5 EMISSION RELEASE POINT QA CHECKS

Stack parameters are an important component of an emission inventory used for regional air quality modeling. Careful QA was required to ensure that the point source emissions were properly located both horizontally and vertically on the modeling grid. This section describes the procedures used to quality assure, augment, and where necessary, revise, stack parameters using standardized procedures to identify and correct stack data errors. These procedures were implemented within the NIF file itself, and are based on the QA procedures built into SMOKE that are designed to catch missing or out-of-range stack parameters.

1.5.1 QA Checks and Gap-Filling for Location Coordinates

The emission release (ER) point record is used to report the location and relevant physical attributes of the emission release point. Location coordinates must be reported to identify where emissions are released to the ambient air, via a stack or non-stack (e.g., fugitive release). If a non-stack, or fugitive release, coordinates may be reported for the general location of the emission release point. In the ER record, location data may be reported as x and y coordinates from either of two coordinate systems - Latitude / Longitude (LATLON), or Universal TransMercator (UTM). X and Y coordinates reported as Latitude and Longitude must be reported in the decimal degree format specified. X and Y coordinates reported as UTM Easting and UTM Northing, must be reported in kilometers. In order to comply with the EPA data standard for Latitude/Longitude, any UTM data received in the SESARM files was processed by the MACTEC Team and converted to, and stored as Latitude Measure and Longitude Measure in decimal degrees.

All conversions of UTM to LATLON were conducting use a spreadsheet developed by the University of Wisconsin - Green Bay (Dutch 2005). This spreadsheet tool allowed for batch conversion of UTM data to decimal degree format and was configured for WGS 84 DATUM. While errors using this spreadsheet are typically a few meters, rarely 10 or more, the accuracy of the conversion is limited to the accuracy of the initial UTM data. A degree latitude/longitude is about 111,000 meters. Thus, to achieve roughly one-meter accuracy you need coordinates accurate to five decimal places. Four places will give you 10 meters accuracy and three will give you 100 meter accuracy. This accuracy could not be improved with the originally provided UTM coordinates, so all conversions should be checked for reasonableness.

Once all conversions were made to LATLON decimal degrees (also the requirement of the SMOKE emissions processing system), reasonableness checks were conducted on each release point relative to county centroids and min/max coordinates associated with the

FIPS codes assigned to each stack. If a stack was found to exist outside of the western-, eastern-, northern- or southern-most boundary of the county (based on SMOKE's county lat/lon file), the point was flagged for additional review. These flagged sources were then mapped with GIS software to determine their placement relative to the FIPS County associated with the stack. If a source was found to be outside of the county boundaries, it was further identified and reported for review by the data provider.

1.5.2 QA Checks and Gap-Filling for Emission Release Parameters

In preparing emissions for grid modeling, valid parameters for the physical characteristics of each release point (stack height, diameter, temperature, velocity, and flow) are necessary to correctly place facility release points and associated emissions into vertical layers for proper air quality modeling. Gaussian dispersion models need stack parameters to characterize the plume, which is needed to estimate proper concentrations from these models. The first step of our quality assurance involves review of the Emission Release Point Type. Using this type code, we used a routine to assess the validity of the stack parameters, to replace values if necessary, and to fill-in missing data points. This methodology is virtually identical to the EPA methodology used for the 2002 NEI (EPA 2006a).

We employed a routine that compared each emission release point parameter to a minimum and maximum range of values and when that parameter was missing or was found to exist outside of that range, we augmented the parameter. We also checked non-fugitive stack parameters for internal consistency between:

- stack height and diameter, and
- stack diameter, exit gas velocity, and exit gas flow rate.

When internal consistency was not met, we provided replacement values for the parameters.

The following steps summarize the process of finding and replacing missing, out-of-range, or internally inconsistent stack parameters.

Step 1: For fugitive emission release points, replace stack parameters

For fugitive emission release points, we first compared the existing height against the following range thought to be representative of the minimum and maximum values allowable for most fugitive emission release points.

- Fugitive Release Height: 0.1 to 100 ft

If the height was valid, we kept the height and replaced all other stack parameters with the defaulted values listed below. If the height was invalid, we replaced all stack parameters with the defaulted values.

- Stack Height: 10 ft
- Stack Temperature: 72 ^{o}F
- Stack Diameter: 0.003ft
- Stack Velocity: 0.0003 ft/sec
- Stack Flow: 0 cu ft/sec

Step 2: For non-fugitive emission release points, find out-of-range or missing stack parameters

For non-fugitive emission release points, we first compared existing stack parameters against a set of the following ranges thought to be representative of the minimum and maximum values allowable for most emission release points.

- Stack Height: 0.1 to 1000 ft
- Stack Temperature: 50 to 1,800 ^{o}F
- Stack Diameter: 0.1 to 50 ft
- Stack Velocity: 0.1 to 560 ft/sec
- Stack Flow: 0.001 to 1,100,000 ft^3/sec

First we identified missing or out-of range parameters. Then we evaluated the source category to determine if out-of-range parameters were plausible. If any parameter was missing or out-of range, the parameter was replaced using the procedures described in Step 4. If all parameters were found to exist within the bounds of the emission release point ranges, we proceeded to Step 3.

Step 3: For non-fugitive emission release points, find inconsistencies in stack parameters

We determined any inconsistencies in stack parameters by conducting the following two steps.

A. For stack diameter, we compared the stack diameter to the stack height. For nonfugitive emission release points, the stack height may not be less than stack diameter.

B. We determined the internal consistency between diameter, velocity and flow rate using the following equation.

Stack Flow [cu ft/sec] = (Π [Pi] * (Stack Diameter [ft] / 2) ^ 2) * Stack Velocity [ft/sec]

If the calculated flow and the reported flow are within 10 % of one another, then internal consistency was assumed to be valid. If all parameters were found to exist within the bounds of the emission release point ranges in Step 2, and the consistency checks (A) and (B) in Step 3 were satisfied, no additional steps were taken. If any parameter was missing or out-of range, or if the parameters failed the internal consistency tests, the parameter was replaced using the procedures described in Step 4.

Step 4: Replace stack parameters for non-fugitive emission release points

The first step in replacing stack parameters was to determine if there are problems with stack height or diameter. Because stack height and diameter are the physical parameters that are most easily measured or estimated, when there are problems with these parameters, then the entire set of stack parameters are deemed questionable. If either height or diameter were missing or out-of range, or if the stack diameter was greater than stack height, then all five parameters were defaulted using national default sets of physical parameter data contained in the 2002 NEI Stack Parameter Default file (EPA 2006b). No additional steps were taken once all five parameters were defaulted.

If stack height and diameter did not need replacement, then velocity and flow rate were evaluated next. If velocity and flow rate were not internally consistent, we conducted QA on the flow rate to determine if it was reported in cubic feet per minute rather than cubic feet per second as required in the reporting to EPA.

We corrected flow rates reported in cubic feet per minute to cubic feet per second and then evaluated the flow rate and velocity for internal consistency. If the internal consistency was not met for velocity, flow rate, and diameter, Exhibit 6 provides instructions on how we replaced missing, out-of-range values, or internally inconsistent values for velocity and flow rate based on different reported scenarios. Velocity and flow rate were augmented either by calculation or the use of national defaults.

Finally, in cases where all five parameters were not defaulted, and velocity and flow rate were evaluated and replaced if necessary, temperature was evaluated. If temperature was missing or out-of-range, then the temperature was defaulted using national default sets of physical parameter data in the order presented below.

1. SCC match
2. Facility level SIC Code match
3. National default for release points, if no SCC or SIC Code match is possible

Stack parameter QA reports were sent to all data providers. The report contained all of the emissions release point records submitted and identifies which parameters were defaulted as a result of our QA. S/L agencies were asked to review the defaulted records and revise the records if they do not agree with the defaulted values.

