Documentation for the Final 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia, Area Sources

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ACRONYMS

ARB	Air Resources Board
BACM	best available control measure
BEIS	Biogenic Emission Inventory System
BELD	Biogenic Emissions Land cover Database
BIA	Bureau of Indian Affairs
BLS	Bureau of Labor Statistics
CHIEF	Clearinghouse for Inventories and Emission Factors
CO	carbon monoxide
CON	condensible
CTIC	Conservation Technology Information Center
D&B	Dun & Bradstreet
DOC	Department of Commerce
DOE	Department of Energy
DOI	Department of the Interior
EFIG	Emission Factor and Inventory Group
EIA	Energy Information Administration
EIIP	Emission Inventory Improvement Program
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FIL	filterable
FIPS	Federal Information Processing Standards
FIRE	Factor Information Retrieval
FTP	File Transfer Protocol
HAPs	hazardous air pollutants
HC	hydrocarbon
LPG	liquified petroleum gas
MSW	municipal solid waste
NAPAP	National Acid Precipitation Assessment Program
NCDOT	North Carolina Department of Transportation
NEC	not elsewhere classified
NEI	National Emissions Inventory
NFDC	National Fire Data Center
NIF	NEI Input Format
NIFC	National Interagency Fire Center
NMOC	nonmethane organic compounds
NOX	oxides of nitrogen
NTI	National Toxics Inventory
OSD	ozone season day
PE	precipitation-evaporation
PM	particulate matter

ACRONYMS (continued)

PM10	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers in diameter
PM2.5	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers in diameter
PRI	primary
QA	quality assurance
QC	quality control
RWC	Residential Wood Combustion
S/L/T	State/Local/Tribal
SCC	Source Classification Code
SIC	standard industrial classification
SO2	sulfur dioxide
SOX	oxides of sulfur
TAFF	temporal allocation factor file
TOG	total organic gases
tpy	tons per year
TVA	Tennessee Valley Authority
U.S.	United States
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
VMT	vehicle miles traveled
VOC	volatile organic compound

A. WHAT IS THE PURPOSE OF THIS DOCUMENT?

This document summarizes the procedures the United States (U.S.) Environmental Protection Agency (EPA) used in developing Final and final Version 3 of the 1999 National Emission Inventory (NEI) and incorporating State/Local/Tribal (S/L/T) agency-submitted area source data. For S/L/T agencies that did not submit an inventory for Final Version 3 of the NEI, in general, emissions data from final Version 2 of the 1999 NEI are used in Final Version 3. However, for Final Version 3, EPA replaced S/L/T annual emissions data for all States with a new 1999 inventory EPA prepared for the residential fossil fuel combustion categories. Note that for the Final, EPA removed all previous annual emissions from residential fossil fuel combustion and used our own estimates. Also, note that EPA applied new wildfire and prescribed burning estimates for the final version of the NEI; however, this data only replaced EPA-generated data and not existing state data.

B. WHO SUBMITTED AREA SOURCE INVENTORIES TO EPA?

Table 1 and Table 2 identifies the agencies that submitted 1999 area source inventories for the criteria air pollutants. These tables also provide information on the geographic and pollutant coverage of each inventory, provides the number of unique source classification codes (SCCs) for which criteria pollutant or ammonia (NH3) emissions data were included in each inventory, and identifies States that previously submitted a 1999 inventory that has been included in final Version 2 of the NEI. All of the inventories were submitted to EPA in NEI Input Format (NIF) 2.0.

C. WHAT IS EPA'S POLICY FOR ACCEPTING STATE/LOCAL/TRIBAL DATA?

EPA preferentially uses S/L/T area source data in the NEI.

D. WHAT DID EPA DO WITH THE STATE/LOCAL/TRIBAL DATA?

Upon receipt of each inventory, EPA ran its quality control/quality assurance (QC/QA) program on the inventory to identify format errors, missing data required in mandatory fields, duplicate records, and other referential integrity problems. EPA contacted the S/L/T agencies to resolve many of these issues in the Access database submittals. Then the S/L/T inventories were loaded into EPA's Oracle database, and combined into a single data set in NIF 3.0. The following procedures were then applied to the S/L/T inventories prior to merging the NEI into the S/L/T inventories to fill data gaps.

1. Removed all non-criteria pollutant emissions from Emission table and associated parent and child records from other tables. Also removed all nonroad source categories from area source inventories except for the paved and unpaved roads, unpaved air strips, and aircraft refueling source categories. The following States included nonroad source categories in the Final submissions that were removed: Maine, Michigan, Oregon, and Virginia.

2. Changed Pollutant Codes as follows: oxides of sulfur (SOX) to sulfur dioxide (SO2); nonmethane organic compounds (NMOC), hydrocarbon (HC), or total organic gases (TOG) to volatile organic compounds (VOC); Chemical Abstract Number 7439921 to NH3; and made all other pollutant

codes upper case. In the NEI, VOC and SO2 are used exclusively, and all pollutants are upper case. If an agency provided NMOC, HC, or TOG emissions for the same data key (excluding the pollutant code) for which it provided VOC emissions, the NMOC, HC, or TOG emissions were removed from the NEI. Otherwise, the NMOC, HC, or TOG codes

Table 1. Summary of State/Local/Tribal Area Source Final Inventories for the Criteria Air Pollutants

State	NIF Version	Geographic Coverage[1]	Number of Counties in Inventory	Number of Counties in State	Criteria Pollutants in Inventory	Number of SCCs[2]	Submitted Version 2?
Connecticut	2.0	Statewide	8	8	CO, NOx, VOC	57	No
Delaware	2.0	Statewide	3	3	CO, NOX, VOC	67	No
Georgia	2.0	Partial State	13	159	CO, NOX, VOC	65	No
Idaho	2.0	Statewide	44	44	CO, NH3, NOX, PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, PM-CON, PM-FIL, PM-PRI, SO2, SOX, VOC	170	No
Maine	2.0	Statewide	16	16	CO, NOX, VOC	51	Yes for VOC, NOX, CO ozone season day (OSD)
Michigan	2.0	Statewide	83	83	CO, NMOC, NOX, PM10-FIL, PM10-PRI, PM-FIL, PM-PRI, SO2, SOX, VOC	40	Yes
Mississippi	2.0	Statewide	82	82	CO, NOX, PM10-PRI, SOX, VOC	2[3]	No
Oregon	2.0	Statewide, except for Washington County	35	36	CO, HC, NMOC, NOX, PM10-PRI, PM25-PRI, PM-CON, PM-FIL, PM-PRI, SOX, TOG, VOC, 7664417	134	No
New Hampshire	2.0	Statewide	10	10	CO, NOX, VOC	20	No
Rhode Island	2.0	Statewide	5	5	CO, NOX, VOC	19	No
Tennessee - Davidson Co. (County FIPS 037)	2.0	Local	1	95	CO, NOX, PM10-PRI, SO2, VOC	17	No
Texas	2.0	Partial State	29	254	CO, NOX, VOC	96	Yes
Virginia	2.0	Statewide	136[4]	135	CO, NOX, VOC	88	No
Vermont	2.0	Statewide	14	14	CO, NOX, PM10-FIL, PM25-FIL, SOX, VOC	6	No
Wisconsin	2.0	Statewide	72	72	CO, NOX, PM10-FIL, PM-FIL, SO2, VOC	56	Yes

[1] Statewide means the inventory was submitted by the State rather than a Local or Tribal agency. It does not mean that the inventory contains data for all counties in a State. Thus, a statewide inventory may exclude counties for which the Local agency prepares its own inventory for the National Emission Inventory (NEI).

[2] Number of Source Classification Codes (SCCs) with annual emissions.

[3] The two SCCs are for residential wood combustion (RWC)

[4] Virginia's inventory contained an independent city code for South Boston which is no longer valid. Emissions for South Boston were combined with Halifax County emissions in Version 3 of the NEI.

Table 2. Summary of State/Local/Tribal Area Source Final Inventories for the Criteria Air Pollutants

State	NIF Version	Geographic Coverage[1]	Number of Counties in Inventory	Number of Counties in State	Criteria Pollutants in Inventory	Number of SCCs[2]	Submitted Version 2?
Arizona- Bishop Pauite[3]	2.0	Tribal=ITEP 433	1		PM10-PRI	7	No
Idaho	2.0	Statewide	44	44	PM10-PRI	3	No
Kansas	2.0	Statewide	3		CO, NOX, VOC	72	
Michigan	2.0	Statewide	83	83	PM10-FIL, PM10-PRI, PM25-PRI, PM-PRI, PM-FIL, VOC	22	Yes
Minnesota	2.0	Statewide	87	87	CO, NH3, NOX, PM10-PRI, PM25-PRI, PM-PRI, SO2, VOC	15	
Oklahoma	2.0	Statewide	77		CO, NH3, NOX, SO2, VOC, PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, PM-CON	112	
New Hampshire	2.0	Statewide	10	10	CO, NOX, SO2, VOC, PM10-FIL, PM10-PRI, PM25-PRI, PM25-FIL, PM-CON	17	
New Mexico - Pueblo of Acoma	2.0	Tribal	1	1	CO, NOX, PM10-PRI, SO2, SOX, VOC	7	
Rhode Island	2.0	Statewide	5	5	CO, NH3, NOX, SO2, VOC, PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, PM-CON	19	
West Virginia	2.0	Statewide	55		CO, NOX, PM10-FIL, PM-FIL, SO2, VOC	24	

[1] Statewide means the inventory was submitted by the State rather than a Local or Tribal agency. It does not mean that the inventory contains data for all counties in a State. Thus, a statewide inventory may exclude counties for which the Local agency prepares its own inventory for the National Emission Inventory (NEI).

[2] Number of Source Classification Codes (SCCs) with annual emissions.

[2] Due to potential double counting, tribal inventories were not used for the area source inventory.

were changed to VOC. The routines for merging Version 2 of the NEI with S/L/T data in the Emission and Control Equipment tables match on the data key for the tables which include Pollutant Code. Where records matched on the data key, S/L/T data were used. The changes to the pollutant codes were made to avoid inserting NEI records that would otherwise double count emissions. In addition, the pollutant codes need to be consistent to generate reports of national emissions or by State.

3. Identified and analyzed referential integrity issues (i.e., orphan and widow [childless parent] records). Corrected issues with mandatory field data to reduce referential integrity issues. Then resolved remaining issues by adding parent records for orphans and adding the minimum required data to make the record valid. Widow records were removed from the tables, and stored in a separate file.

A final analysis was conducted to confirm compliance with referential integrity. Additionally, for the final inventory submissions QA was performed to ensure compliance with submittal flag rules. In general, submittal flag issues were resolved as follows. If a record was coded with a submittal flag of "A" (add), but the record existed in the inventory, the submittal flag was altered to "RA". If the submittal flag was coded as "RA" but the record did not exist in the inventory, the submittal flag was recoded to "A". If records within a table were coded "A" and "D" by key values, these were changed to "RA" and "RD" as appropriate. If duplicates were found, and the record was a true duplicate (all fields were equal), the first record added to the inventory is kept. If it is an emission record, the record with the higher emission value is kept.

4. Ran additional routines to identify remaining QA issues. Corrections to QA issues were coordinated with the S/L/T agencies when necessary.

E. HOW DO I FIND AND REVIEW MY DATA

Final Version 3 of the 1999 NEI is available on EPA's File Transfer Protocol (FTP) server (ftp://ftp.epa.gov/EmisInventory/finalnei99ver3/criteria/). The inventory is provided in NIF 3.0 in a separate Access97 database for each State. The EPA will accept comments if a S/L/T agency comments on these files and if the submittal flag is used to communicate the comments. The EPA will be providing examples of how to use the submittal flags to prepare comments on your inventory. Note that EPA converted all emissions in S/L/T inventory submittals to "TON" in order to facilitate QA and generation of emission summaries. In the Access97 databases, the units of the emissions are now reported as "TON" for all S/L/T agency inventories.

EPA entered a flag in the first blank field of the Emission table to identify the source of the emission records included in your inventory. The flags are defined as follows:

Code	Definition
S	State data
L	Local data
R	Tribal data
E	EPA NEI data
E-R	EPA NEI rollup data
AUG-A	Particulate Matter (PM) Augmented Emissions: Record for PM with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10) or 2.5 micrometers (PM25) emissions were updated or added using individually determined updates
AUG-C	PM Augmented Emissions: Record added for PM10/PM25 emissions estimated using the PM Calculator
AUG-R	PM Augmented Emissions: Record added for PM10/PM25 emissions estimated using ratios of PM10-to-PM or PM25-to-PM10

EPA has also prepared the following summaries to assist S/L/T agencies in their review:

Summary	File Name
Annual emissions by State, County, and Sector	CountySumCrit_99DV3_0303
Annual emissions by State, County, and SCC	SCC_SumCrit_99DV3_0303
Annual emissions by State, County, and Tier 1, 2, and 3 Categories	TierSumCrit_99DV3_0303

Each of these summaries are in an Access97 database located on EPA's FTP server (ftp://ftp.epa.gov/EmisInventory/).

In addition, for the Final version of the NEI, to assist with merging S/L inventory data with NEI Version 2, EPA prepared summaries using the "reports" feature in Access that compared annual emissions in NEI Version 2 and S/L/T inventories by State, County, SCC, and pollutant initial submittals for Version 3. The EPA has exported these summaries from Access to a "snapshot" view file and has posted these files on its FTP server for use by S/L/T agencies. A "snapshot" file can be opened by clicking on the file name in Windows Explorer (if you have Microsoft Office 2000 and the snapshot viewer has been installed). Use the arrows at the bottom left corner of the view to move from one page to the next. If you do not have the snapshot view it can be downloaded from Microsoft at the following URL: http://support.microsoft.com/default.aspx?scid=kb;en-us;175274.

Two "snapshot" files are provided for each State. One file compares emissions by State, County, SCC, and pollutant (File Name = StateAbbreviation_rptStateCountySCCSummaryof Compare.snp) and the other file compares annual emissions summed by State, SCC, and pollutant (File Name = State Abbreviation_rptStateSCCSummaryofCompare.snp).

In each of the two summaries, the black row at the top of each page shows the State Federal Information Processing Standards (FIPS) code and the pollutant name in the S/L inventory. The second level of rows are colored blue for SCCs that occur in Version 2 only, gray for SCCs that occur in both Versions 2 and 3, and yellow for SCCs that occur in Version 3 only. The number 1 on these colored rows show the number of times the SCC occurs in the Version 1 and 2 inventories, and the "Y" means the SCC is a valid SCC in EPA's master SCC list, and an "N" means the SCC is not in EPA's mater list or is in EPA's master list but has been inactivated. The colored rows also provide the SCC description. The clear rows under each colored row show the following items:

First Column: Two letters (M for match and R for no match) are used to show if a record in the S/L inventory electronically matched a record in Version 2 using the data key for the Emission table (i.e., records match on State and county FIPS, SCC, pollutant, start date, end date, and emissions type).
Second Column: State FIPS code
Third Column: County FIPS code in the county-level summary; or the number of counties in which the SCC occurs in the State-level summary
Fourth Column: Number of counties with the SCC
Fifth Column: SCC

Sixth Column: NEI Version number 2 or 3
Remaining Columns: Annual emissions by pollutant

For records flagged with an "M", S/L data replaced Version 2 data. The records flagged with "R" were manually reviewed to determine if there is a source category match between Version 2 and Version 3. In many cases a S/L agency used a general SCC and Version 2 of the NEI used more than one specific SCC for the same source category (e.g., residential wood combustion). Appendix A documents for each S/L agency how EPA merged the S/L data with Version 2 data to avoid double counting of emissions by pollutant. Note that Version 2 does not contain any data for the Tribal inventories incorporated into Version 3; therefore, Tribal it was not necessary to perform this analysis for the Tribal inventories. In addition, only the county-level "snapshot" file was prepared for Local agency inventories.

F. HOW DID EPA MERGE THE 1999 NEI VERSION 2.0 AND STATE/LOCAL/TRIBAL INVENTORIES?

The following explains the steps EPA followed in priority order to merge Version 2 of the 1999 NEI with S/L/T inventories.

1. If there was a match on SCC, EPA replaced records in NEI Version 2 with S/L/T inventory records matching on the NIF 2.0 data key (i.e., State and county FIPS code, SCC, pollutant code, start date, end date, and emission type) for each table.

2. If for a given area source category, S/L/T agencies used SCCs that are different from the SCCs used in NEI Version 2, then EPA manually compared S/L/T inventories to NEI Version 2 to identify these cases, and replaced the NEI emissions data with the S/L/T data. These cases are documented for each State in Appendix A. In addition, Appendix A identifies cases needing further review and comment by the S/L/T agency.

3. For SCCs for which a S/L/T agency submitted emissions for some but not all of the criteria air pollutants, EPA incorporated NEI Version 2 emissions for the missing pollutants. For example, if a State supplied only VOC, NOX, and carbon monoxide (CO) emissions for an industrial fuel combustion category, while NEI Version 2 also contained SO2 and PM-related pollutant emissions, EPA incorporated the State's VOC, NOX, and CO emissions and the Version 2 SO2 and PM-related pollutant emissions into the Final NEI Version 3. Note that in cases where S/L/T emissions for all pollutants were reported as zero, while Version 2 reported emissions for pollutants that were not included in the S/L/T submittal, EPA set these pollutants emissions to zero. Also note that in cases where the S/L/T supplied some but not all PM-related pollutants, EPA did not supplement the S/L/T agency's PM-related pollutant emissions with PM-related pollutant emissions from NEI Version 2. Instead, EPA calculated the other PM-related pollutant emissions using the State's reported PM emissions as input to the augmentation procedures described in section I of this report.