Exhibit 6 - Stack Parameter Data Replacement Matrix (X = Data value present)

Diameter	Velocity	Flow Rate	Action
X	**X**	**X**	1. Check that velocity is within range. A. If velocity is within range and flow rate does not meet internal consistency for diameter, velocity and flow rate, then: > Calculate flow rate using internal consistency formula. B. If velocity is not within range, then: > Calculate velocity using internal consistency formula. > Check that calculated velocity is within range. If so, then default to calculated velocity. > If calculated velocity is not within range, then default all 5 parameters using national default set.
X	**-**	**X**	1. Calculate velocity using internal consistency formula. 2. Check that calculated velocity is within range. A. If calculated velocity is not within range, then: > Default all 5 parameters using national default sets.
X	**X**	**-**	1. Check that velocity is within range. A. If velocity is within range, then: > Calculate flow rate using internal consistency formula. B. If velocity is not within range, then: > Default all 5 parameters using national default sets.
X	**-**	**-**	1. Default velocity using national default sets. 2. Calculate flow rate using internal consistency formula.
-	**X**	**X**	1. Default all 5 parameters using national default sets.

1.6 STATE REVIEW OF INITIAL VERSION

This section describes changes made to the 2007 SEMAP point source inventory based on S/L agency review and comment. The following changes were incorporated to create Version 1.3 of the point source inventory.

1.6.1 Alabama

A large increase in VOC and PM emissions from 2002 to 2007 was identified during the review of Alabama's initial submittal. Alabama investigated this problem and identified a serious problem in their data conversion process. New EM and CE tables were provided in May 2010 to correct this problem. The new submittals were subjected to the same QA and PM augmentation processes described in previous sections.

Alabama reviewed the geographic coordinates for the 34 stacks that were flagged as being outside of the appropriate county boundaries. No changes were needed – the sources were either located off-shore (outside the county boundary) or very close to the edge of the county boundary.

In response to the QA checks of stack parameters, Alabama changed the emission release type to "01" (fugitive sources) for 98 and accepted the default fugitive emission release characteristics. For another 71 stacks, Alabama changed the emission release type to "02" (vertical release sources) and provided corrected stack parameters. Alabama also provided corrections for a number of additional stacks, either by accepting the recommended defaults or providing corrected data.

1.6.2 Alabama – Jefferson County

Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report.

1.6.3 Florida

Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report.

Florida updated the CAMD-to-NIF crosswalk table to link the CAMD and NIF identifiers. Florida updated cases where:

- the facility/emission unit may likely have been reported as a different facility (two CAMD ORIS facilities were combined in Florida's NIF SI table);

- the EU did not operate in 2007, which is why it was not included in Florida's NIF database; or
- typographical errors caused a mismatch between CAMD and NIF.

MACTEC made the above updates and now all CAMD units have a match in Florida's NIF database.

1.6.4 Georgia

Georgia specified that 2008 emissions data should be backcasted to 2007 or and 2005 emissions data should be projected to 2007. The backcasting of 2008 emissions and projecting of 2005 emissions was performed in the following manner:

- Facilities with 2007 emissions do not get changed;
- For facilities with 2005 and 2008 emissions (but no 2007 emissions), 2007 emissions were estimated based on a linear interpolation between facility level 2005 and 2008 emissions on a pollutant-by-pollutant basis to calculate facility level 2007 emissions. A scaling factor was then calculated as the ratio of reported 2008 emissions to interpolated 2007 emissions, which was used to create to scale back 2008 reported emissions to 2007 at the emission process level.
- For facilities with only 2008 data (no 2007 or 2005 data available), we used the SIC growth factors from the VISTAS Best&Final inventory to backcast 2008 reported emissions to 2007. The VISTAS SIC growth factors were used to calculate a scaling factor which was used to scale back 2008 reported emissions to 2007 at the emission process level.
- For facilities with only 2005 data (no 2007 or 2008 data available), we used the SIC growth factors from the VISTAS Best&Final inventory to project 2005 reported emissions to 2007. The VISTAS SIC growth factors were used to calculate a scaling factor which was used to project 2005 reported emissions to 2007 at the emission process level.

After the above backcasting and projecting was performed, additional adjustments were made for facilities where only 2005 data were available and the facility did not operate in 2007 or operated for only part of 2007. Facilities that did not operate in 2007 were removed from the NIF files. For facilities that operated for part of 2007, the 2005 emissions were approximated for 2007 by multiply the 2005 emissions by a scaling factor of the number of days the facility operated in 2007 divided 365 days of full year operation.

Also, the end date in the NIF EM and PE tables were changed to reflect the actual date that the facility ceased operation. These facilities were:

FIPS	PLANTID	FACILITY NAME	DATE SHUTDOWN	SCALING FACTOR
13159	15900011	Georgia-Pacific Corp Panelboard	15-Aug-07	0.62
13045	04500008	Southwire Co, Copper Division	7-Mar-07	0.18
13121	12100364	Ford Motor Co Atlanta Assembly	1-Dec-07	0.92
13121	12100004	General Shale Brick	28-Mar-07	0.24
13175	17500047	Victor Forstmann, Inc.	1-Apr-07	0.25
13081	08100019	Lasco Bathware	6-Nov-07	0.85
13089	08900031	Siemens Energy & Auto	1-Sep-06	0.00
13241	24100001	Rabun Apparel, Inc.	Not operated in 2007	0.00
13261	26100005	Textron Automotive Company	1-Feb-07	0.08

The following facilities reported emissions data to CAMD but were not in Georgia's NIF submittal:

FIPSST	FIPSCNTY	PLANTID	ORISID	FACILITY NAME
13	147	14700021	70454	HARTWELL ENERGY FACILITY
13	149	14900004	55061	TENASKA GEORGIA
13	149	14900005	55141	HEARD COUNTY POWER LLC
13	149	14900006	7917	CHATTAHOOCHEE ENERGY FACILITY
13	149	14900007	7946	WANSLEY
13	153	15300040	7348	GEORGIA POWER COMPANY, ROBINS CT
13	153	15300042	55040	MID GEORGIA COGEN
13	157	15700034	7765	GEORGIA POWER COMPANY, DAHLBERG
13	205	20500043	7768	SOWEGA POWER LLC
13	205	20500044	55304	BACONTON POWER
13	207	20700030	7829	SMARR ENERGY CENTER
13	233	23300042	7813	SEWELL CREEK ENERGY
13	263	26300013	7916	TALBOT COUNTY ENERGY
13	293	29300027	55267	WEST GEORGIA GENERATING CO
13	297	29700040	7764	MPC GENERATING
13	297	29700041	55244	DOYLE GENERATING FACILITY
13	297	29700042	55128	WALTON COUNTY POWER LLC
13	303	30300039	55332	WASHINGTON COUNTY
13	303	30300040	55672	DUKE ENERGY SANDERSVILLE LLC

MACTEC added these facilities and their associated emission units to the NIF tables. All of the units are gas-fired turbines. MACTEC calculated 2007 emissions for these units in the following manner:

- NOx – used the CAMD reported 2007 annual NOx emissions
- SO2 – used the CAMD reported 2007 annual SO2 emissions
- CO – calculated annual CO emissions using the CAMD reported 2007 annual heat input (mmBtu/year) and the AP-42 emission factor of 0.03 lbs/mmBtu
- PM10-PRI – calculated annual PM10-PRI emissions using the CAMD reported 2007 annual heat input (mmBtu/year) and the AP-42 emission factor of 0.0066 lbs/mmBtu
- PM25-PRI – calculated annual PM25-PRI emissions using the CAMD reported 2007 annual heat input (mmBtu/year) and the AP-42 emission factor of 0.0066 lbs/mmBtu
- VOC – calculated annual VOC emissions using the CAMD reported 2007 annual heat input (mmBtu/year) and the AP-42 emission factor of 0.0021 lbs/mmBtu

These calculations were reviewed and approved by Georgia.

Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report.

1.6.5 Kentucky

Kentucky compared facility-level emissions in their State database to the emissions in the 2007 SEMAP inventory. They identified discrepancies at two facilities: (1) NRE Acquisition Co LLC (211450019), which appeared to be undercounted by 25.4955 tons of NOx in the draft 2007 SEMAP inventory and (2) Chesapeake Applachia LLC (2119500252), which appeared to be undercounted by about 76.7157 tons VOC and 6.7362 tons of CO in the SEMAP inventory. These discrepancies were identified and resolved, so that now the Kentucky database and the SEMAP 2007 are in agreement.

Kentucky provided updated latitude and longitude data for 677 stacks that were identified as being located outside of the county boundaries. Stack parameter changes for the stack diameter, flow rate, and velocity were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. We retained Kentucky's values for stack height and exit gas temperature.

1.6.6 Kentucky – Jefferson County

Jefferson County updated the coordinates of emission release points for large and medium-sized point sources. Large sources are those with Title V operating permits. Medium-sized sources are those with synthetic minor operating permits. Most of these emission release points will match those reported in the 2007 National Emissions Inventory (NEI). Many of these coordinates were digitized using a geographic information system (GIS) in early April 2010. Others (those showing fewer significant digits in the UTM coordinates) were obtained by other means, usually by interpolation on USGS 1:24 000 scale paper maps. Generally the ones that were corrected were those that were found to be the most inaccurate as seen in the GIS. The 2007 SEMAP inventory was updated with this new location information.

1.6.7 Mississippi

In preparing the initial version of the 2007 SEMAP point source inventory, MACTEC added facilities from EPA's 2005 NEI that were not included in Mississippi's 2007 submittal. Mississippi reviewed the facilities that were added and indicated that much of the data for the 2005 NEI facilities was for very small sources, contained dated emissions data, had some double-counting of sources, contained data for airports (which are included in the SEMAP nonroad inventory) and did not reliably represent emissions in 2007. As a result, Mississippi decided to remove most of the facilities added from the 2005 NEI from the 2007 SEMAP inventory. The emissions from these sources will be accounted for in the inventories for area and nonroad sectors.

Mississippi provided updated latitude and longitude data for 15 stacks that were identified as being located outside of the county boundaries.

Mississippi approved the stack parameter changes for the stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. Most of these changes affected fugitive emission sources with a emission release point of "9999". These stacks were updated to change the emission release type to "01 – fugitive" and to use the default fugitive emission release stack parameters described in Section 1.5.2.

Mississippi reviewed the CAMD-to-NIF crosswalk and updated several linkages to correctly map CAMD identifiers to NIF. Three facilities (BTEC New Albany ORIS 13213, Natchez ORIS 2052, and AP Holdings Southhaven ORIS 55219) are currently shut down and did not operate in 2007. Choctaw Gas generation (ORIS 55634), and RRI Energy (ORIS 55706), are newer and were not completely represented in Mississippi's

original submittal. Mississippi provided the necessary stack data for modeling for both of these facilities.

1.6.8 North Carolina

A large increase in VOC emissions from 2002 to 2007 was identified during the review of North Carolina's initial submittal. North Carolina investigated this problem and identified a serious problem in their data conversion process. A new spreadsheet table was provided in May 2010 to correct this problem. MACTEC converted the spreadsheet file a NIF database. The new submittals were subjected to the same QA and PM augmentation processes described in previous sections.

North Carolina reviewed the geographic coordinates for the stacks that were flagged as being outside of the appropriate county boundaries. The new submittal mentioned in the previous paragraph contained corrections to the flagged latitude and longitude issues.

NC has reviewed the recommended stack replacement parameters and agreed to accept all of the recommendations based on the SCC code.

In addition, Duke Energy provided additional corrections for stack parameters for 2007. For the Marshall Steam Plant, new FGD stacks were installed in May 2007 (combined stack for Units 1&2), March 2007 (Unit 3) and May 2006 (Unit 4). For other plants (Belews Creek, Cliffside, and G.G. Allen), new stacks will become operational after 2007.

1.6.9 North Carolina – Buncombe County

Buncombe County approved the stack parameter changes for the stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. In a few cases, Buncombe County updated the original stack parameters for certain stacks and requested that the updated stack data be used.

The geographic coordinates were inadvertently truncated (not rounded) to $1/100^{th}$ of a degree during the compilation of the initial SEMAP inventory. This problem was corrected in Version 1.3.

Buncombe County compared a sampling of the 2007 SEMAP inventory to what they had submitted and found them to be in agreement.

1.6.10 North Carolina – Forsyth County

Forsyth County reviewed the data in the SEMAP 2007 inventory and emissions data for the more significant processes, i.e. the highest emitting sources. The emissions for all pollutants except PM for the processes they reviewed matched their data. The PM

emissions did not match the data they provided data in a few cases. The reason for this difference is due to correcting inconsistencies in the reported PM data during the PM augmentation process. For example, the Corn Products International facility (ID 3706700732, emission point ES062C, process ID 62C-W had reported PM-CON emissions of 11.58 tons but PM10-PRI emissions of only 3.41 tons. Since PM-CON cannot be greater than PM10-PRI, the PM10-PRI value was replaced during the PM augmentation process.

Forsyth County provided the mission facility name (Wake Forest University) for Facility ID 3706700003.

The geographic coordinates were incorrect for many facilities. These have been replaced for all facilities in Forsyth County.

1.6.11 North Carolina – Mecklenburg County

Mecklenburg County approved the stack parameter changes for the stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report.

1.6.12 South Carolina

In preparing the initial version of the 2007 SEMAP point source inventory, MACTEC added facilities from EPA's 2005 NEI that were not included in South Carolina's 2007 submittal. South Carolina reviewed the facilities that were added and indicated that much of the data for the 2005 NEI facilities was for very small sources, contained dated emissions data, had some double-counting of sources, contained data for airports (which are included in the SEMAP nonroad inventory) and did not reliably represent emissions in 2007. As a result, South Carolina decided to remove many of the facilities added from the 2005 NEI from the 2007 SEMAP inventory because they were either minor sources, out of business, or airports. The emissions from these sources will be accounted for in the inventories for area and nonroad sectors.

South Carolina provided updated latitude and longitude data for 14 stacks that were identified as being located outside of the county boundaries. Five of these stacks were associated with facilities from the 2005 NEI which were removed from the SEMAP inventory. For the remaining stacks that were flagged, the facility level latitude and longitude were used to more accurately locate the stack.

South Carolina approved the stack parameter changes for the stacks that were recommended for change based on the QA checks and gap filling process described in

Section 1.5.2 of this report. In several cases, South Carolina updated the original stack parameters for certain stacks and requested that the updated stack data be used.

South Carolina reviewed the PM augmentation of PM10-PRI and PM2.5-PRI and generally agreed with the small increases in the PM10-PRI and PM2.5-PRI emissions resulting from the augmentation process. South Carolina expressed a concern about the increases that were made to the certain fuel burning SCCs (20100101, 20100201, and 20200201). The reason for the small PM10-PRI and PM25-PRI increase for these SCCs was that a few facilities had reported PM10-FIL and PM25-FIL, not PM10-PRI and PM25-PRI. Since the PM10-FIL and PM25-FIL were reported, the augmentation process calculated a PM-CON value and added it to the PM10-FIL and PM25-FIL values to get the revised PM10-PRI and PM25-PRI values.

South Carolina reviewed the CAMD-to-NIF crosswalk and updated several linkages to correctly map CAMD identifiers to NIF. South Carolina also compared the CAMD-reported NOx and SO2 emissions to the NIF-reported emissions, and updated the NIF emissions for several coal-fired plants with the CAMD emissions after consulting with the affected facilities.

1.6.13 Tennessee

In preparing the initial version of the 2007 SEMAP point source inventory, MACTEC added facilities from EPA's 2005 NEI that were not included in Tennessee's 2007 submittal. Tennessee reviewed the facilities that were added and indicated that much of the data for the 2005 NEI facilities was for very small sources, contained dated emissions data, had some double-counting of sources, contained data for airports (which are included in the SEMAP nonroad inventory) and did not reliably represent emissions in 2007. As a result, Tennessee decided to remove most of the facilities added from the 2005 NEI from the 2007 SEMAP inventory. The emissions from these sources will be accounted for in the inventories for area and nonroad sectors.