Note that for SCCs for which Version 3 is a combination of S/L/T agency-supplied pollutant estimates and EPA-supplied pollutant estimates originating from final Version 2 of the NEI, and the S/L/T agency-supplied pollutant estimates are all zero, emission estimates for pollutants originating from final Version 2 were also set to zero. For the final version 3 the S/L/T agencies were to have reviewed these SCCs and emissions estimates for consistency and submit comments. As a revision for the final Version 3, if all pollutants for an State/County/SCC combination are zero the following fields will be set to zero:

WINTER_THROUGHPUT_PCT
SPRING_THROUGHPUT_PCT
SUMMER_THROUGHPUT_PCT
FALL_THROUGHPUT_PCT
ANNUAL_AVG_DAYS_PER_WEEK
ANNUAL_AVG_WEEKS_PER_YEAR
ANNUAL_AVG_HOURS_PER_DAY
ANNUAL_AVG_HOURS_PER_YEAR
ACTUAL_THROUGHPUT
THROUGHPUT_UNIT_NUMERATOR

PERIOD_DAYS_PER_WEEK
PERIOD_WEEKS_PER_PERIOD
PERIOD_HOURS_PER_DAY
PERIOD_HOURS_PER_PERIOD

4. Merge procedures for RWC

Several S/L/T inventories included emissions for the RWC area source category for SCCs that did not match directly with the seven SCCs EPA used to prepare emissions for the NEI. The SCCs for which RWC emissions are reported in the NEI using EPA's methodology (see Appendix B) are as follows:

2104008001 (Fireplaces);
2104008002 (Fireplaces: Inserts; non-EPA certified);
2104008003 (Fireplaces: Inserts; non-catalytic, EPA certified);
2104008004 (Fireplaces: Inserts; catalytic, EPA certified);
2104008010 (Woodstoves: General);
2104008030 (Catalytic Woodstoves: General); and
2104008050 (Non-catalytic Woodstoves: General).

The EPA applied the following assumptions to determine when to merge NEI emissions into a S/L/T inventory. You should be aware that three SCCs used in the NEI (i.e., 2104008002, 2104008003, and 2104008004) are new SCCs that may not have been included in the master SCC reference file used by EPA's QC/QA program for NIF 2.0. If you run this program on your inventory, ignore error output indicating that these SCCs are invalid. EPA will eventually revise the QA program to add these SCCs to the master reference file.

a. Because tests have shown that virtually all of the particles emitted from RWC are less than 2.5 microns, EPA assumes PM10-PRI and PM25-PRI emissions are equal. Most S/L/T agencies provided emissions for one but not the other pollutant. The EPA added records to the Emission and Emission Period tables for either PM25-PRI or PM10-PRI if one of these pollutants was not provided in a S/L/T inventory. The emissions for the added records were set equal to the emissions for the records supplied by the S/L/T agency.

b. For a S/L/T that provided emissions for only SCC 2104008000 (Total: Woodstoves and Fireplaces), it was assumed that the S/L/T emissions accounted for RWC emissions for all sources. NEI emissions for fireplaces and woodstoves were merged into a S/L/T inventory if there was no match on County, Pollutant Code, and Emission Type (i.e., annual or OSD).

c. For a S/L/T that provided emissions for only SCC 2104008001 (Fireplaces), it was assumed that the S/L/T emissions accounted for all types of fireplaces. NEI emissions for fireplaces were merged into a S/L/T's inventory if there was no match on County, Pollutant Code, and Emission Type (i.e., annual or OSD).

d. For a S/L/T that provided emissions for only SCC 2104008010 (Woodstoves: General), it was assumed that the S/L/T emissions accounted for all types of woodstoves. NEI emissions for woodstoves were merged into a S/L/T inventory if there was no match on County, Pollutant Code, and Emission Type (i.e., annual or OSD).

e. For a S/L/T that provided emissions for SCCs 2104008051 (Non-catalytic Woodstoves: Conventional), 2104008052 (Non-catalytic Woodstoves: Low Emitting), and 2104008053 (Non-catalytic Woodstoves: Pellet Fired), the emissions provided for these SCCs were used instead of NEI emissions for SCC 2104008050 except where the S/L/T emissions did not match with the NEI emissions on County, Pollutant Code, and Emission Type (i.e., annual or OSD).

G. HOW DID EPA MERGE ITS NEW INVENTORY FOR RESIDENTIAL FOSSIL FUEL COMBUSTION CATEGORIES WITH STATE/LOCAL/TRIBAL INVENTORIES?

For the residential fossil fuel combustion area source categories, the Emission Inventory Improvement Program (EIIP) developed new annual emission estimates for VOC, NOX, CO, SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON. The new emissions data are classified under the following SCCs:

2104001000 (Anthracite Coal/Total: All Combustor Types);
2104002000 (Bituminous/Subbituminous Coal/Total: All Combustor Types);
2104004000 (Distillate Oil/Total: All Combustor Types);
2104006000 (Natural Gas/Total: All Combustor Types);
2104007000 (Liquified petroleum gas (LPG)/Total: All Combustor Types); and
2104011000 (Kerosene/Total: All Combustor Types)

The new methodology is described in detail in Appendix C. In summary, the new methodology takes state-level residential fuel consumption data from the U.S. Department of Energy (DOE) Energy Information Administration (EIA) and allocates the consumption to the county level by using Census Bureau statistics on the number of houses in each county using each fuel as their primary fuel. Emissions are then calculated by using the allocated county-level fuel use and a nationally-consistent set of emission factors derived from AP-42 (see Tables 2 and 3). The DOE/EIA fuel consumption and Census Bureau housing statistics data used for this inventory development are provided in a separate Excel Workbook file named "Resid_Fuel_NEIdr_v3.xls".

The EIIP developed this new inventory because analysis of the emissions data for these categories in the NEI indicated that methods for estimating and reporting residential fossil fuel combustion emissions to the NEI are inconsistent among States due to discrepancies in the emission factors, reported emissions, and the amount of documentation provided in the NEI submittals. Therefore, EIIP prepared the inventory using a consistent methodology for estimating these emissions among all States, showing county activity levels, emission factors, and fuel sulfur and ash contents in the NIF records. The methodology used, including the emission factor selection, DOE State-level fuel consumption, fuel parameters, and the county-level allocation method, were reviewed by the approximately ten State and local air agency representatives comprising the EIIP Area Source Committee during the Summer of 2002. The resulting annual county-level emission records, the comparison to Version 2 final and State-submitted Version 3 data, and the procedure to substitute these records into the existing NEI Version 2 have not yet been reviewed by State and local agencies.

To create Final Version 3 of the NEI, EPA first removed the annual emissions data, including S/L/T data, from the final Version 2 NEI for the six SCCs listed above for all States, except for SCC 2104006000 in California. California's records for this SCC were not removed and replaced because California has reported emissions from residential natural gas consumption under two separate SCCs (2104006000 and 2104006010), believed to be for heating furnaces versus cooking/hot water heating sources. Both SCCs were retained for California. In addition, Version 3 State submittals for the six SCCs (and 2104006010 for Idaho) were not processed. Any Version 3 State submittals for residual oil (2104005000) were processed, and existing Version 2 records for that SCC also remain in Final Version 3.

Annual emissions data records that were removed from Version 2 include parent and child records with Emission Type = 30, AND Start Date = 19990101, AND End Date = 19991231. S/L/T emissions data for daily and seasonal emissions for these SCCs were retained in Final Version 3 of the NEI. In addition, annual emissions associated with SCCs starting with 2199 included in S/L/T inventories have been retained in Final Version 3 of the NEI. SCCs starting with 2199 are general SCCs that account for total fuel combustion across the industrial, commercial/institutional, and residential sectors.

If states provided incompatible values for PM data (for example PM25-PRI greater than PM10-PRI), in general the PM10-PRI (or -FIL as available) value was used unless specific instructions were obtained from the states.

PM Category	Description
PM-PRI	Primary PM (includes filterables and condensibles)
PM-CON	Primary PM, Condensible Portion Only (all less than 1 micron)
PM-FIL	Primary PM, Filterable Portion Only
PM10-PRI	Primary PM10 (includes filterables and condensibles)
PM10-FIL	Primary PM10, Filterable Portion Only
PM25-PRI	Primary PM25 (includes filterables and condensibles)
PM25-FIL	Primary PM25, Filterable Portion Only

The following documents the methods for augmenting the area source NEI with PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL and PM-CON emissions. First, S/L/T inventories were reviewed to identify QA issues with PM-related pollutant emissions, and the QA issues were resolved. Then the methods for gap-filling PM-related pollutant emissions missing from S/L/T inventories were applied. The methods are different for sources that have only filterable emissions versus sources that have condensible and filterable or only condensible. The following documents the QA issues identified and resolved in S/L/T inventories prior to applying the augmentation procedures, the procedures for estimating emissions for sources that have only filterable emissions, and the procedures for estimating emissions for sources that also have condensible emissions.

1. Resolution of QA Issues Identified for PM-Related Pollutants in S/L/T Inventories

If state inventories contained inconsistent emissions (e.g., PM25>PM10 or PM10>PM), they were contacted and provided corrections to resolve the inconsistencies prior to applying the augmentation procedures.

All PM-PRI and PM-FIL records were removed from the input file for the PM augmentation procedure if an emission source had any form of PM10, PM25, or PM-CON. PM-CON records with emissions greater

than zero were used in the PM augmentation procedure. PM-CON records with null or zero emissions were removed.

2. Methods for Sources of Only Filterable Emissions

Ratios of emission factors from the Factor Information Retrieval (FIRE) system, AP-42, speciation profiles, and S/L/T emissions data were developed and applied to SCCs that have only filterable emissions. The ratios were developed and applied to S/L/T emissions to estimate emissions for the PM-related pollutants missing from S/L/T inventories. Table 4 identifies the SCCs for which the ratio method was applied and documents the sources of the data used to prepare the ratios.

3. Methods for Sources of Condensible Emissions

After reviewing the AP-42 and FIRE emission factors for area sources of condensibles, it was determined that emission factors were not available to develop ratios to calculate condensible emissions from the various forms of PM emissions included in S/L/T inventories. Therefore, the SCCs were mapped to similar point source SCCs for which the PM Calculator was used to estimate filterable emissions, and for which a factor was available for estimating PM-CON from PM10-FIL emissions. Table 5 identifies the area source SCCs for which PM-CON emissions were calculated and the point source SCCs to which they were mapped. For the area source SCCs identified in Table 5, the procedures and databases documented in the PM augmentation procedures for point sources were applied to estimate PM emissions. The procedures include the following five steps:

Step 1: Prepare S/L/T PM and PM10 Emissions for Input to the PM Calculator
Step 2: Develop and Apply Source-Specific Conversion Factors
Step 3: Prepare Factors from PM Calculator
Step 4: Develop and Apply Algorithms to Estimate Emissions from S/L/T Inventory Data
Step 5: Review Results and Update the NEI with Emission Estimates and Control Information

The reader is referred to a detailed discussion of these steps in Appendix C to the point source documentation for Final Version 3 of the 1999 NEI.

Table 3. Area Source PM Augmentation Procedure Factors

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
Mobile Sources								
2275085000	Aircraft	Unpaved Airstrips	Total	0.15			Based on ratio of emissions in 1999 NEI V1.5	2
2294000000	Paved Roads	All Paved Roads	Total: Fugitives	0.25			Based on ratio of emissions in 1999 NEI V1.5	2
2296000000	Unpaved Roads	All Unpaved Roads	Total: Fugitives	0.15			Based on ratio of emissions in 1999 NEI V1.5	2
Industrial Processes								
2301010000	Chemical Manufacturing: SIC 28	Industrial Inorganic Chemical Manufacturing	Total	0.68			Based on ratio of emissions in 1999 NEI V1.5	2
2302000000	Food and Kindred Products: SIC 20	All Processes	Total	0.43			Average of ratios in this table for Bakery Products & Miscellaneous Food and Kindred Products	2
2302050000	Food and Kindred Products: SIC 20	Bakery Products	Total	0.55			Based on ratio of emissions in 1999 NEI V1.5	2
2302080000	Food and Kindred Products: SIC 20	Miscellaneous Food and Kindred Products	Total	0.3			Based on ratio of emissions in 1999 NEI V1.5	2
2304000000	Secondary Metal Production: SIC 33	All Processes	Total	0.5			Engineering judgement; no data in AP-42	2
2305000000	Mineral Processes: SIC 32	All Processes	Total	0.29			Based on ratio of emissions in 1999 NEI V1.5	2
2305070000	Mineral Processes: SIC 32	Concrete, Gypsum, Plaster Products	Total	0.5			Based on ratio of generic particle-size specific PM25 & PM10 emission factors in AP-42 Appendix B.1 for talc pebble mill	2
2305080000	Mineral Processes: SIC 32	Cut Stone and Stone Products	Total	0.2			Based on ratio for construction SCCs starting with 23110	2
2306010000	Petroleum Refining: SIC 29	Asphalt Paving/ Roofing Materials	Total	1	0.4		PM10-FIL to PM-FIL ratio is based on an average ratio calculated from PM-PRI and PM10-PRI emissions MI included in their Version 2 1999 inventory for 9 counties for this SCC. Assumed PM25 and PM10 emissions are equal.	2, 3
2307060000	Wood Products: SIC 24	All Processes	Total	0.75			Based on ratio for SCC 2307060000	2

Table 3 (continued)

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
2307060000	Wood Products: SIC 24	Miscellaneous Wood Products	Total	0.75			Based on ratio of emissions in 1999 NEI V1.5	2
2308000000	Rubber/Plastics: SIC 30	All Processes	Total	0.75			Based on ratio of emissions in 1999 NEI V1.5	2
2310000000	Oil and Gas Production: SIC 13	All Processes	Total: All Processes	1			Ratio calculated from 1999 NEI TX data; TX emissions based on State and local activity data.	2
2310010000	Oil and Gas Production: SIC 13	Crude Petroleum	Total: All Processes	0.55			Based on ratio of emissions in 1999 NEI V1.5	2
2310020000	Oil and Gas Production: SIC 13	Natural Gas	Total: All Processes	1			Assume PM25-FIL = PM10-FIL for natural gas	2
2311000000	Construction: SIC 15 - 17	All Processes	Total	0.2			Ratio based on Commercial & Road Construction factor used for NEI	3
2311000100	Construction: SIC 15 - 17	All Processes	Wind Erosion	0.2			Ratio based on Commercial & Road Construction factor used for NEI	3
2311010000	Construction: SIC 15 - 17	General Building Construction	Total	0.2			Ratio based on Commercial & Road Construction factor used for NEI	2
2311010070	Construction: SIC 15 - 17	General Building Construction	Vehicle Traffic	0.2			Ratio based on Commercial & Road Construction factor in this table	2
2311020000	Construction: SIC 15 - 17	Heavy Construction (Commercial Const.)	Total	0.2			Reference: NEI Procedures Document	2
2311030000	Construction: SIC 15 - 17	Road Construction	Total	0.2			Reference: NEI Procedures Document	2
2325000000	Mining and Quarrying: SIC 14	All Processes	Total	0.2			Reference: NEI Procedures Document	2
2325030000	Mining and Quarrying: SIC 14	Sand and Gravel	Total	0.2			Ratio based on Mining & Quarrying, All Processes ratio in this table	2
2399000000	Industrial Processes: NEC	Industrial Processes: NEC	Total	0.69			Based on ratio of emissions in 1999 NEI V1.5	2
Solvent Utilization								

Table 3 (continued)

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
2461020000	Miscellaneous Non-industrial: Commercial	Asphalt Application: All Processes	Total: All Solvent Types	0.96			Ratio based on California Air Resources Board (ARB) PM10 and PM2.5 particle size distribution profile for area source Asphalt Paving and Asphalt Roofing (see http://www.arb.ca.gov/emisinv/speciate/SCC_ASSIGN_FRACTION_2002_10_25_02.xls)	3
Waste Disposal, Treatment, and Recovery								
2610000100	Open Burning	All Categories	Yard Waste - Leaf Species Unspecified	1	1		Reference: NEI Procedures Document and AP-42	2, 3
2610000300	Open Burning	All Categories	Yard Waste - Weed Species Unspecified (incl Grass)	1	1		Reference: NEI Procedures Document and AP-42	2, 3
2610000400	Open Burning	All Categories	Yard Waste - Brush Species Unspecified	1			Reference: NEI Procedures Document	2
2610000500	Open Burning	All Categories	Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	1			Reference: NEI Procedures Document	2
2610030000	Open Burning	Residential	Household Waste (use 26-10-000-xxx for Yard Wastes)	0.92	0.9825		Reference: NEI Procedures Document for PM25-FIL to PM10-FIL ratio. ARB speciation profile applied to Waste Burning, Non-Agricultural, Open Burning for PM10-FIL to PM-FIL ratio.	2, 3
2620030000	Landfills	Municipal	Total	1	0.7		Based on ratio of emissions in 1999 NEI V1.5 for PM25-FIL to PM10-FIL ratio. ARB speciation profile applied to Solid Waste Disposal, Government, Landfill, Area Method for PM10-FIL to PM-FIL ratio.	2, 3
2630000000	Wastewater Treatment	All Categories	Total Processed	1			Ratio calculated from 1999 NEI State data	2
2630020000	Wastewater Treatment	Public Owned	Total Processed	1			Ratio calculated from 1999 NEI V2.0 Local data	2
Miscellaneous Area Sources								

Table 3 (continued)

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
2801000000	Agriculture Production - Crops	Agriculture - Crops	Total (Cotton Ginning)	0.03			Cotton Ginning Full and Conventional Control Emission Factors	2
2801000001	Agriculture Production - Crops	Agriculture - Crops	Land Breaking	0.2			Based on ratio for SCC 2801000003	2
2801000003	Agriculture Production - Crops	Agriculture - Crops	Tilling	0.2			Reference: NEI Procedures Document	2
2801000005	Agriculture Production - Crops	Agriculture - Crops	Harvesting	0.2			Based on ratio for SCC 2801000003	2
2801000008	Agriculture Production - Crops	Agriculture - Crops	Transport	0.2			Based on ratio for SCC 2801000003	2
2801500000	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Total, all crop types	0.91			Based on factor for structure, wild, and prescribed fires.	2
2801500100	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crops Unspecified	0.91	0.984		See Footnote 1.	2, 3
2801500111	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crop is Alfalfa : Headfire Burning	0.954	0.984		See Footnote 2.	3
2801500130	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crop is Barley: Burning Techniques Not Significant	0.954	0.984		See Footnote 2.	3
2801500170	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crop is Grasses: Burning Techniques Not Important	0.954	0.984		See Footnote 2.	3
2801500191	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crop is Oats: Headfire Burning	0.954	0.984		See Footnote 2.	3
2801500261	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Field Crop is Wheat: Headfire Burning	0.954	0.984		See Footnote 2.	3
2801500300	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop Unspecified	0.943	0.981		See Footnote 3.	3

Table 3 (continued)

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
2801500320	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Apple	0.943	0.981		See Footnote 3.	3
2801500330	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Apricot	0.943	0.981		See Footnote 3.	3
2801500350	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Cherry	0.943	0.981		See Footnote 3.	3
2801500390	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Nectarine	0.943	0.981		See Footnote 3.	3
2801500410	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Peach	0.943	0.981		See Footnote 3.	3
2801500420	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Pear	0.943	0.981		See Footnote 3.	3
2801500430	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	Orchard Crop is Prune	0.943	0.981		See Footnote 3.	3
2805001000	Agriculture Production - Livestock	Beef Cattle Feedlots	Total (also see 2805020000)	0.15			Reference: NEI Procedures Document	2
2810001000	Other Combustion	Forest Wildfires	Total	0.9	1		Reference: NEI Procedures Document and AP-42	2, 3
2810005000	Other Combustion	Managed Burning, Slash (Logging Debris)	Total	0.91			Based on factor for structure, wild, and prescribed fires.	2
2810015000	Other Combustion	Prescribed Burning for Forest Management	Total	0.9			Reference: NEI Procedures Document	2
2810025000	Other Combustion	Charcoal Grilling	Total	0.91	0.7		PM25-FIL to PM10-FIL ratio based on factor for structure fires. PM10-FIL to PM-FIL ratio based on ARB speciation profile applied to Cooking, Commercial, Charbroiling.	2, 3

Table 3 (continued)

Source Classification Code (SCC)	SCC Description			Ratio of PM25-FIL to PM10-FIL	Ratio of PM10-FIL to PM-FIL	Ratio of PM25-PRI to PM10-PRI	Notes	Version of NEI in Which S/L/T Agencies Used SCC
2810030000	Other Combustion	Structure Fires	Total	0.91	1		Reference: NEI Procedures Document and EIIP Chapter 18.	2, 3
2810050000	Other Combustion	Motor Vehicle Fires	Total	0.91	1		Reference: AP-42.	2, 3

[1] In NEI Version 2 for SCC 2801500100, S/L/T agencies provided PM10-FIL emissions; the PM25-FIL to PM10-FIL ratio for NEI Version 2 is based on ratio for SCC 2801500000. For consistency purposes, this same ratio was used in NEI Version 3. For NEI Version 3, some agencies supplied only PM-FIL emissions. The PM10-FIL to PM-FIL ratio for NEI Version 3 is based on an ARB PM size distribution profile for "Waste Burning, Agricultural Debris, Field Crops" (see http://www.arb.ca.gov/emisinv/speciate/SCC_ASSIGN_FRACTION_2002_10_25_02.xls).

[2] Both ratios are based on an ARB PM10 and PM2.5 size distribution profile for "Waste Burning, Agricultural Debris, Field Crops" (see http://www.arb.ca.gov/emisinv/ speciate/SCC_ASSIGN_FRACTION_2002_10_25_02.xls).

[3] Both ratios are based on an ARB PM10 and PM2.5 size distribution profile for "Waste Burning, Agricultural Debris, Prunings" (see http://www.arb.ca.gov/emisinv/ speciate/SCC_ASSIGN_FRACTION_2002_10_25_02.xls).

Table 4. Mapping of Area Source to Point Source SCCs for Calculating Condensible Emissions Using Point Source Emission Factors in the PM Calculator

AREA SCC	SCC3_DESC	SCC6_DESC	SCC8_DESC	POINT SCC	SCC3_DESC	SCC6_DESC	SCC8_DESC
Stationary Source Fuel Combustion				**External Combustion Boilers (SCCs 10xxxxxx) and Internal Combustion Engines (SCCs 20xxxxxx)**			
2101006000	Electric Utility	Natural Gas	Total: Boilers and IC Engines	10100602	Electric Generation	Natural Gas	Boilers <100 Million Btu/hr except Tangential
2102001000	Industrial	Anthracite Coal	Total: All Boiler Types	10200101	Industrial	Anthracite Coal	Pulverized Coal
2102002000	Industrial	Bituminous/Subbituminous Coal	Total: All Boiler Types	10200201	Industrial	Bituminous/ Subbituminous Coal	Pulverized Coal: Wet Bottom
2102004000	Industrial	Distillate Oil	Total: Boilers and IC Engines	10200501	Industrial	Distillate Oil	Grades 1 and 2 Oil
2102005000	Industrial	Residual Oil	Total: All Boiler Types	10200401	Industrial	Residual Oil	Grade 6 Oil
2102006000	Industrial	Natural Gas	Total: Boilers and IC Engines	10200602	Industrial	Natural Gas	10-100 Million Btu/hr
2102006001	Industrial	Natural Gas	All Boiler Types	10200602	Industrial	Natural Gas	10-100 Million Btu/hr
2102006002	Industrial	Natural Gas	All IC Engine Types	20200201	Industrial	Natural Gas	Turbine
2102007000	Industrial	Liquified Petroleum Gas	Total: All Boiler Types	10201001	Industrial	Liquified Petroleum Gas	Butane
2102008000	Industrial	Wood	Total: All Boiler Types	10200901	Industrial	Wood/Bark Waste	Bark-fired Boiler
2102009000	Industrial	Coke	Total: All Boiler Types	10200802	Industrial	Coke	All Boiler Sizes
2102010000	Industrial	Process Gas	Total: All Boiler Types	10200701	Industrial	Process Gas	Petroleum Refinery Gas
2102011000	Industrial	Kerosene	Total: All Boiler Types	20300901	Commercial/ Institutional	Kerosene/ Naphtha (Jet Fuel)	Turbine: JP-4
2103001000	Commercial/ Institutional	Anthracite Coal	Total: All Boiler Types	10300101	Commercial/ Institutional	Anthracite Coal	Pulverized Coal
2103002000	Commercial/ Institutional	Bituminous/ Subbituminous Coal	Total: All Boiler Types	10300203	Commercial/ Institutional	Bituminous/ Subbituminous Coal	Cyclone Furnace (Bituminous Coal)
2103004000	Commercial/Institutional	Distillate Oil	Total: Boilers and IC Engines	10300501	Commercial/ Institutional	Distillate Oil	Grades 1 and 2 Oil
2103005000	Commercial/ Institutional	Residual Oil	Total: All Boiler Types	10300401	Commercial/ Institutional	Residual Oil	Grade 6 Oil
2103006000	Commercial/ Institutional	Natural Gas	Total: Boilers and IC Engines	10300602	Commercial/ Institutional	Natural Gas	10-100 Million Btu/hr
2103007000	Commercial/ Institutional	Liquified Petroleum Gas	Total: All Combustor Types	10301001	Commercial/ Institutional	Liquified Petroleum Gas	Butane
2103007010	Commercial/ Institutional	Liquified Petroleum Gas	Asphalt Kettle Heaters	10301001	Commercial /Institutional	Liquified Petroleum Gas	Butane
2103008000	Commercial/ Institutional	Wood	Total: All Boiler Types	10300901	Commercial/ Institutional	Wood/Bark Waste	Bark-fired Boiler
2103011000	Commercial /Institutional	Kerosene	Total: All Combustor Types	20300901	Commercial/ Institutional	Kerosene/ Naphtha (Jet Fuel)	Turbine: JP-4
2104001000	Residential	Anthracite Coal	Total: All Combustor Types	10300101	Commercial/ Institutional	Anthracite Coal	Pulverized Coal
2104002000	Residential	Bituminous/ Subbituminous Coal	Total: All Combustor Types	10300203	Commercial/ Institutional	Bituminous/ Subbituminous Coal	Cyclone Furnace (Bituminous Coal)
2104004000	Residential	Distillate Oil	Total: All Combustor Types	10300501	Commercial/ Institutional	Distillate Oil	Grades 1 and 2 Oil
2104005000	Residential	Residual Oil	Total: All Combustor Types	10300401	Commercial/ Institutional	Residual Oil	Grade 6 Oil
2104006000	Residential	Natural Gas	Total: All Combustor Types	10300602	Commercial/ Institutional	Natural Gas	10-100 Million Btu/hr
2104006010	Residential	Natural Gas	Residential Furnaces	10300602	Commercial/ Institutional	Natural Gas	10-100 Million Btu/hr
2104007000	Residential	Liquified Petroleum Gas	Total: All Combustor Types	10301001	Commercial/ Institutional	Liquified Petroleum Gas	Butane
2104011000	Residential	Kerosene	Total: All Heater Types	20300901	Commercial/ Institutional	Kerosene/ Naphtha (Jet Fuel)	Turbine: JP-4
2199001000	Total Area Source Fuel Combustion	Anthracite Coal	Total: All Boiler Types	10100101	Electric Generation	Anthracite Coal	Pulverized Coal

Table 4 (continued)

AREA SCC	SCC3_DESC	SCC6_DESC	SCC8_DESC	POINT SCC	SCC3_DESC	SCC6_DESC	SCC8_DESC
2199004000	Total Area Source Fuel Combustion	Distillate Oil	Total: Boilers and IC Engines	10200501	Industrial	Distillate Oil	Grades 1 and 2 Oil
2199004002	Total Area Source Fuel Combustion	Distillate Oil	All IC Engine Types	20100101	Electric Generation	Distillate Oil (Diesel)	Turbine
2199011000	Total Area Source Fuel Combustion	Kerosene	Total: All Heater Types	20100901	Electric Generation	Kerosene/ Naphtha (Jet Fuel)	Turbine
Industrial Processes				**Industrial Processes**			
2302002000	Food and Kindred Products: SIC 20	Commercial Charbroiling	Total	30201311	Food and Agriculture	Meat Smokehouses	Meat Charbroiler
2302003000	Food and Kindred Products: SIC 20	Commercial Deep Fat Frying	Total	30203601	Food and Agriculture	Deep Fat Frying	Continuous Deep Fat Fryer: Potato Chips
Waste Disposal, Treatment, and Recovery				**Waste Disposal**			
2601000000	On-site Incineration	All Categories	Total	50410530	Site Remediation	Thermal Destruction	Combustion Unit
2601010000	On-site Incineration	Industrial	Total	50410530	Site Remediation	Thermal Destruction	Combustion Unit
2601020000	On-site Incineration	Commercial/ Institutional	Total	50410530	Site Remediation	Thermal Destruction	Combustion Unit
Miscellaneous Area Sources				**Industrial Processes**			
2801520000	Agriculture Production - Crops	Orchard Heaters	Total, all fuels	30290001	Food and Agriculture	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
2801520004	Agriculture Production - Crops	Orchard Heaters	Diesel	30290001	Food and Agriculture	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
2801520010	Agriculture Production - Crops	Orchard Heaters	Propane	30290001	Food and Agriculture	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
2801600000	Agriculture Production - Crops	Country Grain Elevators	Total	30200699	Food and Agriculture	Feed and Grain Country Elevators	General

H. DATA ISSUES ADDRESSED

You should review what EPA did to your submittal. Details are in Appendix A.

1. Daily Emissions

For final Version 3, EPA did not add OSD emissions if these emissions data are not provided by S/L/T agencies during the comment period and removed EPA-generated daily records generated for Version 2. Some State inventories contain daily emissions that exceed annual emissions. In these cases, the State-supplied daily emissions but not annual emissions; therefore, the annual emissions record (Data Source Flag = E) from the previous version of the NEI was maintained in Version 3. The States where this issue occurs include CT, ME, MA, PA, RI, TX, UT, VA, and WI.

Source Classification Codes

During preparation of final Version 2 of the NEI, EPA replaced SCCs that are not in or are inactivated in EPA's master list of SCCs with the generic SCC 2999001001. The EPA's current master list of SCCs is located on the Clearinghouse for Inventories and Emission Factors (CHIEF) web site (http://www.epa.gov/ttn/chief/codes/index.html#scc). For final version 3 emissions associated with this SCC were removed or in the case of CA merged with SCC 2465900000.

In order to removed double-counting issues the following SCCs: 2104008050, 2104008010, 2104008004, 2104008003, 2104008002 were removed from the MA inventory.

The SCC 2610000500 was removed from CO inventory.

Units of Measure

Where units of measure were provided that were not consistent with EPA standard units these units were altered as appropriate. Where an appropriate unit could not be found, and if the unit of measure was not mandatory these values were nulled out.

Material Code and Material I/O

Where material information was provided that was not consistent with EPA standard units this information was altered as appropriate. Where an appropriate value was not able to be determined, these values were nulled out.

I. WHERE DO I FIND DOCUMENTATION OF EPA AREA SOURCE METHODOLOGIES?

EPA prepares emissions for several area source categories for the NEI each year using the most current activity and emission factor data available. The categories are:

2294xxxxxx (Paved Road Dust)
2296xxxxxx (Unpaved Road Dust)
2311010000 (Residential Construction)
2311020000 (Non-Residential Construction)
2311030000 (Roadway Construction)
2325000000 (Mining and Quarrying)
2610030000 (Residential Municipal Solid Waste Burning)
2610000100 (Residential Leaf Burning)
2610000400 (Residential Brush Burning)
2610000500 (Land Clearing Debris Burning)
2801000000 (Cotton Ginning)
2801000003 (Agricultural Tilling)
28017xxxxx (Fertilizer Application; 10 SCCs)
2805001000 (Animal Husbandry/Beef Cattle Feedlots)
2805020000 (Animal Husbandry/Cattle and Calves)
2805025000 (Animal Husbandry/Hogs and Pigs)
2805030000 (Animal Husbandry/Poultry)
2805035000 (Animal Husbandry/Horses and Ponies)
2805040000 (Animal Husbandry/Sheep)
2805045001 (Animal Husbandry/Goats)
2810001000 (Wildfires)
2810015000 (Prescribed Burning)
2810030000 (Structure Fires)

If a S/L/T agency did not provide emissions for these categories, the NEI emissions are included in the inventory (i.e., unless emissions are zero). Appendix D and Appendix E provides the methodologies for these categories.

Emissions for other area source categories for which methodologies are not included in Appendix D are grown from the most recent S/L/T inventory submitted to EPA before June 2001. For example, if a S/L/T agency's most recent inventory submittal for a county, SCC, and pollutant was for the 1996 base year, the 1999 NEI emissions are grown from the 1996 inventory. In some cases, emissions may be grown from the 1990 Ozone Transport Assessment Group, 1990 Interim, or 1985 National Air Pollutant Assessment Program inventories. Documentation of S/L/T inventory submittals prior to this year and methods for growing emissions to prepare the 1999 NEI are provided in "Current Methods Used to Estimate Emissions, 1985-1999 Procedures Document for National Emission Inventory, Criteria Air Pollutants 1985-1999," March 2001, EPA-454/R-01-006. This document is available from the following EPA Web Site: http://www.epa.gov/ttn/chief/trends/index.html.

APPENDIX A
DOCUMENTATION OF CHANGES MADE TO INDIVIDUAL STATE, LOCAL, AND TRIBAL INVENTORIES

Connecticut 1999 Area Source Inventory: Criteria Pollutants

CT included annual and ozone season day emissions and related data for volatile organic compounds (VOC), oxides of nitrogen (NOX), and carbon monoxide (CO); and CO season day emissions in their inventory.

A. Initial Submittal Processing

1. For Start Date for CO season records, changed year from 19991201 to 19981201.

2. Removed the following source classification codes (SCCs) for residential fossil fuel combustion from State's inventory: 2104001000, 2104004000, 2104006000, and 2104007000. The United States (U.S.) Environmental Protection Agency (EPA) has developed new emission estimates for residential fossil fuel combustion to replace State data.

3. Removed SCC 2610000000 (Open Burning/All Categories). The EPA has developed new emission estimates for open burning and is using these new estimates instead of State submitted data. This includes estimates for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500).

4. Added State data for SCC 2104008030 (Stationary Source Fuel Combustion/Residential Wood/Catalytic Woodstoves: General), 2104008050 (Stationary Source Fuel Combustion/Residential Wood/Non-catalytic Woodstoves: General), and SCC 2104008051 (Stationary Source Fuel Combustion/Residential Wood/Non-catalytic Woodstoves: Conventional), and maintained EPA default emissions in Version 2 of the 1999 NEI for SCC 2104008010 (Stationary Source Fuel Combustion/Residential Wood/Woodstoves: General). (Also maintained EPA default emissions for SCCs 2104008030 and 2104008050 for pollutants not reported in State submittal.)

5. State provided VOC emissions for SCC 2461850000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: Agricultural All Purposes) that replaced VOC emissions for the same SCC in Version 2 of the NEI. Version 2 of the NEI contains VOC emissions for SCC 2461800000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: All Processes Total: All Solvent Types) which have been retained in final Version 3 of the NEI.

6. Replaced VOC, NOX, and CO emissions in Version 2 with State data for SCC 2104008001 (Residential Wood/Fireplaces/General), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), and 2104008004 (Fireplace Inserts, EPA Certified Catalytic).

Since the state did not provide emissions for sulfur dioxide (SO2), PM10-PRI, and PM25-PRI for SCC 2104008001, EPA summed the NEI Version 2 emissions for SO2, PM10-PRI, and PM25-PRI for SCCs 2104008002, 2104008003, and 2104008004 and add to VOC, NOX, and CO emissions for SCC 2104008001 in State's inventory.