Tennessee provided updated 2007 emissions data for 16 facilities that were not in their original submittal:

FIPS	Facility Identifier	Facility Name
47149	0155	NISSAN NORTH AMERICA, INC.
47027	0022	HONEST ABE LOG HOMES, INC., ETC.
47029	0020	SONOCO PRODUCTS COMPANY
47031	0010	ARNOLD ENGINEERING DEVELOPMENT CENTER
47031	0067	BATESVILLE MANUFACTURING, INC.
47031	0113	M-TEK, INC.

FIPS	Facility Identifier	Facility Name
47031	0123	CREATEC CORPORATION
47047	0080	STABILT AMERICA, INC
47053	0119	Kongsberg Automotive
47071	0074	PRAXIS INDUSTRIES
47077	0060	VOLVO PENTA MARINE PRODUCTS, L.C.
47113	0020	ARMSTRONG HARDWOOD FLOORING
47125	0092	NYRSTAR CLARKSVILLE, INC
47151	0002	HARTCO FLOORING COMPANY
47151	0051	ARMSTRONG HARDWOOD FLOORING
47167	0079	QW MEMPHIS CORPORATION - COVINGTON DIVISION

Tennessee provided updated latitude and longitude data for 25 stacks that were identified as being located outside of the county boundaries. Tennessee also provided changes to the stack parameters for 29 stacks. Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report.

1.6.14 Tennessee – Davidson County

Davidson County reviewed the draft point source emission inventory and approved the emissions contained in it.

Davidson County approved the stack parameter changes for 723 stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. In several cases, Davidson County provided updated stack parameters for selected stacks.

1.6.15 Tennessee – Hamilton County

Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. Hamilton County provided updated stack latitude and longitude for three facilities that were identified as being located outside of the county boundaries.

1.6.16 Tennessee – Knox County

Stack parameter changes were made for fugitive emission release points that were recommended for change based on the QA checks and gap filling process described in

Section 1.5.2 of this report. Knox County provided updated stack latitude and longitude for one facility that was identified as being located outside of the county boundaries.

1.6.17 Tennessee – Shelby County

Shelby County approved the stack parameter changes for 765 stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. In a few cases, Shelby County provided updated stack parameters for selected stacks.

Hamilton County provided updated stack latitude and longitude for facilities that were flagged as being located outside of the county boundaries.

1.6.18 Virginia

Virginia provided updated latitude and longitude data for 115 stacks that were identified as being located outside of the county boundaries.

Virginia approved the stack parameter changes for 540 stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. The only exception was for the Jewel Coke Company (ID 51027-00004, stacks 1 and 3), where Virginia requested that the original stack exhaust gas temperatures of 1500 degrees Fahrenheit be retained.

As part of the development of a 2007 inventory for the Mid-Atlantic and Northeast States directed by MARAMA, Virginia developed and approved the 2007 CAMD-to-NIF crosswalk and the 2007 emission values for all sources.

1.6.19 West Virginia

West Virginia approved the stack parameter changes for 540 stacks that were recommended for change based on the QA checks and gap filling process described in Section 1.5.2 of this report. There were four exceptions (Aker Plastics 5400300026, Gratech International 5403300001, Monongahela Power Harrison 5403300015, DuPont Belle 5403900001) where West Virginia requested that the original stack parameters for certain stacks be retained.

West Virginia reviewed the locations for the seven facilities flagged as being outside of the county boundaries and provided updated stack latitude and longitude for these facilities.

West Virginia reviewed the draft emission inventory and confirmed that all point source facilities are represented in the inventory, that the PM augmentation procedure produced

reasonable results, and the 2007 emissions in the SEMAP inventory agreed with the data they submitted.

West Virginia reviewed the CAMD-to-NIF crosswalk and identified the linkage between CAMD and NIF identifiers for the Union Carbide Corporation (5403900003) boilers B25, B26, and B27. West Virginia approved all other linkages between CAMD and NIF identifiers.

1.7 STAKEHOLDER REVIEW

S/L agencies provided access to Version 1.3 of the 2007 point source inventory and solicited input from various stakeholders including EPA, the regulated community, academia, environmental groups, and the general public. This section documents the changes made to Version 1.3 based on S/L agency review of stakeholder comments as well as any additional updates or corrections identified by the S/L agencies.

1.7.1 Alabama

The National Lime Association requested consideration of a modification to PM emissions data for one of their facilities in Alabama (Unimin Lime Corporation, Calera Plant). The request was reviewed by State staff and the suggested correction was justified and made.

1.7.2 Florida

Lakeland Electric requested that the SO2 and NOx emission values from the EPA CAMD submittal be used instead of the values reported to the State. The CAMD represent the emissions more accurately that the State submittal for two plants (Plant IDs 1050004 and 1050003). Florida agreed to make these changes.

Tampa Electric reviewed the database and suggested several corrections. Most of the changes are due to the installation and operation of the SCR control devices on Big Bend units 1-4. Tampa Electric also evaluated filterable and condensable PM emissions for all of its major generating units and provided better, unit specific, emission rates for these units where available. Finally, Tampa Electric provided some corrections to stack exhaust gas parameters. Florida agreed to make all of these changes.

Southern Company indicated that the inventory stack data for Crist plant reflects the current scrubbed stack parameters, not the operating parameters in 2007. Appropriate stack parameters for 2007 were submitted and reviewed/approved by Florida.

1.7.3 Georgia

Georgia reviewed the emissions values and stack parameters for the Georgia Power facilities in the State. Georgia provided updated PM and NH3 emissions data for all Georgia Power facilities. The revised PM emission values included condensable emissions which were previously missing from the inventory. Georgia also provided updated stack parameters for selected Georgia Power stacks.

Georgia also identified a number of emission units where the PM2.5 emissions were greater than the PM10 emissions. The source of this error was investigated and identified, and revisions were made to correct this error.

1.7.4 Kentucky

Kentucky identified that the PM point source emissions originally submitted for all Kentucky counties, excluding Jefferson County, should be considered as filterable PM emissions. The original submittal contained pollutant codes (PM-PRI, PM10-PRI, PM25-PRI) that represent the sum of filterable and condensable emissions. These should have been reported as filterable only (PM-FIL, PM10-FIL, PM25-FIL). MACTEC changed the pollutant codes to represent filterable emissions only, and re-ran the PM augmentation process described previously in Section 1.4 to add condensable emissions to the filterable emissions. Kentucky reviewed and approved the revised PM emissions, except for a few EGUs. Kentucky worked with these utilities in obtaining updated PM emissions data that included both filterable and condensable emissions. These changes to the EGU PM emissions are discussed further in Section 1.9.

1.7.5 North Carolina

Duke Energy indicated that the SCC for Marshall Units 1&2 were 10200202 and 10200502 (industrial boiler, coal and oil) but should be 10100202 and 10100502 (electric generation boiler, coal and oil). Duke Energy requested that the SCC be changed as that will impact how boilers are grouped by category for various regulatory and emission projection scenarios.

1.7.6 Tennessee

Tennessee identified three facilities (APAC-TN Harrison Construction Division, Dyersburg Compressor Station, Kimberly Clark Corporation) that had duplicate entries in the emission inventory. MACTEC investigated this issue and identified the error. The duplicate entries were removed.

Tennessee also provided updated 2007 emissions data for the CalsonicKansei North America -Lewisburg Operations facility.

1.8 IDENTIFICATION OF EGU AND NONEGU POINT SOURCES

States were asked to classify units in the 2007 SEMAP emissions inventory as either EGU or nonEGU for emission projection purposes. Emission projections for EGU point sources are being developed by the Eastern Regional Technical Advisory Committee (ERTAC). The emissions from point sources classified as nonEGUs will be projected using the methods and data developed by SEMAP.