B. Comment Processing

No comments were submitted.

Delaware 1999 Area Source Inventory: Criteria Pollutants

DE included annual and ozone season day emissions and related data for VOC, NOX, and CO emissions in their inventory.

A. Initial Submittal Processing

1. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104001000, 2104004000, 2104006000, and 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

2. SCC 2401001000 (Architectural Coatings Total: All Solvent Types) in Version 2 was removed because it is included in SCC 2401002000 (Architectural Coatings - Solvent-based Total: All Solvent Types) and SCC 2401003000 (Architectural Coatings - Water-based Total: All Solvent Types) in Version 3 State submittal.

3. State submitted data for three counties for two Open Burning SCCs: 2610000000 (All Categories, Total) and 2610030000 (Residential Household Waste). Version 2 did not report emissions in SCC 2610000000, but instead reported data for specific Open Burning subcategories. Also, the State submittal reported an RE of 80 percent instead of the 100 percent RE used in the EPA estimates. The EPA incorporated the State's emissions/RE values for SCC 2610030000, but removed emissions for 2610000000 because EPA is using its specific Open Burning subcategory emissions unless a State reports its own emissions for these subcategories. Because the State submittal for SCC 2610030000 is missing emissions for SO2 and particulate matter (PM) that are reported in Version 2, EPA incorporated the Version 2 emissions for these pollutants.

4. Added State data for SCC 2104008051 (Stationary Source Fuel Combustion/Residential Wood/Non-catalytic Woodstoves: Conventional), and maintained EPA default emissions in Version 2 of the 1999 NEI for the following SCCs:

2104008010 (Stationary Source Fuel Combustion/Residential Wood/Woodstoves: General);
2104008030 (Stationary Source Fuel Combustion/Residential Wood/Catalytic Woodstoves: General); and
2104008050 (Stationary Source Fuel Combustion/Residential Wood/Non-catalytic Woodstoves: General).

5. State provided data for industrial and commercial/institutional distillate and residual oil and gas, but did not provide any data for SCC 2102002000 (Industrial Coal/Total: All Boiler Types), SCC 2103001000 (Commercial/Institutional Anthracite Coal/Total: All Boiler Types), and SCC 2103002000 (Commercial/Institutional Bituminous/;Subbituminous Coal/Total: All Boiler Types). NEI contains emissions for these SCCs for SO2 and PM-related pollutants only (NEI also shows NH3 emissions of zero for SCC 2103002000).

6. State's inventory contained VOC emissions for all Marine Vessel Petroleum Product Transport fuel types in Version 2 of the NEI except for SCC 2505020180 (Storage and Transport/ Petroleum and Petroleum Product Transport/Marine Vessel Kerosene).

In addition, the State's inventory did not contain data for SCC 2630020000 (Waste Disposal, Treatment, and Recovery/Wastewater Treatment/Public Owned: Total Processed), which is included in Version 2 of the NEI. The emissions for these SCCs in Version 2 of the 1999 NEI have been used in Version 3.

B. Comment Processing

No comments were submitted.

Georgia 1999 Area Source Inventory: Criteria Pollutants

GA included annual and ozone season day emissions and related data for VOC, NOX, and CO; and CO season day emissions in their inventory. GA provided data for 13 of the total 159 counties in the State.

A. Initial Submittal Processing

1. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104002000, 2104004000, 2104006000, and 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

2. Incorporated State submitted emissions for 13 counties for SCC 2401002000 (Architectural Coatings - Solvent-based Total: All Solvent Types) and SCC 2401003000 (Architectural Coatings - Water-based Total: All Solvent Types). Removed Version 2 emissions for SCC 2401001000 (Architectural Coatings Total: All Solvent Types) for the 13 counties included in Version 3 submittal because their emissions are reported under SCCs 2401002000 & 2401003000 in State submittal. Retained Version 2 emissions for SCC 2401001000 for all counties not included in Version 3 State submittal.

3. Removed SCC 2601030000 (Residential On-Site Incineration), SCC 2610010000 (Open Burning, Industrial), and SCC 2610020000 (Open Burning, Commercial/Institutional) from Version 3 submittal. The EPA believes the emissions for these categories are accounted for under different open burning categories. The EPA has developed new emission estimates for open burning. The EPA open burning estimates are for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500). The EPA is using these new estimates unless a State submits estimates for one of these SCCs (for an issue related to State submittal for SCC 2610030000, see #10 under the "Further Review by State" section below).

State submitted emissions for SCC 2601030000, 2610010000, and 2610020000 were removed.

4. State submittal contained emissions for only 13 counties of the total 159 counties in the State. EPA retained the Version 2 emissions for the counties not included in the State submittal.

5. Incorporated State VOC, NOX, and CO emissions for SCC 2104008000 (Residential Wood/Woodstoves & Fireplaces/General) for 13 counties provided in submittal. Removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General) for these counties. For final version 3, EPA summed the NEI Version 2 emissions for these pollutants for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, 2104008030, and 2104008050 and add these emissions to the VOC, NOX, and CO emissions for SCC 2104008000. VOC, NOX, CO, SO2, PM10-

PRI, and PM25-PRI emissions were retained from Version 2 for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, 2104008030, and 2104008050 for all other counties.

6. Incorporated State submitted emissions for 13 counties for SCC 2401040000. Removed Version 2 emissions for counties included in the State submittal. Retained Version 2 emissions for following counties that were not included in State submittal: Federal Information Processing Standards (FIPS) CODES 047, 051, 065, 071, 143, and 153.

7. Incorporated State data for SCC 2415000000 (Degreasing, All Processes/All Industries, Total: All Solvent Types) and for SCCs 2415030000 (Degreasing, Electronic and Other Elec. (standard industrial classification [SIC] 36): All Processes, Total: All Solvent Types), 2415045000 (Degreasing, Miscellaneous Manufacturing (SIC 39): All Processes, Total: All Solvent Types), and 2415065000 (Degreasing, Auto Repair Services (SIC 75): All Processes, Total: All Solvent Types).

8. Incorporated State emissions for SCC 2420010000 (Solvent Utilization, Dry Cleaning, Commercial/Industrial Cleaners, Total: All Solvent Types) and removed Version 2 emissions.

9. Incorporated State emissions for SCC 2425040000 (Solvent Utilization, Graphic Arts, Flexography, Total: All Solvent Types) and removed Version 2 emissions. State should review for the possibility of emissions double-counting between this SCC and the NEI Version 2 SCC 2425000000 (Solvent Utilization, Graphic Arts, All Processes, Total: All Solvent Types).

10. Incorporated State supplied emissions for SCC 2461021370 (Solvent Utilization, Miscellaneous Non-industrial: Commercial, Cutback Asphalt, Special Naphthas). Incorporated State supplied emissions for SCC 2461021000 (Solvent Utilization, Miscellaneous Non-industrial: Commercial, Cutback Asphalt, Total: All Solvent Types) for 13 counties supplied by State and removed Version 2 emissions for these counties (all other counties' Version 2 emissions for this SCC were retained).

11. Incorporated State supplied emissions for SCCs 2461022000 (Solvent Utilization, Miscellaneous Non-industrial: Commercial, Emulsified Asphalt, Total: All Solvent Types) and 2461022370 (Solvent Utilization, Miscellaneous Non-industrial: Commercial, Emulsified Asphalt, Special Naphthas).

12. Incorporated State submitted emissions for 13 counties for SCC 2461800000 (Solvent Utilization, Miscellaneous Non-industrial, Commercial, Pesticide Application: All Processes, Total: All Solvent Types. Removed Version 2 emissions for counties included in the State submittal. Retained Version 2 emissions for counties that were not included in State submittal. Incorporated State submitted emissions for SCC 2461850000 (Solvent Utilization, Miscellaneous Non-industrial, Commercial, Pesticide Application: Agricultural, All Process, Total: All Solvent Types) and removed Version 2 emissions.

13. State submitted VOC, NOX, and CO emissions for SCC 2610030000 (Leaf Burning), while NEI Version 2 reported SO2, PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL emissions in addition to VOC, NOX, and CO. EPA incorporated the State VOC, NOX, and CO emissions data for SCC 2610030000 and retained the SO2, PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL emissions from Version 2. In

addition, the following counties were included in the State submittal, but were not reported in Version 2: FIPS COUNTY codes 063, 067, 089, 121, and 135.

14. Incorporated State submitted emissions for SCC 2801500000 (Agricultural Field Burning, Total, All Cop Types) for 13 counties for NOX, CO, and VOC. For counties not supplied by State, EPA retained emissions from Version 2. Version 2 of the NEI reported emissions for either PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL or CO and VOC, but not for both sets of pollutants.

15. Incorporated State submitted NOX, CO, and VOC emissions for SCC 2810005000 (Managed Burning, Slash (Logging Debris), Total) for 13 counties submitted by State and retained NOX, CO, VOC, and SO2 emissions for remaining counties from Version 2. Retained SO2 emissions from Version 2 for counties submitted by State. EPA set SO2 emissions to zero for FIPS County Codes 063 and 113 because the State submittal reported these counties with zero emissions for NOX, CO, and VOC and Version 2 did not report SO2 emissions for these counties.

B. Comment Processing

No comments were submitted.

Idaho 1999 Area Source Inventory: Criteria Pollutants

ID included annual emissions and related data for VOC, NOX, CO, SO2, oxides of sulfur (SOx), NH3, PM-FIL, PM-PRI, PM-CON, PM10-FIL, PM10-PRI, PM25-FIL, and PM25-PRI emissions in their inventory.

A. Initial Submittal Processing

1. Changed TON-YR to TON in the emission unit numerator field to comply with NEI Input Format (NIF) 2.0 unit specifications.

2. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104004000, 2104006010, 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

3. Incorporated State VOC, NOX, CO, SO2, and PM10-PRI emissions for SCC 2104008000 (Residential Wood/Woodstoves & Fireplaces/General), and removed VOC, NOX, CO, SO2, PM10-PRI, and PM25-PRI emissions in Version 2 of the 1999 NEI for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General). Emissions for PM25-PRI for SCC 2104008000 were calculated from the PM10-PRI emissions in State's inventory using EPA's augmentation procedures.

4. SCC 2401008000 in Version 2 was removed because emissions are reported under SCC 2401008030 (Solvent Utilization Surface Coating Traffic Markings Acetone) in Version 3 State submittal.

5. SCCs 2420010055 and 2420010370 in Version 2 were removed because emissions are reported under SCC 2420010000 (Solvent Utilization Dry Cleaning Commercial/Industrial Cleaners Total: All Solvent Types) in Version 3 State submittal.

6. SCC 2420020055 in Version 2 was removed because emissions are being reported under SCC 2420020000 (Solvent Utilization Dry Cleaning Coin-operated Cleaners Total: All Solvent Types) in Version 3 State submittal.

7. Removed SCC 2610000000 (Open Burning/All Categories) from State's inventory. The EPA has developed emission estimates for specific open burning categories and is using these estimates instead of total open burning category estimates. Therefore, EPA incorporated the State's estimates for SCC 2610000100 (Leaf Burning), SCC 2610000300 (Weed Burning), and SCC 2610030000 (Residential Municipal Solid Waste) and retained EPA Version 2 estimates for SCC 2610000400 (Brush Burning) and SCC 2610000500 (Construction Activity Land Clearing Debris Burning).

8. SCC 2801500000 (Miscellaneous Area Sources Agriculture Production - Crops Agricultural Field Burning - whole field set on fire Total, all crop types) in Version 2 was removed because emissions are being reported

under specific 280150**** SCCs in Version 3 State submittal. Agricultural field burning PM10-PRI and PM25-PRI emissions were estimated from State supplied PM-PRI emissions using particle size distribution information. Field crop burning emissions were estimated from using the California Air Resources Board particle size profile for "Waste Burning, Agricultural Debris, Field Crops" (PM10/PM = 0.984 and PM2.5/PM10 = 0.954). Orchard crop burning source category PM10-PRI and PM25-PRI emissions were estimated from State supplied PM-PRI emissions using the California Air Resources Board particle size profile for "Waste Burning, Agricultural Debris, Field Crops" (PM10/PM = 0.981 and PM2.5/PM10 = 0.943). For SCC 2801500100 (Field Crops Unspecified), PM25-PRI emissions were estimated using the PM2.5/PM10 particle size ratio (0.91) that was used for this SCC in Version 2 of the NEI (0.91).

9. SCC 2805020000 in Version 2 was removed because emissions are being reported under SCC 2805001000 (Miscellaneous Area Sources Agriculture Production - Livestock Beef Cattle Feedlots Total) in Version 3 State submittal. For SCC 2805001000, the pollutant codes PM-PRI and PM10-PRI were reversed in State submittal; therefore, per direction from the State, the pollutant codes were corrected.

10. SCC 2805025000 in Version 2 was removed because emissions are being reported under SCC 2805015000 (Miscellaneous Area Sources Agriculture Production - Livestock Hogs Operations Total) in Version 3 State submittal.

11. SCC 2805030000 in Version 2 was removed because emissions are being reported under SCC 2805005000 (Miscellaneous Area Sources Agriculture Production - Livestock Poultry Operations Total) in Version 3 State submittal.

12. For SCC 2805001000 (Miscellaneous Area Sources/Agriculture Production - Livestock/Beef Cattle Feedlots/Total (also see 2805020000)), the State of Idaho confirmed that the emissions assigned to PM-PRI and PM10-PRI are reversed. Therefore, the PM10-PRI emissions in Idaho's inventory were removed and the pollutant code for PM-PRI was changed to PM10-PRI.

13. For SCC 2103008000 (Stationary Source Fuel Combustion/Commercial/Institutional/ Wood/Total: All Boiler Types), Idaho's inventory contained PM2.5 emissions that were greater than PM10 emissions. The State of Idaho indicated that they used FIRE emission factors for point SCC 10300902 (External Combustion Boilers/Commercial/Institutional/Wood/Bark Waste/Wood/Bark-fired Boiler) to estimate emissions for SCC 2103008000. The fire emission factor for PM2.5 is for uncontrolled emissions, and the emission factor for PM10 is for miscellaneous controls. Per instructions from the State of Idaho, the PM10 emissions were kept in their inventory, and the PM2.5 emissions were removed and replaced with PM2.5 emissions estimated using EPA's PM augmentation procedures.

14. For SCC 2461020000 (Miscellaneous Non Industrial: Commercial, Asphalt Application: All Processes, Total: All Solvent Types), estimated PM25-FIL emissions from State supplied PM10-FIL emissions using a California Air Resources Board particle size profile for area source asphalt paving/roofing (PM2.5/PM10 = 0.964).

15. For SCC 2801000005 (Miscellaneous Area Sources, Agriculture Production - Crops, Agriculture- Crops, Harvesting), estimated PM25-FIL emissions from State supplied PM10-FIL emissions using AP-42 generalized particle size distribution for category 6 - Grain Handling (PM2.5/PM10 = 0.067).

16. There appear to be numerous instances where the State has reported emissions in both a total category and in related sub-categories. For example, dry cleaning emissions are reported as follows:

SCC 2420000000 - Dry Cleaning, All Processes, Total (1,117.8 tons per year [tpy])
SCC 2420010000 - Dry Cleaning, Commercial/Industrial Cleaners, Total (797 tpy)
SCC 2420020000 - Dry Cleaning, Coin-operated Cleaners, Total (320.9 tpy)

Similarly, the State many times reports emissions in both a total SCC and in a "not elsewhere classified" SCC. For example, machinery and equipment surface coating emissions are reported as follows:

SCC 2401055000 - Surface Coating, Machinery and Equipment: SIC 35 Total (248.4 tpy)
SCC 2401055999 - Surface Coating, Machinery and Equipment: SIC 35 Solvents: Not Elsewhere Classified (148.4 tpy).

17. For SCC 2630020000 (Public Owned Waste Water Treatment), incorporated State's NH3 emission estimates. The VOC emission estimates from Version 2 of the NEI were also retained because the State did not supply VOC estimates. However, the Version 2 estimates are reported for 43 counties, while the State's estimates are reported for 44 counties.

18. For SCC 2801000003, State submittal contained emissions for only 4 counties while Version 2 reported 44 counties with emissions. EPA retained the Version 2 emissions for the additional forty counties.

B. Comment Processing

Idaho comment consistent of adjustment to PM10-PRI numbers for the following SCCs: 2311000100, 2801000003, 2801000005. These were incorporated per submittal flag instructions. See section on PM augmentation processing for more details.

Kansas 1999 Area Source Inventory: Criteria Pollutants

KS submitted comments for 3 counties (091, 173, 209) for NOX and VOC for the72 SCCs.

A. Initial Submittal Processing

An initial submittal was not processed.

B. Comments Processing

1. State values for residential fuel combustion records for SCCs 2104004000 and 2104006000 were not processed as it was determined that EPA residential fossil fuel combustion values would be used. The remainder of the submittal was processed as directed.

2. The following SCCs were cascade deleted from the EP level for counties 091 and 209:

- 2401025000
- 2401075000
- 2401085000
- 2415105000
- 2415110000
- 2415120000
- 2415125000
- 2415130000
- 2415135000
- 2415140000
- 2415145000
- 2415305000
- 2415310000
- 2415320000
- 2415325000
- 2415330000
- 2415335000
- 2415340000
- 2415345000
- 2415355000
- 2415360000
- 2420010055
- 2420010370
- 2420020055
- 2465100000

- 2465200000
- 2465400000
- 2465600000
- 2610000500

Maine 1999 Area Source Inventory: Criteria Pollutants

ME included annual emissions and related data for VOC, NOX, and CO emissions in their inventory.

A. Initial Submittal Processing

1. SCCs 2465100000, 2465200000, 2465400000, and 2465600000 from Version 2 were removed because emissions are being reported under SCC 246500000 (Solvent Utilization Miscellaneous Non-Industrial: Consumer All Products/Processes Total: All Solvent Types) in State submittal.

2. SCCs 2505020030, 2505020060, 2505020090, 2505020120, 2505020150, and 2505020180 in Version 2 were removed because emissions are being reported under SCC 2505020000 (Storage and Transport Petroleum and Petroleum Product Transport Marine Vessel Total: All Products) in State submittal.

3. SCC 2620030000 (Waste Disposal, Treatment, and Recovery Landfills Municipal Total) in Version 2 was removed because emissions are being reported under SCC 2620000000 (Waste Disposal, Treatment, and Recovery Landfills All Categories Total) in State submittal.

4. Incorporated VOC, NOX, and CO emissions from State submittal for SCC 2104008000 (Residential Wood/Woodstoves & Fireplaces/General), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General).

EPA summed the NEI Version 2 emissions for SO2, PM10-PRI, and PM25-PRI for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, 2104008030, and 2104008050 and add to VOC, NOX, and CO emissions for SCC 2104008000 (Stationary Source Fuel Combustion Residential Wood Total: Woodstoves and Fireplaces) in State's inventory.

5. Specific solvent utilization degreasing SCCs (2415105000 thru 2415145000 and SCCs 2415305000 thru 2415365000) from Version 2 were removed because of degreasing emission submittals by State. State degreasing emissions appear to contain double-counting because State submitted data for SCCs 2415000000 (All Industries, Total: All Solvent Types) and for SCCs 2415030000 (Electronic and Other Electrical), 2415045000 (Miscellaneous Manufacturing), 2415065000 (Auto Repair Services), and 2415300000 (All Industries: Cold Cleaning).

6. For SCC 2302050000 (Food and Kindred Products: SIC 20, Bakery Products), State only submitted emissions for 10 counties. EPA retained the Version 2 emissions for the remaining counties (009, 013, 017, 021, 023, 029).

7. State submitted emissions data for SCC 2660000000 (Leaking Underground Storage Tanks, Total) for 11 fewer counties than Version 2. EPA retained the emissions for missing counties.

8. Incorporated VOC, NOX, and CO State emissions for SCC 2601000000 (Waste Disposal, Treatment, and Recovery On-site Incineration All Categories Total), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2601010000 (On-site Incineration Industrial) and 2601020000 (On-site Incineration Commercial/Institutional).

EPA will summed the NEI Version 2 emissions for SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON for SCCs 2601010000 and 2601020000 and add to VOC, NOX, and CO emissions for SCC 2601000000 in State's inventory (note that Version 2 contains SCC 2601010000 data for 15 out of the total 16 counties in the State).

9. State submitted VOC, CO, and NOX emissions for SCC 2801500000 for 16 counties while Version 2 reported PM emissions for 4 counties. EPA retained the PM emissions for these 4 counties.

B. Comments Processing

1. Per direction from the State VOCs were revised for the following two SCCs - 2415065000 (16 counties) and 2460200000 (1 county).

2. Maine deleted SCC 2199004000 for all pollutants for 10 counties.

Michigan 1999 Area Source Inventory: Criteria Pollutants

MI included annual emissions and related data for VOC, NOX, CO, SO2, SOx, PM-FIL, PM-PRI, PM10-FIL, and PM10-PRI emissions in their inventory.

A. Initial Submittal Processing

1. Based on direction provided by MI, revised emission period from "29" to "30" for 4 records identified with an emission period of "29" in State submittal. These records were as follows:

STATE_FIPS	COUNTY_FIPS	SCC	POLLUTANT_CODE
26	017	2505020120	VOC
26	147	2505020090	VOC
26	163	2505020060	VOC
26	163	2505020090	VOC

2. Through consultation with MI, corrected PM-related pollutant emissions were PM25>PM10 or PM10>PM.

3. If a VOC record did not exist for the data key (minus the pollutant code), changed nonmethane organic compounds (NMOC) to VOC. If a VOC record existed for the data key (minus the pollutant code), removed NMOC records.

4. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104001000, 2104004000, and 2104006000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

5. Version 2 reported VOC, CO, and NOX emissions for SCC 2401001000 (Solvent Utilization, Surface Coating, Architectural Coatings, Total: All Solvent Types). State submitted VOC emissions for this SCC. EPA did not supplement the State submitted VOC emissions with the CO and NOX emissions from Version 2 because this category does not emit these pollutants.

6. Version 2 reports emissions in SCC 2505000000 (Petroleum and Petroleum Product Transport, All Transport Types, Total: All Products). As noted in #3 above, State submitted data for SCCs 2505020060 (Petroleum and Petroleum Product Transport, Marine Vessel, Residual Oil), 2505020090 (Petroleum and Petroleum Product Transport, Marine Vessel, Distillate Oil), and 2505020120 (Petroleum and Petroleum Product Transport, Marine Vessel, Gasoline).

7. Version 2 reports emissions in SCC 2103007000 (Stationary Source Fuel Combustion, Commercial/Institutional, Liquified Petroleum Gas (LPG), Total: All Combustor Types) while the State submitted emissions data for SCC 2103007010 (Stationary Source Fuel Combustion, Commercial/Institutional, Liquified Petroleum Gas (LPG), Asphalt Kettle Heaters).

8. Version 2 reports emissions in SCC 2305000000 (Industrial Processes, Mineral Processes: SIC 32, All Processes, Total) while State provided pollutant emissions under SCC 2305070000 (Industrial Processes, Mineral Processes: SIC 32, Concrete, Gypsum, Plaster Products, Total). In addition, for SCC 2305070000, State submitted PM emissions for one county while NEI Version 2 reported VOC, NOX, CO, and PM emissions for 3 counties. EPA retained the Version 2 emissions for missing counties.

9. Version 2 reports emissions for SCCs 2310000000 (Industrial Processes, Oil and Gas Production: SIC 13, All Processes, Total: All Processes), 2310010000 (Industrial Processes, Oil and Gas Production: SIC 13, Crude Petroleum, Total: All Processes), and 2310020000 (Industrial Processes, Oil and Gas Production: SIC 13, Natural Gas, Total: All Processes), while the State only submitted data for SCCs 2310010000 and 2310020000. Also note that State submitted data for SCCs 2310010000 and 2310020000 for fewer counties than were reported for these SCCs in Version 2. EPA retained the emissions for these missing counties.

10. Version 2 reports emissions for SCC 2501060050 (Storage and Transport, Petroleum and Petroleum Product Storage, Gasoline Service Stations, Stage 1: Total) while State submitted data for SCCs 2501060051, 2501060052, and 2501060053.

11. Version 2 reports emissions for SCC 2501060200 (Storage and Transport, Petroleum and Petroleum Product Storage, Gasoline Service Stations, Underground Tank: Total) while State submitted data for SCC 2501060201 (Storage and Transport, Petroleum and Petroleum Product Storage, Gasoline Service Stations, Underground Tank: Breathing and Emptying).

12. Version 2 reports emissions for SCC 2620000000 (Waste Disposal, Treatment, and Recovery Landfills All Categories Total) and SCC 2620030000 (Waste Disposal, Treatment, and Recovery Landfills Municipal Total), while State only submitted CO and NMOC emissions under SCC 2620030000 (for 39 counties). EPA set VOC emissions = NMOC emissions. Also note that State submitted data for SCC 2620030000 were reported for 15 fewer counties than were reported in Version 2. EPA retained the SCC 2620030000 emissions for these missing counties.

13. Version 2 reports emissions for SCC 2630000000 (Waste Disposal, Treatment, and Recovery, Wastewater Treatment, All Categories, Total Processed) while State submitted data for SCCs 2630010000 (Waste Disposal, Treatment, and Recovery, Wastewater Treatment, Industrial, Total Processed) and 2630020000 (Waste Disposal, Treatment, and Recovery, Wastewater Treatment, Public Owned, Total Processed). State should provide guidance on whether to remove or retain/revise the Version 2 emissions for SCC 2630000000. Also note that State submitted data for SCC 2630020000 for 12 fewer counties than were reported in Version 2. In addition to retaining this SCC's NH3 emissions from Version 2 for the counties included in Version 3, EPA retained the VOC and NH3 emissions from Version 2 for the counties not reported by the State. State should provide guidance on whether to remove or retain/revise the Version 2 emissions for these missing counties.

14. SCC 2102001000 (Stationary Source Fuel Combustion Industrial Anthracite Coal Total: All Boiler Types). State provided no data for this SCC. NEI Version 2 contains emissions for VOC and CO pollutants only. State should indicate if emissions for this SCC should be removed from NEI because they are accounted

for in the point source inventory. Otherwise, State should provide emissions for other pollutants (i.e., NOX, SO2, and PM).

15. SCC 2103001000 (Stationary Source Fuel Combustion Commercial/Institutional Anthracite Coal Total: All Boiler Types). State provided no data for this SCC. NEI Version 2 contains emissions for SO2 and PM-related pollutants only. State should indicate if emissions for this SCC should be removed from NEI because they are accounted for in the point source inventory. Otherwise, State should provide emissions for other pollutants (i.e., VOC, NOX, and CO).

16. SCC 2103002000 (Stationary Source Fuel Combustion Commercial/Institutional Bituminous/Subbituminous Coal Total: All Boiler Types). State provided no data for this SCC. NEI Version 2 contains emissions for VOC, NOX, CO, SO2 and PM-related pollutants. State should indicate if emissions for this SCC should be removed from NEI because they are accounted for in the point source inventory.

17. State provided emissions for SCC 2420010000 (Solvent Utilization, Dry Cleaning, Commercial/Industrial Cleaners, Total: All Solvent Types) for 6 fewer counties than were reported in Version 2. EPA retained the Version 2 emissions for the missing counties. State should provide guidance on whether to remove or retain/revise the Version 2 emissions for these missing counties.

18. State provided emissions for SCC 2425000000 (Solvent Utilization, Graphic Arts, All Processes, Total: All Solvent Types) for 1 less county than was reported in Version 2. EPA retained the Version 2 emissions for the missing county (037). State should provide guidance on whether to remove or retain/revise the Version 2 emissions for this missing county.

19. State reported VOC emissions under SCC 2501030120. This is not an official EPA SCC. State should identify a valid SCC code for these emissions.

20. State submitted data for SCC 2465000000 (Solvent Utilization, Miscellaneous, Non-industrial: Consumer, All Products/Processes, Total: All Solvent Types) and all consumer product subcategory SCCs (2465100000 through 2465900000).

B. Comments Processing

1. The SCC 2620002000 PM10-FIL revision comments were not processed.

2. State submitted PM revision data emissions data for SCC 2103007010 (Stationary Source Fuel Combustion, Commercial/Institutional, Liquified Petroleum Gas (LPG), Asphalt Kettle Heaters) for 4 counties. (Refer to 7 above).

3. State submitted revisions for PM and VOC data for 83 counties for SCCs 2104008001 and 2104008051.

4. State submitted revisions for PM and VOC data for the following SCCs (and different levels of county coverage):

- 2305070000

- 2306010000
- 2401015000
- 2401020000
- 2401060000
- 2401065000
- 2401075000
- 2501060103
- 2505030120
- 2530000080
- 2810001000
- 2810015000
- 2810030000
- 2810060100

5. MI deleted SCC 2501030120 for 81 counties and SCC 2461022000 (2 counties) for all pollutants.

Minnesota 1999 Area Source Inventory: Criteria Pollutants

MN submitted comments for CO, NH3, NOX, SO2, PM for a variety of SCCs with vary levels of county coverage.

A. Initial Submittal Processing

An initial submittal was not processed.

B. Comments Processing

1. State values for residential fossil fuel combustion records in general were not processed as it was determined that EPA residential fossil fuel combustion values would be used. However, deletions for NH3 values for 2104004000 and 2104006000 were processed for 86 counties.

2. State revisions to the NEI for the following SCC/pollutant combinations were processed as requested:

- 2401001000 VOC
- 2401001999 VOC
- 2401005000 VOC
- 2401005000 VOC
- 2401008000 VOC
- 2401008999 VOC
- 2461021000 VOC
- 2461021000 VOC
- 2620030000 CO
- 2620030000 NOX
- 2620030000 VOC
- 2620030000 PM10-PRI
- 2620030000 PM25-PRI
- 2630020000 VOC
- 2810001000 CO
- 2810001000 VOC
- 2810015000 CO
- 2810015000 VOC
- 2810030000 CO
- 2810030000 CO
- 2810030000 NOX
- 2810030000 NOX
- 2810030000 VOC
- 2810030000 VOC
- 2810030000 PM-PRI

Mississippi 1999 Area Source Inventory: Criteria Pollutants

MS included annual emissions and related data for VOC, NOX, CO, SOX, and PM10-PRI emissions in their inventory. Pollutant code SOX was changed to SO2 to comply with NEI pollutant code requirements.

A. Initial Submittal Processing

1. Replaced VOC, NOX, CO, SO2, and PM10-PRI emissions in Version 2 with State data for SCC 2104008001 (Residential Wood/Fireplaces/General), and set PM25-PRI emissions equal to State-supplied PM10-PRI emissions. Removed VOC, NOX, CO, SO2, PM10-PRI, and PM25-PRI emissions in Version 2 for SCCs 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), and 2104008004 (Fireplace Inserts, EPA Certified Catalytic).

2. Replaced VOC, NOX, CO, SO2, and PM10-PRI emissions in Version 2 with State data for SCC 2104008010 (Residential Wood/Woodstoves/General), and set PM25-PRI emissions equal to State-supplied PM10-PRI emissions. Removed VOC, NOX, CO, SO2, PM10-PRI, and PM25-PRI emissions in Version 2 for SCCs 2104008030 (Catalytic Woodstoves) and 2104008050 (Non-catalytic Woodstoves).

New Hampshire 1999 Area Source Inventory: Criteria Pollutants

NH included annual and ozone season day emissions for VOC, NOX, and CO emissions in their inventory.

A. Initial Submittal Processing

1. Replaced Solvent Utilization Degreasing SCCs (SCC 2415xxxxxx) in Version 2 with SCC 2415000000 in Version 3 State submittal.

2. Consumer Product SCCs (2465xxxxxx) from Version 2 was removed because this SCC's emissions were replaced by SCC 2465000000 in Version 3 State submittal.

3. Removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2102004000 (Industrial Distillate Oil Total: All Boiler Types) and 2103004000 (Commercial/Institutional Distillate Oil Total: All Boiler Types), and incorporated VOC, NOX, and CO State emissions for SCC 2199004000 (Stationary Source Fuel Combustion Total Area Source Fuel Combustion Distillate Oil Total: Boilers and IC Engines).

4. For the following SCCs, State's inventory contains emissions for fewer counties than Version 2 of the NEI:

SCC	Counties in State Inventory	Counties in NEI Version 2
2401080000 (Marine Surface Coating)	1	7
2401090000 (Misc. Manuf. Surface Coating)	9	10
2620000000 (Landfills)	9	10

4. Potential double-counting exists in SCC 2501060103 (Gasoline Service Stations, Stage 2: Spillage) should be removed or retained given the State's emissions submittal for SCC 2501060100 (Gasoline Service Stations, Stage 2: Total).

5. State's inventory provided data for SCC 2630000000 (Wastewater Treatment, All Categories). State's inventory did not contain data for SCC 2630020000 (Waste Disposal, Treatment, and Recovery/Wastewater Treatment/Public Owned: Total Processed), which was included in Version 2 of the 1999 NEI.

6. The EPA is developing new emission estimates for residential fossil fuel combustion (i.e., for SCCs 2104002000, 2104004000, 2104006000, and 2104007000). State should review the estimates for 2104004000 (Fuel Combustion, Residential, Distillate Oil, Total: All Combustor Types) for the potential for double-counting with State submitted data for 2199004000 (Fuel Combustion, Total Area Source Fuel Combustion, Distillate Oil, Total: Boilers and IC Engines) and provide EPA with guidance on whether to remove or retain/revise the estimates for SCC 2199004000.

B. Comments Processing

NH sent comments for a variety of pollutant code and SCC combinations, generally with complete county coverage.

1. Comments for SCC 2102004000, 2102006000, and 2102007000 for all pollutants were submitted and processed.

2. Comments for SCC 2103001000, 2103004000, 2103006000, 2103007000, and 2103008000 for all pollutants were submitted and processed.

3. Comments for SCC 2104008000 for all pollutants were submitted and processed.

4. Comments for SCC 2401090000 and 2620000000 for VOC were submitted and processed.

5. State values for residential fuel combustion records for SCCs 2104001000, 2104004000, 2104006000 and 2104007000 were not processed as it was determined that EPA residential fossil fuel combustion values would be used.

6. The SCC 2102005000 was removed from NH inventory for all pollutants.

Oklahoma 1999 Area Source Inventory: Criteria Pollutants

OK included annual emissions for VOC, NOX, CO, SOX, PM-FIL, PM-PRI, PM-CON, PM10-PRI, and PM25-PRI emissions in their inventory.

A. Initial Submittal Processing

OK did not provide an initial submittal for Version 3.

B. Comments Processing

OK sent comments for a variety of pollutant code and SCC combinations, with varying levels of complete county coverage.

1. State values for residential fuel combustion records for SCCs 2104001000, 2104002000, 2104004000, 2104006000 and 2104007000 were not processed as it was determined that EPA residential fossil fuel combustion values would be used.

2. State comments for SCCs 2102004000, 2102005000, 2102006000, 2103002000, 2103004000, 2103006000 for all pollutants were processed.

3. State comments for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, and 2104008030 for all pollutants were processed.