Most, but not all, of the units that are required to report hourly emissions to EPA's Clean Air Markets Division (CAMD) are considered to be EGUs. CAMD implements EPA's rule found in Volume 40 Part 75 of the Code of Federal Regulations (CFR), which requires an hourly accounting of emissions from each affected unit - i.e., sources participating in an emissions cap and trade program under the Acid Rain Control Program, the NOx Budget Trading Program, or the Clean Air Interstate Rule. The following guidance was provided to States to determine whether a unit that reports to CAMD should be classified as an EGU or nonEGU:

For the ERTAC process, a unit should only be considered EGU if it meets the following criteria:

- An EGU sells most of the power generated to the electrical grid;
- An EGU burns mostly commercial fuel. Commercial fuel in this case means natural gas, oil, and coal. Wood would not be considered as commercial fuel because some states have them as renewable, therefore, to prevent double counting, unless it's already in the CAMD database, units that burn wood and other renewable sources (depending on each state's own definition) should not be considered as EGU.

The following units were NOT considered as EGU for the purpose of projection emissions:

- A unit that generates power for a facility but occasionally sells to the grid;
- Emergency generators;
- Distributed generation units.

S/L agencies were provided with a list of units that report to CAMD as well as a list of units with an electric generating unit SCC (1-01-xxx-xx or 2-01-xxx-xx). From these lists, S/L agencies identified units that should be classified as EGUs and those that should be classified as nonEGUs. A few States also identified units with SCCs beginning with 1-01 or 2-01 that do not report to CAMD but which should be classified as EGUs; however, for

emission projection purposes these units will be processed using the nonEGU projection methodology developed by SEMAP.

MACTEC added a flag to the NIF EP table to identify each unit according to the following classification scheme:

- **EGU-CAMD** are combustion units that report hourly emissions to the CAMD database and have been classified as EGUs by the S/L agency;
- **EGU-nonCAMD** are combustion units with SCC starting with 101 or 201 that are not contained in CAMD database;
- **nonEGU-CAMD** are combustion units that report hourly emissions to the CAMD database and have been classified as nonEGUs by the S/L agency; and
- **nonEGU-nonCAMD** are all other point sources not classified above.

The above flags allow for sources to be categorized in different ways for emission projection and emission reporting purposes.

1.9 FINAL S/L AGENCY QA REVIEW

Two final QA checks were made. The first check was for S/L agencies to verify the PM emissions data for coal- and oil-fired units included PM condensable emissions in addition to PM filterable emissions. The second check was for S/L agencies to verify the location and emission values for certain sources via review of emission bubble plots prepared by another SEMAP contractor. This section documents the changes made based on these final QA checks. In addition, the documentation was revised to address comments provided by EPA Region 4.

1.9.1 Kentucky

Kentucky coordinated the review of PM emissions with utilities in the Commonwealth and provided updated PM condensable emissions for the following units:

- Duke Energy East Bend (21-015-00029) Unit 2;
- TVA Shawnee (21-145-00006) Units 1 through 10;
- TVA Paradise (21-177-00006) Units 1, 2, and 3; and
- Kentucky Energy Reid/Henderson (21-233-00001) Units H1 and H2

1.9.2 North Carolina

Both Duke Energy and Progress Energy submitted information to confirm that the PM2.5-PRI and PM10-PRI emission estimates for its facilities do include both filterable and condensable values.

1.9.3 North Carolina – Forsyth County

In its original submittal, Forsyth County submitted a mix of 2007 and 2008 emission data. After further reviewing the 2007 and 2008 data, Forsyth County identified several revisions to make the data more representative of 2007. One facility (VP Buildings, Inc., Plant ID 00488) that shut down in 2008 was omitted for the initial submittal and was added to the SEMAP 2007 inventory. The only other significant change was the addition of the coal boilers at R.J. Reynolds Tobacco Company (Plant ID 00039) to the SEMAP 2007 inventory that were shut down in 2008. Some additional relatively minor corrections were made as well.

1.9.4 South Carolina

South Carolina confirmed that the PM condensable emissions are included in the PM10-PRI and PM2.5-PRI data provided for coal- and oil-fired EGUs.

1.9.5 Virginia

Virginia confirmed that the PM condensable emissions are included in the PM10-PRI and PM2.5-PRI data provided for coal- and oil-fired EGUs.

1.9.6 West Virginia

After reviewing the emission density maps and emission bubble plots, West Virginia submitted revisions to the geographic coordinates at three facilities (54-009-00012 Impress USA, 54-021-00001 Columbia Gas Glenville, 54-057-00008 Newpage Corporation).

1.10 2007 POINT SOURCE EMISSION SUMMARY

This section presents State-level summaries of the annual point source emissions by pollutant in the 2007 SEMAP inventory and compares the emissions to the 2002 VISTAS Best and Final inventory. For most States and pollutants, point source emissions have decreased from 2002 to 2007.

Exhibit 7 shows that CO emissions in the SEMAP region have decreased by about 30 percent between 2002 and 2007. Exhibit 8 shows that most of the point source CO emissions (about 81 percent) come from nonEGUs that are not required to report emissions to CAMD.

Exhibit 9 shows that NH3 emissions in the SEMAP region have remained about the same in 2002 and 2007, although NH3 emissions increased substantially in some States while decreasing in others. Exhibit 10 shows that most of the point source NH3 emissions (about 90 percent) come from nonEGUs that are not required to report emissions to CAMD.

Exhibit 11 shows that NOx emissions have decreased by about 27 percent between 2002 and 2007. All States showed a decrease in NOx emissions from point sources. Exhibit 12 shows that about 69 percent of the point source NOx emissions come from EGUs that are required to report emissions to CAMD. Another 28 percent of the NOx emissions result from nonEGUs that are not required to report emissions to CAMD.

Exhibit 13 shows that PM10-PRI emissions in the SEMAP region have decreased by about 14 percent between 2002 and 2007, although PM10-PRI emissions increased substantially in some States while decreasing in others. Exhibit 14 shows that about 46 percent of the point source PM10-PRI emissions come from EGUs that are required to report emissions to CAMD. Another 53 percent of the PM10-PRI emissions result from nonEGUs that are not required to report emissions to CAMD.

Exhibit 15 shows that PM25-PRI emissions in the SEMAP region have decreased by about 12 percent between 2002 and 2007, although PM25-PRI emissions increased substantially in some States while decreasing in others. Exhibit 16 shows that about 45 percent of the point source PM25-PRI emissions come from EGUs that are required to report emissions to CAMD. Another 54 percent of the PM25-PRI emissions result from nonEGUs that are not required to report emissions to CAMD.

Exhibit 17 shows that SO2 emissions in the SEMAP region have decreased by about 14 percent between 2002 and 2007. All States except Georgia showed a decrease in SO2 emissions. Exhibit 18 shows that most of the point source SO2 emissions (about 87 percent) come from EGUs that are required to report emissions to CAMD. Another 11 percent of the SO2 emissions result from nonEGUs that are not required to report emissions to CAMD.

Exhibit 19 shows that VOC emissions in the SEMAP region have decreased by about 20 percent between 2002 and 2007. Exhibit 20 shows that nearly all of the point source VOC emissions (about 97 percent) result from nonEGUs that are not required to report emissions to CAMD.

The reasons for the differences between 2002 and 2007 are many and vary by State, facility, and pollutant. Examples include: 1) new controls added between 2002 and 2007; 2) change in emission factors or source test data; 3) inclusion of PM condensables that were not included in 2002; 4) more {or less} facilities in 2002 inventory than in 2007 inventory; 5) new sources that came online between 2002 and 2007; 6) different fuels used in 2007 than in 2002; 7) industry specific economic growth or contraction between 2002 and 2007; 8) facility or emission unit closures; and 9) errors in 2002 inventory.