4. State comments for SCCs 2275085000, 2294000000, and 2296000000 for PM were processed.

5. State comments for 2301030000, 2302050000, 2310000000 for VOC were processed.

6. State comments for 2311010000, 2311020000, 2311030000 for PM were processed.

7. State comments for 2325000000 for PM were processed.

8. State comments for 2399000000 for CO, NH3, NOX, SO2, VOC, and PM were processed.

9. The following SCC comments apply to VOC. These were processed.

- 2401001000
- 2401005000
- 2401008000
- 2401015000
- 2401020000
- 2401025000
- 2401030000

- 2401040000
- 2401045000
- 2401055000
- 2401060000
- 2401065000
- 2401070000
- 2401075000
- 2401080000
- 2401085000
- 2401090000
- 2401100000
- 2401200000
- 2415105000
- 2415110000
- 2415120000
- 2415125000
- 2415130000
- 2415135000
- 2415140000
- 2415145000
- 2415305000
- 2415310000
- 2415320000
- 2415325000
- 2415330000
- 2415335000
- 2415340000
- 2415345000
- 2415355000
- 2415360000
- 2415365000
- 2420010055
- 2420010370
- 2420010370
- 2420010370
- 2420020055
- 2425000000
- 2430000000
- 2440020000
- 2461021000
- 2461800000
- 2465100000
- 2465200000

- 2465400000
- 2465600000
- 2501050120
- 2501060050
- 2501060050
- 2501060100
- 2501060100
- 2501060201
- 2501060201

10. The following pollutant code/SCC combinations were submitted. These comments were processed.

- 2610000100 CO
- 2610000100 VOC
- 2610000100 PM10-FIL
- 2610000100 PM10-PRI
- 2610000100 PM25-FIL
- 2610000100 PM25-PRI
- 2610000400 CO
- 2610000400 VOC
- 2610000400 PM10-FIL
- 2610000400 PM10-PRI
- 2610000400 PM25-FIL
- 2610000400 PM25-PRI
- 2610000500 CO
- 2610000500 NOX
- 2610000500 VOC
- 2610000500 PM10-FIL
- 2610000500 PM10-PRI
- 2610000500 PM25-FIL
- 2610000500 PM25-PRI
- 2610030000 CO
- 2610030000 NOX
- 2610030000 SO2
- 2610030000 VOC
- 2610030000 PM10-FIL
- 2610030000 PM10-PRI
- 2610030000 PM25-FIL
- 2610030000 PM25-PRI
- 2630020000 NH3
- 2630020000 VOC
- 2640000000 VOC

- 2801000000 PM10-FIL
- 2801000000 PM10-PRI
- 2801000000 PM25-FIL
- 2801000000 PM25-PRI
- 2801000003 PM10-FIL
- 2801000003 PM10-PRI
- 2801000003 PM25-FIL
- 2801000003 PM25-PRI
- 2801700001 NH3
- 2801700003 NH3
- 2801700004 NH3
- 2801700005 NH3
- 2801700006 NH3
- 2801700007 NH3
- 2801700008 NH3
- 2801700009 NH3
- 2801700010 NH3
- 2805001000 PM10-FIL
- 2805001000 PM10-PRI
- 2805001000 PM25-FIL
- 2805001000 PM25-PRI
- 2805020000 NH3
- 2805025000 NH3
- 2805030000 NH3
- 2805035000 NH3
- 2805040000 NH3
- 2805045001 NH3
- 2810001000 CO
- 2810001000 NOX
- 2810001000 NOX
- 2810001000 SO2
- 2810001000 VOC
- 2810001000 VOC
- 2810001000 PM10-FIL
- 2810001000 PM10-PRI
- 2810001000 PM25-FIL
- 2810001000 PM25-PRI
- 2810015000 CO
- 2810015000 NOX
- 2810015000 SO2
- 2810015000 VOC
- 2810015000 PM10-FIL
- 2810015000 PM10-PRI

- 2810015000 PM25-FIL
- 2810015000 PM25-PRI
- 2810030000 CO
- 2810030000 NOX
- 2810030000 VOC
- 2810030000 PM10-FIL
- 2810030000 PM10-PRI
- 2810030000 PM25-FIL
- 2810030000 PM25-PRI

11. OK deleted the following SCCs for all pollutants 2306000000 (5 counties) and 2310000000 (1 county) and 2420010370 (28 counties)

Oregon 1999 Area Source Inventory: Criteria Pollutants

OR included annual emissions for VOC, NOX, CO, SOX, PM-FIL, PM-PRI, PM-CON, PM10-PRI, and PM25-PRI emissions in their inventory.

A. Initial Submittal Processing

1. Fax number is missing

2. Changed End Dates of 1990131 to 19991231.

3. Changed the Chemical Abstract Number 7664417 to NH3 to comply with NIF 2.0 pollutant code specifications for NH3.

4. If a VOC record did not exist for the data key (minus the pollutant code), changed NMOC, hydrocarbon (HC), and total organic gases (TOG) to VOC. If a VOC record existed for the data key (minus the pollutant code), removed NMOC, HC, and TOG records.

5. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104004000, 2104006000, and 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

6. Removed State's emissions data for SCCs 2610000000 (Open Burning/All Categories) and 2610020000 (Open Burning Commercial/Institutional /Total). The EPA has developed new emission estimates for open burning and are using these new estimates instead of State submitted data. This includes estimates for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500).
Because the State also submitted data for SCC 2610000400, the EPA's estimates for this SCC were replaced with the State's estimates. PM10-FIL and PM25-FIL emissions were calculated from State's PM10-PRI and PM25-PRI estimates using the PM augmentation procedure.

7. Changed end dates for annual emissions records with an emission type of "30" from "19990131" to "19991231".

8. Replaced VOC, NOX, SO2, and PM10-PRI emissions in Version 2 with State data for SCC 2104008001 (Residential Wood/Fireplaces/General), and removed VOC, NOX, SO2, PM10-PRI, and PM25-PRI emissions in Version 2 of the 1999 NEI for SCCs 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), and 2104008004 (Fireplace Inserts, EPA Certified Catalytic). PM25-PRI emissions for SCC 2104008001 were calculated from PM10-PRI emissions using the PM augmentation procedure.

EPA summed the NEI Version 2 emissions for CO for SCCs 2104008001, 2104008002, 2104008003, and 2104008004 and add to VOC, NOX, SO2, and PM10-PRI emissions for SCC 2104008001 in State's inventory.

9. The State submitted Agricultural Field Burning estimates for both the general SCC 2801500000 (Agricultural Burning, Total, All Crops) and numerous crop-specific SCCs (e.g., 2801500320 -- Agricultural Burning, Orchard Crop is Apple).

10. Added State's Woodstove emissions data for SCCs 2104008030, 2104008050, 2104008051, and 2104008053. Potential double-counting may exist where NEI Version 2 emissions for SCC 2104008010 (Stationary Source Fuel Combustion/Residential Wood/Woodstoves: General) exist with State-supplied emissions for SCCs 2104008030, 2104008050, 2104008051, and 2104008053.

11. State provided VOC emissions for SCC 2461850000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: Agricultural All Purposes). Version 2 of the NEI contains VOC emissions for SCC 2461800000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: All Processes, Total: All Solvent Types) which have been retained in Final Version 3 of the NEI.

12. Added State's emissions data for SCCs 2505030120 (Petroleum Product Transport Truck Total: Gasoline) and 2505030180 (Petroleum Product Transport Truck Total: Kerosene). Potential double-counting may exist where NEI Version 2 emissions for SCC 2505030000 (Petroleum Product Transport Truck Total: All Products) exist with State-supplied emissions for SCC 2505030120 and 2505030180.

13. There are numerous SCCs for which the State provides emissions data for counties which do not report emissions in Version 2 of the NEI. In other cases, the NEI Version 2 reports emissions for counties for which the State submittal does not report emissions. For example, Version 2 of the NEI reports emissions for SCC 2401040000 (Surface Coating, Metal Cans: SIC 341) for Lane and Marion counties, while the State submittal does not.

14. For the following SCCs, State's inventory contains emissions for fewer counties than Version 2 of the NEI:

SCC	Counties in State Inventory	Counties in NEI Version 2
2102004000 (Industrial Boilers and IC Engines: Distillate Oil)	6	36
2401045000 (Surface Coating, Metal Coils: SIC 3498)	8	21
2401065000 (Surface Coating, Electronic and Other Electrical)	21	23
2461021000 (Solvent Utilization, Commercial Cutback Asphalt)	10	33
2810001000 (Forest Wildfires)	33	36

SCC	Counties in State Inventory	Counties in NEI Version 2
2810015000 (Prescribed Burning for Forest Management)	32	36
2810030000 (Structure Fires)	33	36

For each of these SCCs, State needs to provide guidance on whether the NEI emissions for counties that are not in the State's inventory should be removed or retained/revised.

15. For SCC 2801500000, EPA kept the NOX and CO emissions from Version 2 because these pollutants were not reported in the State submittal (in addition, EPA developed PM25-FIL and PM10-FIL emissions using the State's estimates for PM10-PRI and PM25-PRI and the PM augmentation procedure). However, Version 2 only reports emissions for this SCC for 16 counties rather than the 26 counties reported in the State submittal.

16. The State did not provide any area source emissions for FIPS County Code 067 (Washington County). EPA contacted the State about this issue and was told that this county was not purposely excluded from the submittal. EPA incorporated Version 2 emission estimates for this county into the Final Version 3 NEI.

B. Comments Processing

Oregon did not provide comments during the comments period for Version 3, however the SCC 2275900101 was changed to 2275900000.

Rhode Island 1999 Area Source Inventory: Criteria Pollutants

RI included annual and daily emissions and related data for VOC, NOX, and CO emissions in their inventory.

A. Initial Submittal Processing

1. Incorporated State submitted VOC, NOX, and CO emissions for SCC 2199001000 (Stationary Source, Fuel Combustion, Total Area Source Fuel Combustion, Anthracite Coal, Total: All Boiler Types). NEI Version 2 emissions for SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON for SCC 2103001000 were added to VOC, NOX, and CO emissions for SCC 2199001000 in State's inventory.

2. All Version 2 Surface Coating SCCs (2401015000 to 2401200000) were removed, because they are replaced by SCC 2401990000 (Solvent Utilization, Surface Coating, All Surface Coating Categories, Total: All Solvent Types) in Version 3 State submittal.

3. Removed Version 2 SCCs 2420010055 (Commercial/Industrial Cleaners, Perchloroethylene) and 2420020055 (Coin-operated Cleaners, Perchloroethylene) because they are replaced by SCC 2420000055 (Dry Cleaning, All Processes, Perchloroethylene) in Version 3 State submittal.

4. Removed Version 2 SCCs 2461800000, 2465100000, 2465200000, 246540000, and 2465600000 because they are replaced by SCC 2460000000 (Solvent Utilization, Miscellaneous Non-industrial: Consumer and Commercial, All Processes, Total: All Solvent Types) in Version 3 State submittal.

5. Removed Version 2 SCCs 2501060051, 2501060052, 2501060053, 2501060101, and 2501060201 because they are replaced by SCC 2501060000 (Storage and Transport, Petroleum and Petroleum Product Storage, Gasoline Service Stations, Total: All Gasoline/All Processes) in Version 3 State submittal.

6. Removed Version 2 SCC 2505030120 (Petroleum Product Transport, Truck: Gasoline) because it is replaced by SCC 2505000000 (Petroleum Product Transport, All Transport Types: All Products) in Version 3 State submittal.

7. Removed SCC 2610000000 (Open Burning/All Categories). The EPA has developed new emission estimates for open burning and is using these new estimates instead of State-submitted data. This includes estimates for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500).

8. The EPA is developing new emission estimates for residential fossil fuel combustion. There is a possibility for potential double-counting with State submitted data for SCC 2199001000.

9. The EPA is developing new emission estimates for residential fossil fuel combustion. There is a possibility for potential double-counting with State submitted data for SCC 2199004001.

10. Incorporated State submitted VOC, NOX, and CO emissions for SCC 2199005000 (Stationary Source Fuel Combustion, Total Area Source Fuel Combustion, Residual Oil, Total: All Boiler Types). EPA added Version 2 emissions for SCC 2102005000 to SCC 2199005000 in State's inventory.

11. The EPA is developing new emission estimates for residential fossil fuel combustion. There is a possibility for potential double-counting with State submitted data for 2199006001.

12. The EPA is developing new emission estimates for residential fossil fuel combustion. There is a possibility for potential double-counting with State submitted data for SCC 2199007000.

13. Incorporated State submitted VOC, NOX, and CO emissions for SCC 2199004001 (Total Area Source Fuel Combustion, Distillate Oil, All Boiler Types), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2102004000 (Industrial, Distillate Oil, Total: Boilers and IC Engines) and 2103004000 (Commercial/Institutional, Distillate Oil, Total: Boilers and IC Engines).

EPA summed the NEI Version 2 emissions for SO2, NH3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON for SCCs 2102004000 and 2103004000 and added to VOC, NOX, and CO emissions for SCC 2199004001 in State's inventory.

14. There is potential for double-counting in Surface Coating categories given that the State submitted emissions for SCC 2401990000 (All Surface Coating Categories, Total: All Solvent Types) as well as emissions for SCC 2401001000 (Surface Coating, Architectural Coatings, Total: All Solvent Types), SCC 2401005000 (Surface Coating, Auto Refinishing: SIC 7532, Total: All Solvent Types), and SCC 2401008000 (Surface Coating, Traffic Markings, Total: All Solvent Types).

15. There is potential for double-counting in Commercial Solvent Utilization given that the State submitted emissions for SCC 2460000000 (Consumer and Commercial, All Processes, Total: All Solvent Types) and for SCC 2461021000 (Commercial Cutback Asphalt, Total: All Solvent Types). State should provide EPA with guidance on whether the emissions for either of these Solvent Utilization SCCs should be removed or revised to eliminate double-counting.

16. State submitted VOC, NOX, and CO emissions for SCC 2199007000 (Stationary Source, Fuel Combustion, Total Area Source Fuel Combustion, Liquified Petroleum Gas (LPG), Total: All Boiler Types) were incorporated.

EPA will summed the emissions for SO2, PM10-PRI, and PM25-PRI in Version 2 of the 1999 NEI for SCCs 2102007000 and 2103007000 and added them to SCC 2199007000 in State's inventory .

17. State submitted VOC, NOX, and CO emissions for SCC 2199006001 (Stationary Source Fuel Combustion, Total Area Source Fuel Combustion, Natural Gas, All Boiler Types) were incorporated.

EPA summed emissions for SO2, PM10-PRI, and PM25-PRI in NEI Version 2 for SCCs 2102006000 and 2103006000 and added them to VOC, NOX, and CO emissions for SCC 2199006001 in State's inventory.

B. Comments Processing

RI submitted a number of SCCs with generally all counties represented in their comments.

1. Delete comments were submitted for a number of SCCs

- 2102002000
- 2103001000
- 2104001000
- 2275900000
- 2415105000
- 2415110000
- 2415120000
- 2415125000
- 2415130000
- 2415135000
- 2415140000
- 2415145000
- 2415305000
- 2415310000
- 2415320000
- 2415325000
- 2415330000
- 2415335000
- 2415340000
- 2415345000
- 2415355000
- 2415360000
- 2415365000
- 2420010370
- 2430000000
- 2440020000
- 2601010000
- 2601020000
- 2601020000
- 2610000100
- 2610000400
- 2610000400
- 2610000500
- 2610000500
- 2610030000
- 2610030000

- 2630020000
- 2640000000
- 2640000004

These deletes were at the PE level and therefore they were processed in a cascading fashion.

2. State values for residential fuel combustion records were not processed as it was determined that EPA residential fossil fuel combustion values would be used.

3. State comments for 2199001000, 2199004001, 2199005000, 2199006001, 2199007000, and 2401090000 for CO, NOX and VOC were processed.

Davidson County, Tennessee 1999 Area Source Inventory: Criteria Pollutants

Davidson County (FIPS code 037), TN included annual and ozone season day emissions for VOC, NOX, CO, SO2, and PM10-PRI emissions in their inventory.

A. Initial Submittal Processing

1. Removed the following SCCs for residential fossil fuel combustion from county's inventory: 2104002000, 2104004000, and 2104006000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

2. Replaced VOC, NOX, CO, SO2, and PM10-PRI emissions in Version 2 for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General) with county-supplied VOC, NOX, CO, SO2, and PM10-PRI emissions for SCC 2104008000 (Stationary Source Fuel Combustion Residential Wood Total: Woodstoves and Fireplaces). Set PM25-PRI emissions in Version 3 equal to county-supplied PM10-PRI emissions.

3. Incorporated State PM10-PRI emissions for SCC 2311000000 (Industrial Processes Construction: SIC 15-17 All Processes Total), and removed PM10-PRI emissions in Version 2 for SCCs 2311010000 (General Building Construction Total), 2311020000 (Heavy Construction Total), and 2311030000 (Road Construction Total). Removed PM10-FIL, PM25-FIL, and PM25-PRI emissions in Version 2 and estimated emissions for these pollutants from county-supplied PM10-PRI emissions (see PM augmentation procedures).

4. Replaced VOC emissions in Version 2 for SCCs 2465100000, 2465200000, 2465400000, and 2465600000 with county VOC emissions for SCC 2460000000 (Solvent Utilization Miscellaneous Non-industrial: Consumer and Commercial All Processes Total: All Solvent Types).

5. Replaced VOC emissions in Version 2 for SCCs 2501060053, 2501060100, and 2501060201 in Version 2 with county VOC emissions for SCC 2501060000 (Storage and Transport Petroleum Product Storage Gasoline Service Stations Total: All Gasoline/All Processes).

6. Did not incorporate county emissions data for SCC 2610000000 (Open Burning/All Categories) into Version 3. The EPA has developed new emission estimates for open burning and are using these new estimates instead of county-submitted data. This includes estimates for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500). Note that for Davidson County, TN, EPA estimates for SCCs 2610030000, 2610000100, and 2610000400 are zero, and, therefore, are not included in Version 3 of the 1999 NEI.

7. Incorporated State emissions for SCC 2401001030 (Architectural Coatings, Acetone). Version 2 of the NEI reports emissions in Davidson County for SCC 2401001000 (Architectural Coatings, Total: All Solvent Types). Potential double-counting may exist.