Exhibit 7 – 2002 and 2007 Point Source CO Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	185,550	119,409	-36%
Florida	139,045	111,280	-20%
Georgia	140,561	82,547	-41%
Kentucky	122,555	82,553	-33%
Mississippi	59,871	40,294	-33%
North Carolina	64,461	67,127	4%
South Carolina	63,305	60,375	-5%
Tennessee	122,348	50,667	-59%
Virginia	70,688	72,029	2%
West Virginia	100,220	65,230	-35%
SEMAP	**1,068,604**	**751,511**	**-30%**

Exhibit 8 – 2007 Point Source CO Emissions by Category (tons/year)

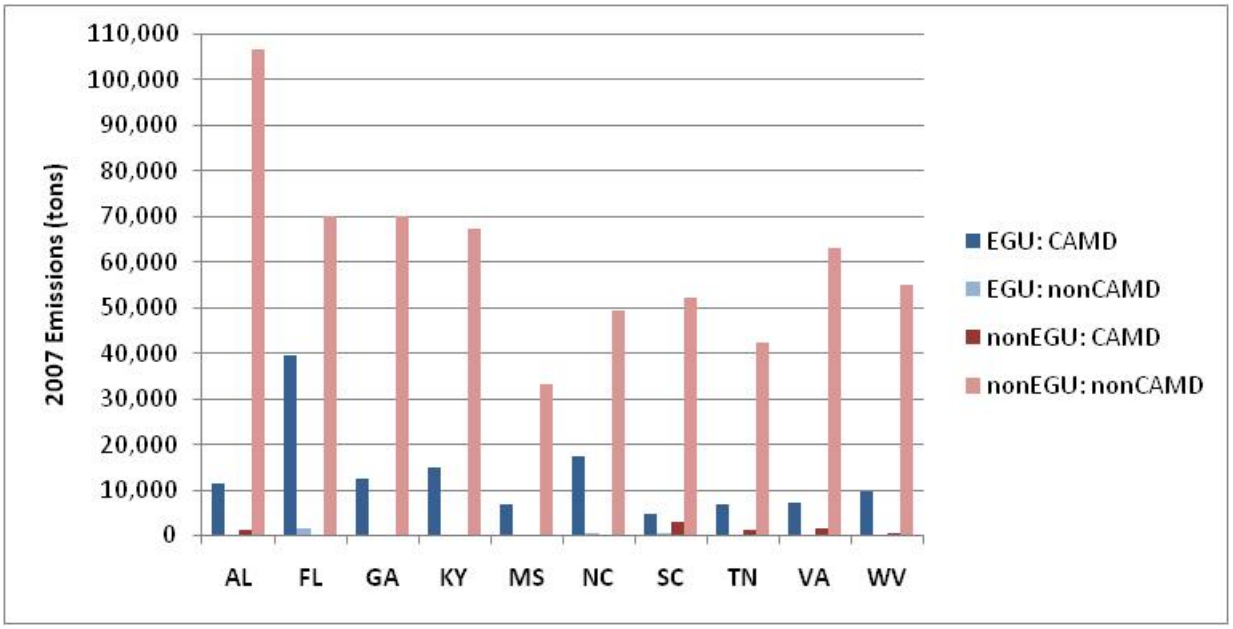


Exhibit 9 – 2002 and 2007 Point Source NH3 Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	2,200	2,191	0%
Florida	1,657	1,661	0%
Georgia	3,697	6,046	64%
Kentucky	1,000	113	-89%
Mississippi	1,359	1,640	21%
North Carolina	1,234	1,706	38%
South Carolina	1,553	1,125	-28%
Tennessee	1,817	1,429	-21%
Virginia	3,230	1,830	-43%
West Virginia	453	366	-19%
SEMAP	**18,200**	**18,107**	**-1%**

Exhibit 10 – 2007 Point Source NH3 Emissions by Category (tons/year)

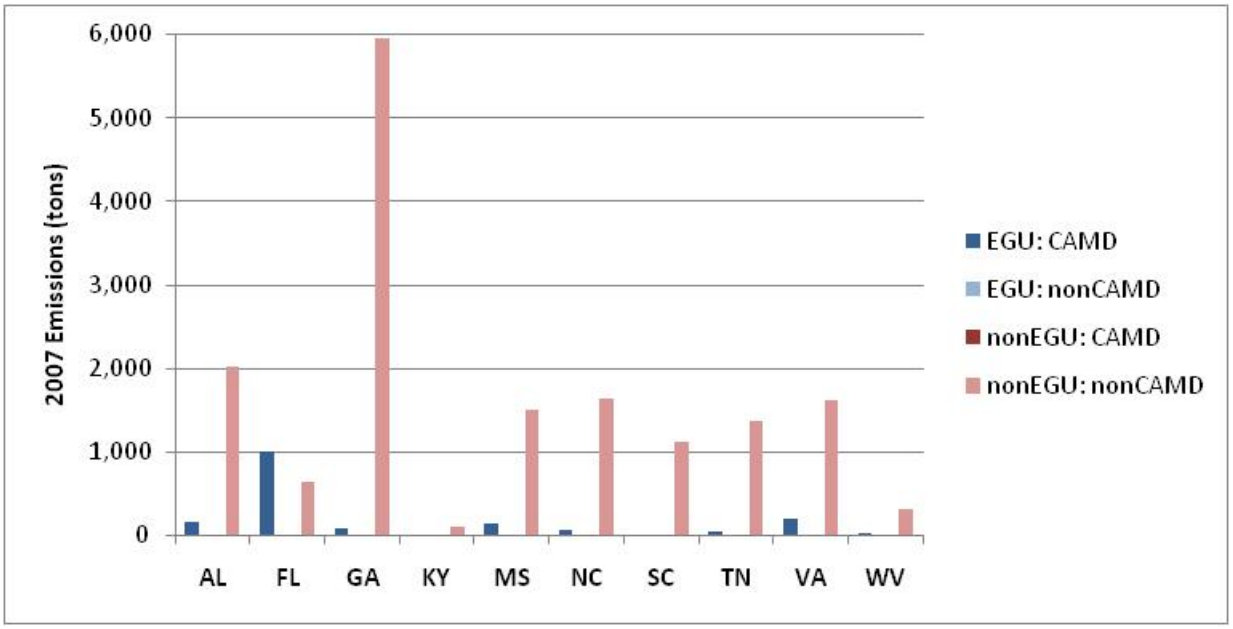


Exhibit 11 – 2002 and 2007 Point Source NOx Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	244,348	196,145	-20%
Florida	302,834	212,294	-30%
Georgia	196,767	154,496	-21%
Kentucky	237,209	208,455	-12%
Mississippi	104,661	98,183	-6%
North Carolina	196,782	100,949	-49%
South Carolina	130,394	81,480	-38%
Tennessee	221,652	144,792	-35%
Virginia	147,300	112,938	-23%
West Virginia	277,589	188,629	-32%
SEMAP	**2,059,536**	**1,498,361**	**-27%**

Exhibit 12 – 2007 Point Source NOx Emissions by Category (tons/year)