Texas 1999 Area Source Inventory: Criteria Pollutants

TX included in their inventory VOC, NOX, and CO annual emissions and related data for 29 counties. Pollutant code SOX was changed to SO2 to comply with NEI pollutant code requirements.

A. Initial Submittal Processing

1. Updated null emission numeric values for VOC for 58 records after receiving updated information from the TX.

2. All Tables

3. Although Texas submitted a statewide inventory that has been included in Version 2 of the final 1999 NEI, fugitive dust emissions for the paved and unpaved road categories were inadvertently left out of Texas' inventory. As directed by Texas, fugitive dust emissions for paved and unpaved roads from Version 1.5 of the 1999 NEI were added to Final Version 3 of the 1999 NEI.

4. TX used the submittal flags in NIF 2.0 to provide comments on PE and EM records in final Version 2 of the 1999 NEI. Modifications to the TX inventory for both PE and EM records included making the usage of the submittal flags consistent and inactivating duplicate records. The submittal flag comments were incorporated as TX directed. These comments affected 29 counties and 97 SCCs.

5. Submittal flag comments for PE records included revisions to 97 SCCs primarily for the purpose of removing actual throughput information.

6. For 17 counties, submittal flag comments on the EM records included revisions, additions, and deletions with the primary result of changing the emission type code on records from 29 to 27 and removing emission factor information. VOC emissions were deleted for the following SCCs:

2401100000	2460500000
2430000000	2460600000
2440020000	2460800000
2460100000	2460900000
2460200000	2465600000
2460400000	2830000000

Vermont 1999 Area Source Inventory: Criteria Pollutants

VT included annual emissions and related data for VOC, NOX, CO, SOx, PM10-FIL, and PM25-FIL emissions in their inventory.

A. Initial Submittal Processing

1. Fax number is missing

2. Changed pollutant code for SCC PM10-FIL to PM10-PRI for SCCs 2104008xxx (Stationary Source Fuel Combustion/Residential Wood). This change was made to make the reporting of PM10 and PM25 emissions consistent in the NEI. Basis is that emission factors for residential wood combustion represent primary rather than filterable emissions.

3. Replaced VOC, NOX, CO, and SO2 emissions in Version 2 with State data for SCC 2104008001 (Residential Wood/Fireplaces/General). Also removed PM10-PRI and PM25-PRI emissions for this SCC in Version 2, changed pollutant code for PM10-FIL in State's inventory to PM10-PRI, incorporated State's PM10-PRI emissions into Version 3, and set PM25-PRI emissions equal to PM10-PRI emissions.
In addition, EPA estimates for SCCs 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), and 2104008004 (Fireplace Inserts, EPA Certified Catalytic) in Version 2 were removed from the NEI; emissions for these SCCs were assumed to be included in the State-supplied emissions for SCC 2104008001.

4. State provided VOC, NOX, CO, SO2, and PM10-FIL emissions for SCCs 2104008010 (Stationary Source Fuel Combustion/Residential Wood/Woodstoves: General) and 2104008050 (Stationary Source Fuel Combustion/Residential Wood/Non-catalytic Woodstoves: General). Replaced NEI Version 2 VOC, NOX, CO, and SO2 emissions with State emissions for both of these SCCs. Also removed PM10-PRI and PM25-PRI emissions for the two SCCs in Version 2, changed pollutant code for PM10-FIL in State's inventory to PM10-PRI, incorporated State's PM10-PRI emissions into Version 3, and set PM25-PRI emissions equal to PM10-PRI emissions.

EPA Version 2 emission estimates for SCC 2104008030 (Fireplace Inserts, EPA Certified Non-Catalytic) were removed because emissions for this SCC were assumed to be included in the State-supplied emissions for SCC 2104008010 (Residential Wood Woodstoves: General).

5. Clarification may be necessary on the use of SCC 2104008010 (Woodstoves: General). State does not use SCC 2104008030 (Catalytic Woodstoves: General) to report other woodstove emissions; instead the state uses SCC 2104008010. The State is reporting all non-catalytic woodstove emissions in SCC 204008050.

Virginia 1999 Area Source Inventory: Criteria Pollutants

VA included annual and ozone season day emissions and related data for VOC, NOX, and CO emissions in their inventory.

A. Initial Submittal Processing

1. VA's inventory contained an independent city code for South Boston (County FIPS code 780) which is no longer valid. Emissions for South Boston were combined with Halifax County (County FIPS code 083) emissions in Final Version 3 of the NEI.

2. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104002000, 2104004000, 2104006000, and 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

3. Replaced VOC emissions for SCC 2302070000 (SIC 20 Fermentation/Beverages Total) in Version 2 with State-supplied VOC emissions for SCC 2302070001 (SIC 20 Fermentation/Beverages Breweries), SCC 2302070005 (SIC 20 Fermentation/Beverages Wineries), and SCC 2302070010 (SIC 20 Fermentation/Beverages Distilleries).

4. Replaced VOC emissions for SCC 2401001000 (Architectural Coatings Total: All Solvent Types) in Version 2 with State-supplied VOC emissions for SCC 2401002000 (Architectural Coatings - Solvent-based Total: All Solvent Types) and SCC 2401003000 (Architectural Coatings - Water-based Total: All Solvent Types).

5. Replaced VOC emissions for SCC 2415000000 (Degreasing All Processes/All Industries Total: All Solvent Types) in Version 2 with State-supplied VOC emissions for specific degreasing SCCs 24153*****.

6. For SCC 2420000000 (Dry Cleaning All Processes: All Solvents), replaced 1999 NEI Version 2 emissions (1,271.87 tons/year; 7.79 tons/day) with State emissions (0 tons/year; 0 tons/day).

7. Removed SCCs 2601030000 (Residential On-Site Incineration) and 2610020000 (Open Burning Commercial/Institutional /Total) from Version 3. The EPA believes the emissions for this category are accounted for under residential open burning. The EPA has developed new emission estimates for open burning and is using these new estimates instead of State submitted data. This includes estimates for the burning of residential municipal solid waste (backyard burn barrels, SCC 2610030000), residential yard waste burning (SCC 2610000100 for leaf burning and 2610000400 for brush burning), and the burning of land clearing debris from construction activities (SCC 2610000500).

8. Replaced VOC, NOX, and CO emissions in Version 2 with State data for SCC 2104008000 (Residential Wood/Woodstoves & Fireplaces/General), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified

Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General).

EPA summed the NEI Version 2 emissions for SO2, PM10-PRI, and PM25-PRI for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, 2104008030, and 2104008050 and added them to SCC 2104008000 in State's inventory.

3. EPA retained SO2, NH3, and PM-related pollutant emissions from Version 2 for SCCs for which the State submitted VOC, NOX, and CO emissions. In many cases, there are fewer counties with SO2 and PM-related emissions in Version 2 for a given SCC than there are VOC, NOX, and CO emissions in the State submittal. For example, for SCC 2810015000 (Prescribed Burning for Forest Management) State shows 136 counties reporting VOC, NOX, and CO emissions, while Version 2 reports 112 counties with SO2 and PM emissions.

4. Potential double-counting may exist with SCC 2461020000 (Commercial Asphalt Application, All Process, Total: All Solvent Types) given State submittals for SCCs 2461021000 (Commercial Cutback Asphalt, Total: All Solvent Types), 2461022000 (Commercial Emulsified Asphalt, Total: All Solvent Types), and 2461023000 (Commercial Asphalt Roofing, Total: All Solvent Types).

4. Potential double-counting may exist with SCC 2465000000 (Consumer, All Products/Processes, Total: All Solvent Types) given State submittals for SCCs 2465800000 (Consumer Pesticide Application, Total: All Solvent Types) and 2465900000 (Consumer Miscellaneous Products: Not Elsewhere Classified (NEC), Total: All Solvent Types).

5. Potential double-counting may exist with SCC 2505020000 (Petroleum and Petroleum Product Transport, Marine Vessel, Total: All Products) given petroleum product-specific submittals from State for SCCs 2505020***.

6. Potential double-counting may exist with 2601000000 (On-site Incineration, All Categories, Total) given State submittals for SCCs 2601010000 (On-site Incineration, Industrial, Total) through 2601030000 (On-site Incineration, Residential, Total).

B. Comments Processing

1. Virginia submitted revisions to 14 counties for SO2 for the following SCCs.

- 2102005000
- 2103001000
- 2103002000
- 2103004000
- 2103005000

Wisconsin 1999 Area Source Inventory: Criteria Pollutants

WI included annual and ozone season day emissions and related data for VOC, NOX, CO, SO2, PM-FIL, and PM10-FIL emissions in their inventory.

A. Initial Submittal Processing

1. Removed the following SCCs for residential fossil fuel combustion from State's inventory: 2104001000, 2104004000, 2104006000, and 2104007000. The EPA has developed new emission estimates for residential fossil fuel combustion to replace State data.

2. Specific Solvent Utilization Degreasing SCCs (2415105000, 2415110000, 2415120000, 2415125000, 2415130000, 2415135000, 2415140000, 2415145000, 2415305000, 2415310000, 2415320000, 2415325000, 2415330000, 2415335000, 2415340000, 2415345000, 2415355000, 2415360000, 2415365000) in Version 2 were removed because they were replaced by SCC 2415000000 (Solvent Utilization Degreasing All Processes/All Industries: All Solvent Types) in Version 3 State submittal.

3. SCC 2465000000 (Consumer All Products/Processes Total: All Solvent Types) in Version 2 was removed because it was replaced by emissions for SCC 2460000000 (Consumer and Commercial All Processes Total: All Solvent Types) in Version 3 State submittal.

4. The State submitted emissions for many pollutants for the fuel combustion SCCs listed in the following table. However, the State submittal did not report the following pollutants that were reported in Version 2.0:

SCC	Pollutants Not Reported
2102002000 (Industrial Bituminous/Subbituminous Coal Boilers)	SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2102004000 (Industrial Distillate Oil Boilers and IC Engines)	SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2102006000 (Industrial Natural Gas Boilers and IC Engines)	SO2, NH3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2102008000 (Industrial Wood Boilers)	SO2, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2103004000 (Commercial/Institutional Distillate Oil Boilers and IC Engines)	SO2, NH3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2103005000 (Commercial/Institutional Residual Oil Boilers and IC Engines)	SO2, NH3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON
2103006000 (Commercial/Institutional Natural Gas Boilers and IC Engines)	SO2, NH3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, PM-CON

The EPA incorporated the Version 2.0 emission estimates for these pollutants into the Final Version 3.0 inventory.

5. SCC 2102005000 (Fuel Combustion Industrial Residual Oil Total: All Boiler Types). State provided no data for this SCC. NEI Version 2 contains emissions for VOC, NOX, CO, SO2, and PM-related pollutants.

6. State provided no data for SCC 2103001000 (Fuel Combustion Commercial/Institutional Anthracite Coal Total: All Boiler Types). NEI Version 2 contains emissions for SO2 and PM-related pollutants only.

7. State provided no data for SCC 2103002000 (Fuel Combustion Commercial/Institutional Bituminous/Subbituminous Coal Total: All Boiler Types). NEI Version 2 contains emissions for VOC, NOX, CO, SO2, and PM-related pollutants.

8. State provided no data for SCC 2103008000 (Fuel Combustion Commercial/Institutional Wood Total: All Boiler Types). NEI Version 2 contains emissions for VOC, NOX, CO, SO2, and PM-related pollutants.

9. Incorporated VOC, NOX, and CO State emissions data for SCC 2104008000 (Residential Wood/Woodstoves & Fireplaces/General), and removed VOC, NOX, and CO emissions in Version 2 of the 1999 NEI for SCCs 2104008001 (Fireplaces/General), 2104008002 (Fireplace Inserts, Non-EPA Certified), 2104008003 (Fireplace Inserts, EPA Certified Non-Catalytic), 2104008004 (Fireplace Inserts, EPA Certified Catalytic), 2104008010 (Woodstoves/General), 2104008030 (Catalytic Woodstoves/General), and 2104008050 (Non-Catalytic Woodstoves/General).

EPA will summed the NEI Version 2 emissions for SO2, PM10-PRI, and PM25-PRI for SCCs 2104008001, 2104008002, 2104008003, 2104008004, 2104008010, 2104008030, and 2104008050 and added them to VOC, NOX, and CO emissions for SCC 2104008000 in State's inventory.

10. State provided emissions for SCC 2461020000 (Commercial Asphalt Application Total: All Solvent Types). The NEI Version 2 reports emissions for SCC 2461021000 (Commercial Cutback Asphalt Total: All Solvent Types). Potential double-counting may exist.

11. State provided VOC emissions for SCC 2461850000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: Agricultural All Purposes). The NEI Version 2 reports emissions for SCC 2461800000 (Solvent Utilization Miscellaneous Non-Industrial: Commercial Pesticide Application: All Processes Total: All Solvent Types). Potential double-counting may exist.

12. The State submittal for the Open Burning SCCs (2610000100, 2610000400, 2610000500, 2610030000) does not always include emissions for the following pollutants reported in Version 2 of the NEI (SO2, PM10-PRI, PM25-PRI, and PM25-FIL). EPA calculated emissions for the missing PM-related pollutants using the PM emissions data supplied by the State and the PM augmentation procedure. SO2 emissions were retained from Version 2. However, Version 2 of the NEI reports SO2 emissions for fewer counties than the State submittal.

13. Added State emissions data for SCC 2620030000 (Municipal Landfills). Version 2 contained emissions for one county (FIPS Code 078) that was not reported in the State data. EPA retained the Version 2

emissions for this county. Potential double-counting may exist between SCC 2620000000 (Landfills, All Categories) in Version 2 with State-supplied emissions for SCC 2620030000.

14. State submitted only daily emissions for SCC 2501060100 (Gasoline Service Stations, Stage 2: Total).

15. State submittal for SCC 2630020000 (Wastewater Treatment, Public Owned) reported VOC emissions while Version 2 of the NEI reported both VOC and NH3 emissions. EPA incorporated the NH3 emissions from Version 2 into the Version 3 inventory for this SCC.

16. State submittal for SCC 2810001000 (Forest Wildfires) reported NOX, CO, and VOC emissions while Version 2 of the NEI reported these pollutants and SO2, PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL. EPA incorporated the SO2, PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL emission estimates from Version 2 into Version 3 of the NEI.

17. State submittal for SCC 2810030000 (Structure Fires) reported NOX, CO, and VOC emissions while Version 2 of the NEI reported these pollutants and PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL. EPA incorporated the PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL emission estimates from Version 2 into Version 3 of the NEI.

B. Comments Processing

1. WV deleted the following SCCs for all pollutants from 55 counties:

- 2401001000
- 2415355000
- 2415360000
- 2465100000
- 2465200000
- 2465400000
- 2465600000

The following SCCs were deleted for all pollutants for only a subset of counties.

- 2415105000
- 2415110000
- 2415120000
- 2415125000
- 2415130000
- 2415135000
- 2415140000
- 2415145000
- 2415305000
- 2415310000

- 2415320000
- 2415325000
- 2415330000
- 2415335000
- 2415340000
- 2415345000
- 2415365000

APPENDIX B
METHODOLOGIES FOR ESTIMATING 1999 NEI EMISSIONS FOR AREA SOURCE RESIDENTIAL WOOD COMBUSTION

Methodologies for Estimating 1999 NEI Emissions for Area Source Residential Wood Combustion

RESIDENTIAL WOOD COMBUSTION

SCC

2104008001 Fireplaces
2104008002 Fireplaces: Inserts; non-EPA certified
2104008003 Fireplaces: Inserts; non-catalytic, EPA certified
2104008004 Fireplaces: Inserts; catalytic, EPA certified
2104008010 Woodstoves: General
2104008030 Catalytic Woodstoves: General
2104008050 Non-catalytic Woodstoves: General

Fireplaces

1. Determine the number of homes with fireplaces in the U.S. (U.S. Department of Commerce (DOC) data).
2. Adjust for the fact that some homes have more than one fireplace (multiply by 1.17).
3. Adjust for the fact that not everybody burns wood (74% burn wood, 26% burn gas).
4. Subtract out the fireplaces not being used (42% not used).
5. Subtract out the number of fireplace with inserts (DOC data. Fireplaces with inserts (i.e., inserts) are treated with woodstoves).
6. Separate the fireplaces into 2 categories; those used for heating and those used for aesthetics (DOC data).
7. Determine the amount of wood burned in each device. To do this, we assume wood consumption rates of 0.656 cords burned /unit/year for fireplaces used for heating and 0.069 cords/unit/year for fireplaces used for aesthetics. In 1997, we estimate that 2.94 million cords of wood were burned in the former and 0.483 million cords of wood were burned in the latter.
8. Account for climate differences. Now that the total wood burned in fireplaces is determined, we allocate the tons of wood burned into 5 climate zones. We do this based on information from the Department of Energy that indicates the relative amounts of wood burned in each climate zone.
9. Allocate wood consumption in each climate zone to individual counties in that zone.
10. Designate each county as either urban or rural and ADJUST urban and rural wood consumption to match American Housing Survey data (68% of wood burned in fireplaces is burned in urban counties). Note: if the Census data indicates that greater that 50 percent of the county's population is located in cities and towns, the county was considered urban. Less than 50 percent, rural.
11. Adjust the final allocation so that the desired urban and rural split is achieved.
12. Use AP-42 factors (section 1.9) to determine county emissions from fireplaces.