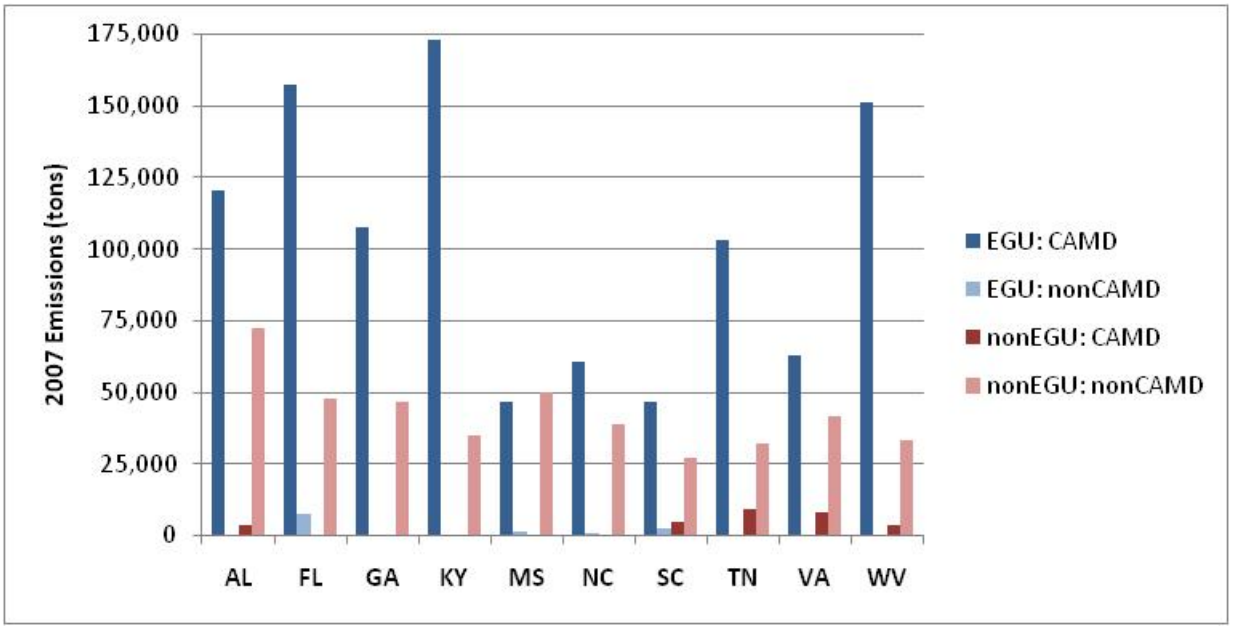


Exhibit 13 – 2002 and 2007 Point Source PM10-PRI Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	32,886	34,800	6%
Florida	57,243	35,796	-37%
Georgia	32,834	33,214	1%
Kentucky	21,326	30,678	44%
Mississippi	21,106	12,368	-41%
North Carolina	36,592	42,991	17%
South Carolina	35,542	30,605	-14%
Tennessee	49,814	27,882	-44%
Virginia	17,211	19,203	12%
West Virginia	22,076	13,736	-38%
SEMAP	**326,630**	**281,273**	**-14%**

Exhibit 14 – 2007 Point Source PM10-PRI Emissions by Category (tons/year)

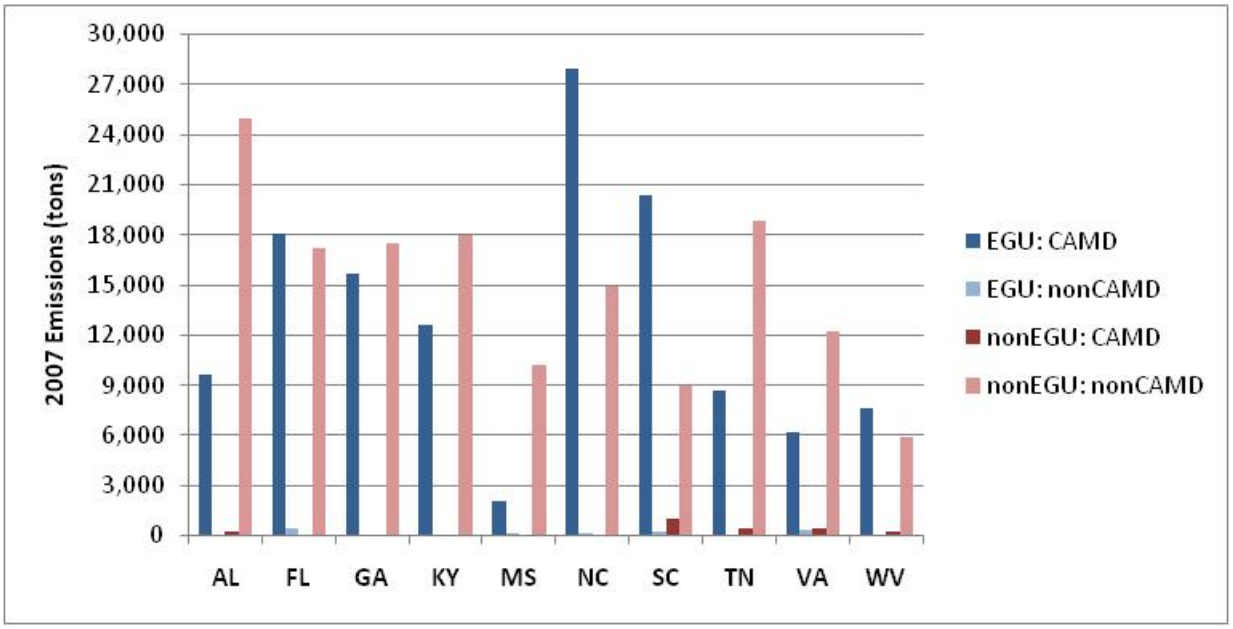


Exhibit 15 – 2002 and 2007 Point Source PM25-PRI Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	23,291	24,953	7%
Florida	46,148	28,418	-38%
Georgia	22,401	25,059	12%
Kentucky	14,173	21,111	49%
Mississippi	11,044	8,731	-21%
North Carolina	26,998	33,441	24%
South Carolina	27,399	23,493	-14%
Tennessee	39,973	22,147	-45%
Virginia	12,771	14,875	16%
West Virginia	15,523	9,173	-41%
SEMAP	**239,721**	**211,401**	**-12%**

Exhibit 16 – 2007 Point Source PM25-PRI Emissions by Category (tons/year)

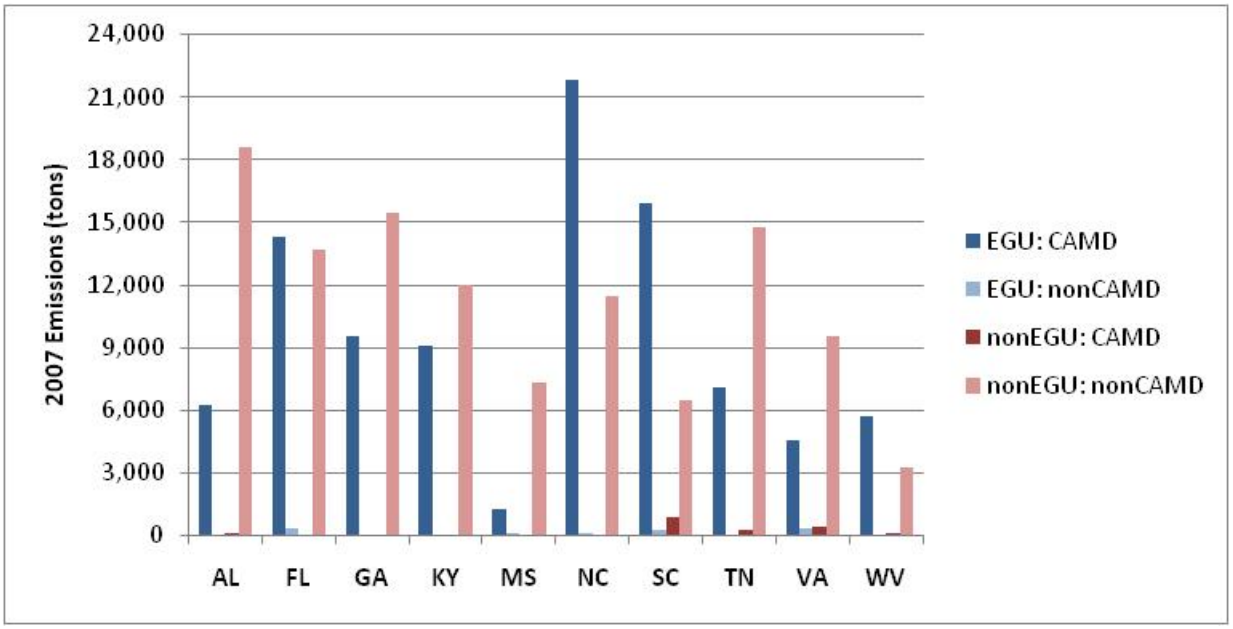


Exhibit 17 – 2002 and 2007 Point Source SO2 Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	544,309	526,664	-3%
Florida	518,721	371,619	-28%
Georgia	568,731	683,370	20%
Kentucky	518,086	433,731	-16%
Mississippi	103,388	94,978	-8%
North Carolina	522,113	420,554	-19%
South Carolina	259,916	216,157	-17%
Tennessee	413,755	287,698	-30%
Virginia	305,106	243,048	-20%
West Virginia	570,153	428,350	-25%
SEMAP	**4,324,278**	**3,706,169**	**-14%**

Exhibit 18 – 2007 Point Source SO2 Emissions by Category (tons/year)

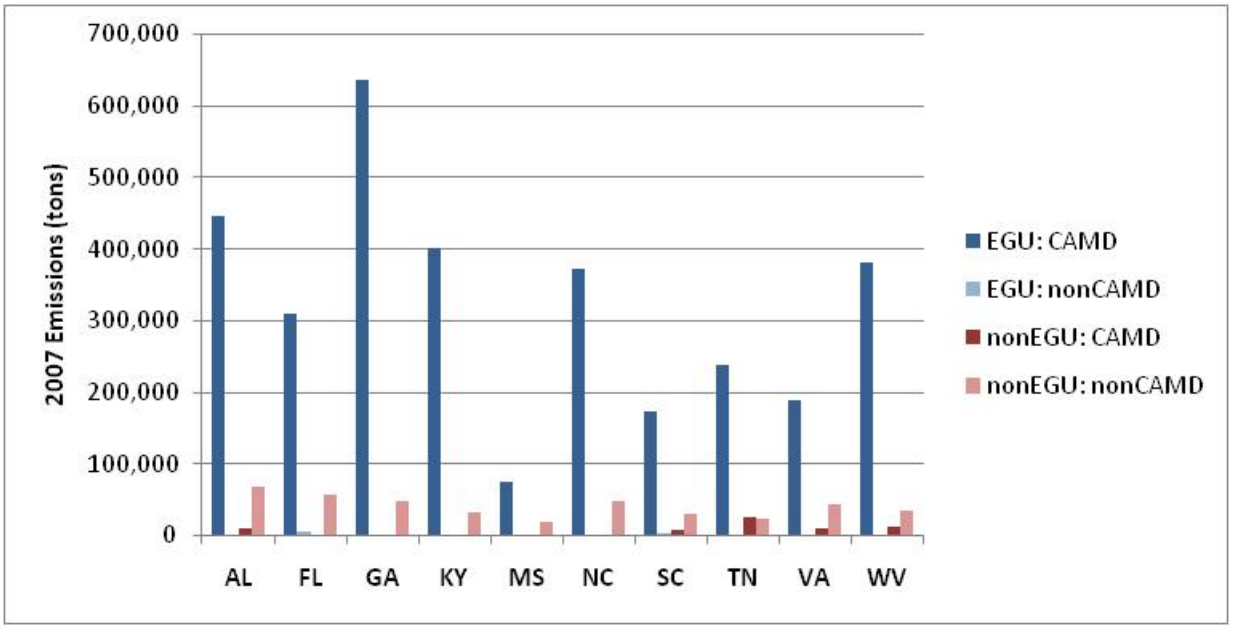
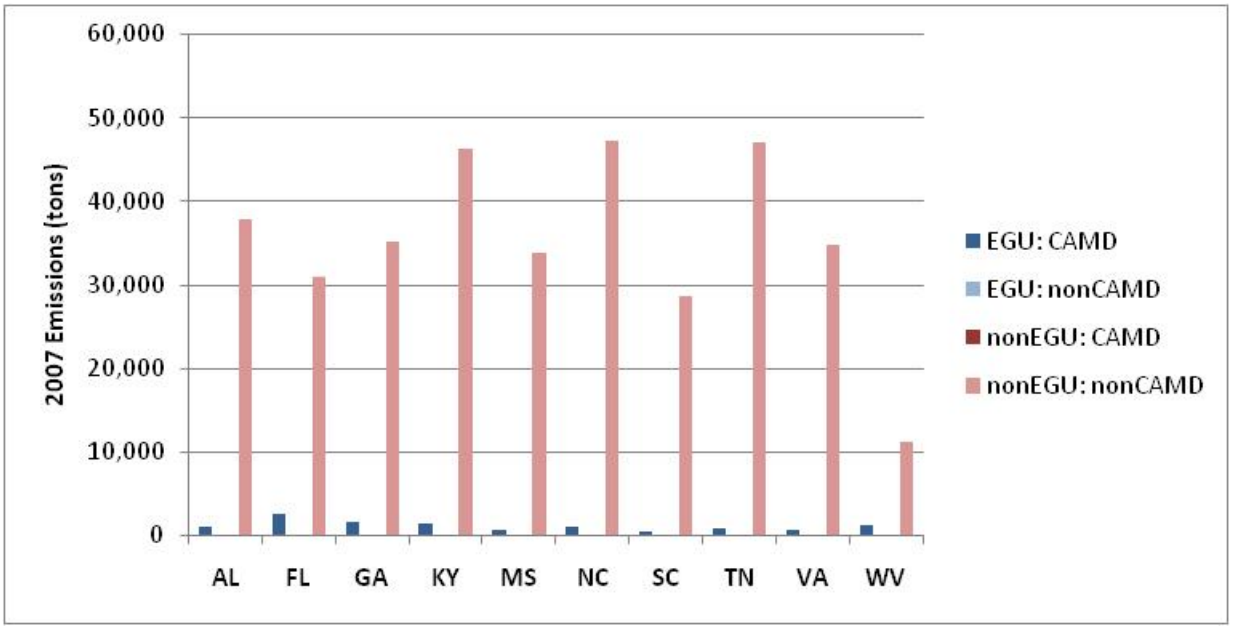


Exhibit 19 – 2002 and 2007 Point Source VOC Emissions by State (tons/year)

STATE	2002	2007	Change
Alabama	49,332	38,881	-21%
Florida	40,995	33,683	-18%
Georgia	34,952	36,717	5%
Kentucky	46,321	47,679	3%
Mississippi	43,852	34,587	-21%
North Carolina	62,170	48,346	-22%
South Carolina	38,927	29,281	-25%
Tennessee	85,254	48,104	-44%
Virginia	43,906	35,618	-19%
West Virginia	15,775	12,503	-21%
SEMAP	**461,484**	**365,399**	**-21%**

Exhibit 20 – 2007 Point Source VOC Emissions by Category (tons/year)



1.11 DATA FILES

These files are accessible on the MARAMA ftp site in the following location:

Address: ftp.mactec.com
Login ID: externalclient
Password: sen382
Folder: /OUTGOING/SEMAP_POINT_V_1_8/

Process level summary files containing all data that will be used in modeling:

AL SEMAP 2007 Process V_1_8.xls
FL SEMAP 2007 Process V_1_8.xls
GA SEMAP 2007 Process V_1_8.xls
KY SEMAP 2007 Process V_1_8.xls
MS SEMAP 2007 Process V_1_8.xls
NC SEMAP 2007 Process V_1_8.xls
SC SEMAP 2007 Process V_1_8.xls
TN SEMAP 2007 Process V_1_8.xls
VA SEMAP 2007 Process V_1_8.xls
WV SEMAP 2007 Process V_1_8.xls

NIF 3.0 ACCESS Database with the 8 NIF tables:

SEMAP 2007 Point NIF V_1_8.mdb

NIF 3.0 ASCII delimited text files of the 8 NIF tables:

SEMAP 2007 PTTR V_1_8.txt
SEMAP 2007 PTSI V_1_8.txt
SEMAP 2007 PTER V_1_8.txt
SEMAP 2007 PTEU V_1_8.txt
SEMAP 2007 PTEP V_1_8.txt
SEMAP 2007 PTPE V_1_8.txt
SEMAP 2007 PTCE V_1_8.txt
SEMAP 2007 PTEM V_1_8.txt

Annual point source files in SMOKE ORL format are being prepared under SEMAP's emission modeling contract.

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