Woodstoves and Inserts

13. Determine the number of woodstoves and inserts in the U.S. Use data from the DOC and adjust for the fact that some homes have more than one stove. Consider units used for main heating different from units that are used for other heating.
14. We have the total cords of wood consumed by the residential section for 1997 from the Energy Information Administration (EIA). This figure does not include consumption for aesthetics so subtract out the cords of wood used for aesthetics used in fireplaces (determined previously).
15. Allocate wood consumption to the five climate zones.
16. Within each climate zone, allocate wood consumption to the individual county using the relative percent of detached single family homes in the county to the total number of detached single family homes in the entire climate zone.
17. Sum the wood consumption in each zone and compare the urban and rural split. Adjust the total until you get the desired split. For woodstoves, the split is 69 percent rural and 31 percent urban. For inserts, the split is 50/50. For example, if the total wood consumption for woodstoves in climate zone 1 was 60 percent for rural 40 percent fir urban, then each urban and rural county with that zone would receive a percent increase or decrease in cordwood

consumption to obtain the correct percent split to reach the 69 percent rural and 31 percent urban split.

18. We also apportion woodstove type. We know that 92 percent of the woodstoves are non-EPA certified, 5.7 percent are EPA certified non-catalytic, and 2.3 percent are EPA-certified catalytic.
19. Once the amount of wood consumed per residential wood combustion (RWC) type is obtained, we use AP-42 factors to obtain emission estimates.

This procedure is newly developed and this is the first year we are using it, although emissions in the NEI will be backcast to 1996. If a State submits data for RWC during our regular submittal times, we will use that instead. For more detail, see out reports on this procedure on our Clearinghouse for Inventories and Emission Factors (CHIEF) website (www.epa.gov/ttn/chief/) or contact Roy Huntley at Huntley.Roy@epa.gov.

Emission factors for Residential Wood Combustion can be found in Table B-1.

Table B-1. Criteria Pollutant Emission Factors For Residential Wood Combustion, lb/ton

SCC		VOC	NOX	CO	SO2	PM10	PM2.5
2104008001	Fireplaces	229	2.6	64.1	0.4	11.8	11.8
2104008002	Fireplaces: Inserts; non-EPA certified	53	2.8	230.8	0.4	30.6	30.6
2104008003	Fireplaces: Inserts; non-catalytic, EPA certified	12		140.8	0.4	19.6	19.6
2104008004	Fireplaces: Inserts; catalytic, EPA certified	15	2	104.4	0.4	20.4	20.4
2104008010	Woodstoves: General	53	2.8	230.8	0.4	30.6	30.6
2104008030	Catalytic Woodstoves: General	15	2	104.4	0.4	20.4	20.4
2104008050	Non-catalytic Woodstoves: General	12		140.8	0.4	19.6	19.6

APPENDIX C
METHODOLOGIES FOR ESTIMATING 1999 NEI EMISSIONS FOR RESIDENTIAL FOSSIL FUEL COMBUSTION

FINAL SUMMARY OF THE DEVELOPMENT AND RESULTS OF A METHODOLOGY FOR CALCULATING AREA SOURCE EMISSIONS FROM RESIDENTIAL FUEL COMBUSTION

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FINAL SUMMARY OF THE DEVELOPMENT AND RESULTS OF A METHODOLOGY FOR CALCULATING AREA SOURCE EMISSIONS FROM RESIDENTIAL FUEL COMBUSTION

1.0 INTRODUCTION

The Final 1999 National Emissions Inventory (NEI) contains area source emissions estimates for residential fuel combustion. These emission estimates are provided to the United States (U.S.) Environmental Protection Agency (EPA) by individual States. There is no comprehensive national methodology for calculating emissions from residential fuel combustion. Consequently, the methodologies used by States for calculating emissions from residential fuel combustion are inconsistent, as are their results.

This project had a two-fold goal: to analyze the reported residential fuel combustion emissions estimates in the 1999 NEI, and to develop a methodology for estimating residential fuel combustion emissions on a State and county level for the whole nation. State-level emissions comparisons were developed to show the differences between NEI reported emissions and emissions estimates developed for this project.

The methodology developed for estimating residential fuel combustion emissions makes use of publicly available data sets. Separate data sets were obtained for fuel consumption, and for allocating fuel to States and individual counties. Emission factors were obtained from EPA. Using the data and emission factors, emissions calculations were prepared for the following criteria pollutants:

- Carbon monoxide (CO;
- Oxides of nitrogen (NOX);
- Sulfur dioxide (SO2);
- Volatile organic compounds (VOC); and,
- Condensable and filterable particulate matter (both PM10 and PM2.5).

Emissions estimates for all States and counties in the United States were developed in spreadsheets. Due to the size of the spreadsheets, it was not feasible to include copies in table format in this document. Consequently, the emissions calculations have to be viewed in MS Excel. A snapshot of the data are provided in Attachment 1 to this document.

This report documents the methodology and results of this project. It is arranged in a sequential order, beginning with a description and explanation of the various data sources. This is followed by a description of the methodology used to calculate emissions for residential fuel combustion. The results of applying the methodology are discussed, and conclusions are made regarding the use and validity of the emissions estimates generated by this project.

2.0 DATA SOURCES

2.1 U.S. Department of Energy

2.1.1 Fuel Consumption Data

The methodology that was developed to estimate residential fuel combustion for this project uses fuel consumption data from the U.S. Department of Energy's (DOE) Energy Information Administration (EIA). The EIA annually publishes the State Energy Data Report that includes the amount of fuel consumed by various sectors, including the residential sector. The EIA reports residential fuel consumption for the following fuels:

1. Utility gas (natural gas);
2. Liquefied petroleum gas (LPG);
3. Distillate fuel oil (No. 2 fuel oil);
4. Kerosene; and,
5. Coal.

The EIA report does not distinguish among the various types of coal that are available in the U.S. Consequently, the EIA was contacted directly to obtain anthracite and bituminous coal consumption estimates. Due to low production, the EIA will discontinue its reporting of anthracite coal after 1999; therefore, in the future, all coal consumption can be considered to be bituminous.

The EIA report does not contain fuel consumption estimates for Puerto Rico or the Virgin Islands. Consequently it was not possible to calculate residential fuel combustion emissions for these areas.

2.1.2 Fuel Oil Sulfur Data

Throughout this project, a distillate fuel oil sulfur content of 0.30 percent has been assigned to all SO_2 calculations. This number was obtained from background documentation for the 1985 National Acid Precipitation Assessment Program (NAPAP). To validate this number the Federal Energy Regulatory Commission's FERC-423 database (http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html) was downloaded from the EIA. This database contains yearly data on multiple parameters for fuels combusted by electric utilities, including fuel costs, quality, place of origin, fuel heat input values, sulfur content, etc.

By using the FERC-423 database, it was determined that the average national distillate fuel oil sulfur content is approximately 0.24 percent. It was consequently decided to conservatively use 0.30 percent sulfur as the default national average. The 0.30 percent default average is a published value (NAPAP) and appears to be representative of distillate fuel oil consumed in the U.S.

2.2 U.S. Census Bureau

Fuel consumption data obtained from the EIA was State-specific, and was not broken out by county. Therefore, a method was developed that uses 1990 U.S. Census Bureau Detailed Housing Information (http://www.census.gov/prod/cen1990/ch2/det-hou.html) data to calculate a ratio with which EIA data can be

apportioned to individual counties. 2000 Census data was not used as it was not available during the development of this project. However, once it becomes available, the 1990 data can be replaced with 2000 data.

The 1990 Census Bureau data contains information on the primary fuel combusted by houses by county. The Detailed Housing Characteristics Report(s) provide data on the following categories of fuels:

- Utility Gas (assumed to be natural gas),
- Bottled, tank, or liquified petroleum gas (LPG),
- Electricity,
- Fuel oil, kerosene, etc.,
- Coal or coke,
- Wood,
- Solar energy,
- Other fuel,
- No fuel used.

Of the fuels listed in the Census Bureau Report, only utility gas, bottled gas, fuel oil, kerosene, and coal/coke were used in this report. The reports are broken out to provide the number of houses per county that burn each fuel type as their primary fuel.

2.3 U.S. Geological Survey

In order to calculate State specific emissions for anthracite and bituminous coal, an effort was made to obtain sulfur and ash content data for individual coal seams. Some of the emission factors for SO_2 and particulate matter for anthracite and bituminous coal require specific sulfur and ash content data. To this effect, the U.S. Geological Survey's (USGS) COALQUAL database (http://energy.er.usgs.gov/coalqual.htm#submit) was obtained and queried for individual coal seams.

The COALQUAL database contains data on anthracite, bituminous, subbituminous, and lignite coal. Queries were designed to obtain ash and sulfur content data for every State that has coal seams. The database contains bituminous, subbituminous or lignite coal seam data for 31 States. In addition, it contains anthracite coal data for 6 States (only 4 had sulfur and ash data). An average coal ash and sulfur content was calculated for coal seams having numerous data points. Only non-zero data points were used to calculate State specific averages. Some States only reported data for subbituminous or lignite coal. Whenever this was the case, averages for subbituminous or lignite coal were calculated and used in conjunction with bituminous coal emission factors. As will be explained in further detail in the discussion pertaining to emission factors, there are no emission factors for lignite or subbituminous coals.

Not all States for which coal use is reported by DOE contain coal seams. States for which anthracite coal use was reported but that contain no anthracite coal were assigned average ash and sulfur values based on coal found in Pennsylvania. The ash content for Pennsylvania was also assigned to Virginia. Pennsylvania has the most robust data set in the COALQUAL database from which average values could be calculated.

Similarly, States reporting bituminous coal consumption that do not have any such coal were assigned coal values based on State proximity. The proximity analysis was performed by selecting a neighboring State with coal seams and corresponding data. The neighboring State's coal data were substituted for the State that did not have any coal, but for which coal consumption was reported by the DOE. For States that are bordered by more than one coal containing State, the State with the most conservative (those with the highest value) coal data was selected. In addition, States that do not have any DOE-reported coal consumption were included in this analysis as placeholders. The data will be available in the eventuality that the DOE reports coal use for these States in the future.

The results of the COALQUAL analysis are presented in Table 1. The State coal ash and sulfur proximity analysis is presented in Table 2.

2.4 National Emission Inventory

A copy of the Final area source 1999 version 2 NEI was obtained from the EPA. This version was used for State emissions comparisons, and was the most current version of the 1999 NEI available at the time that this methodology was developed. SCC-specific data queries were developed to obtain data regarding State level residential fuel combustion estimates.

2.5 Source Classification Codes

2.5.1 Residential Area Source Fuel Combustion SCCs

A listing of applicable source classification codes (SCC) was obtained from the EPA. The residential fuel combustion SCCs used in this analysis are presented in Table 3. The Final 1999 NEI was queried for these SCCs to obtain State-reported emissions data.

2.5.2 SCCs Starting with 2199

The Final 1999 area source NEI was found to contain emissions that were reported using an SCC code beginning with 2199. According to the EPA's master list of SCC codes, SCCs beginning with 2199 represent "Total Area Source Fuel Combustion." Based on the SCC6 and SCC8 descriptions, it was possible to determine the fuel type as well as the combustion device type, and these are presented in section 4.3 of this report.

Table 1. COALQUAL Ash and Sulfur Analysis

State	Ash (%)	Sulfur ($\%_w$)	No. of Data Points	1999 DOE Reported Consumption (10^3 tons)	Comments
Anthracite Coal					
New Mexico	16.61	0.77	1.00	0.00	
Pennsylvania	13.38	0.89	32.00	292.80	
Virginia	27.60*	0.43	1.00	0.60	
Washington	12.00	0.90	1.00	0.00	
Average	**17.40**	**0.75**	n/a	n/a	
Bituminous Coal					
Alabama	12.01	2.08	940.00	8.05	
Alaska	8.44	0.31	32.00	193.55	
Arizona	7.45	0.47	11.00	0.00	Subbituminous Coal
Arkansas	5.43	1.20	26.00	0.00	
Colorado	8.39	0.61	290.00	35.70	
Georgia	9.37	1.28	37.00	5.95	
Idaho	11.53	0.31	1.00	19.25	Subbituminous Coal
Illinois	10.63	3.48	16.00	63.35	
Indiana	7.50	2.49	157.00	118.30	
Iowa	12.41	4.64	118.00	136.15	
Kansas	14.37	5.83	30.00	2.45	
Kentucky	9.56	1.93	905.00	140.35	
Maryland	11.22	1.67	59.00	15.40	
Michigan	3.37	1.20	3.00	6.65	
Mississippi	9.79	1.24	8.00	0.00	Lignite Coal
Missouri	14.11	4.96	91.00	78.05	
Montana	6.39	0.60	262.00	1.05	Subbituminous Coal
Nebraska	14.05	2.43	6.00	0.00	
Nevada	9.60	2.30	1.00	0.00	
New Mexico	15.34	0.75	29.00	2.10	
North Dakota	8.47	0.97	193.00	44.80	Lignite Coal
Ohio	11.84	3.45	660.00	75.25	
Oklahoma	10.59	3.08	46.00	0.70	
Pennsylvania	11.96	2.42	759.00	70.70	
Tennessee	7.67	1.62	58.00	34.30	
Texas	12.52	1.14	47.00	2.80	Lignite Coal
Utah	10.31	0.80	151.00	39.90	
Virginia	8.47	1.19	451.00	43.05	
Washington	23.69	0.50	7.00	5.95	
West Virginia	9.03	1.25	568.00	58.80	
Wyoming	9.91	0.87	45.00	36.40	
Average	**10.50**	**1.84**	n/a	n/a	

* Using this ash content created a discrepancy between the emission factors for PM10-FIL (which is not ash dependent) and PM25-FIL (which is ash dependent); therefore the value for Pennsylvania was used for Virginia.

Table 2. Bituminous Coal Sulfur and Ash Proximity Analysis

State	Ash (%)	Sulfur (%)	1999 Consumption Data by DOE (10^3 tons)	State Proximity
California	7.45	0.47	9.80	AZ data
Connecticut	11.96	2.42	0.00	PA data
Delaware	11.22	1.67	0.00	MD data
Washington DC	11.22	1.67	2.10	MD data
Florida	9.37	1.28	2.10	GA data
Maine	11.96	2.42	9.45	PA data
Massachusetts	11.96	2.42	9.45	PA data
Minnesota	8.47	0.97	5.25	ND data
New Hampshire	11.96	2.42	0.00	PA data
New Jersey	11.96	2.42	0.00	PA data
New York	11.96	2.42	47.25	PA data
North Carolina	7.67	1.62	52.50	TN data
Oregon	23.69	0.50	0.00	WA data
Rhode Island	11.96	2.42	0.00	PA data
South Carolina	9.37	1.28	82.95	GA data
South Dakota	8.47	0.97	0.35	ND data
Vermont	11.96	2.42	0.00	PA data
Wisconsin	3.37	1.20	54.95	MI data

Table 3. SCCs used for Residential Fuel Combustion

SCC	Fuel	Description
2104001000	Anthracite Coal	All Combustor Types
2104002000	Bituminous/Subbituminous Coal	All Combustor Types
2104004000	Distillate Oil	All Combustor Types
2104005000	Residual Oil	All Combustor Types
2104006000	Natural Gas	All Combustor Types
2104006010	Natural Gas	Residential Furnaces
2104007000	Liquefied Petroleum Gas	All Combustor Types
2104011000	Kerosene	Total: All Heater Types

2.6 FIPS Codes

The FIPS codes used in the emissions estimation spreadsheets were obtained from the EPA's Emission Factor and Inventory Group (EFIG). U.S. Census Bureau housing data were matched to the applicable State and county FIPS codes. In some instances it was necessary to reapportion 1990 U.S. Census Bureau data to match EFIG's FIPS master list. For example, the 1990 U.S. Census Bureau includes Yellowstone National Park, but the EFIG FIPS master list does not. The Census Bureau listed 24 houses in Yellowstone National Park that burned LPG as their primary fuel. These 24 houses were reapportioned in the following manner: 12 houses were assigned to Yellowstone County, and 12 houses were assigned to Teton County. It was also necessary to reapportion two boroughs in Alaska.

2.7 Emission Factors

An extensive search and review was conducted to identify emission factors for the fuels and pollutants of concern to this project. The principal source of emission factors was the EPA's Compilation of Stationary Source Emission Factors, commonly referred to as AP-42. Wherever possible, the most recent release(s) of AP-42 were used. In many cases, residential-specific emission factors were not available for selected fuel types or heating unit size ranges. Emission factors were then selected based on the heating unit size and firing configuration that most closely matched residential heating units. When residential-specific emission factors were not available, commercial/institutional factors were selected. Commercial/institutional emission factors for heating units were selected (in the absence of residential specific factors) because these units are assumed to be the most similar to residential heating units. Heating unit size ranges were obtained from an earlier version of AP-42, Section 1.4 (1996). This section distinguishes among heating unit/boiler sizes in the following manner:

- Utility/Large Industrial Boilers: >100 MMBtu
- Small Industrial Boilers: 10 - 100 MMBtu
- Commercial Boilers: 0.3 - <10 MMBtu
- Residential Furnaces: <0.3 MMBtu.

Information is provided in the fuel specific emission factor tables regarding the publication date of the AP-42 section from which the factor was obtained.

2.7.1 Natural Gas

Emission factors for residential natural gas combustion were obtained from AP-42, Section 1.4 (Natural Gas Combustion, 1998 version). Table 4 presents the selected emission factors for natural gas combustion.

Table 4. Emission Factors for Residential Natural Gas Combustion

Pollutant	Emission Factor ($lb/10^6$ ft^3)	AP-42 Table	Publication Date
CO	40	1.4-1	07/98
NO_x	94	1.4-1	07/98
SO_2	0.6	1.4-2	07/98
VOC	5.5	1.4-2	07/98
PM10 (Filterable)	1.9	1.4-2	07/98
PM2.5 (Filterable)	1.9	1.4-2	07/98
PM Condensable	5.7	1.4-2	07/98

All emission factors are based on natural gas having a heat content of 1,020 Btu/ft^3. The CO and NO_x emission factors are specific for uncontrolled residential furnaces. The SO_2 and VOC emission factors are applicable to all units burning natural gas. The SO_2 emission factor assumes that the sulfur content of natural gas is 2,000 grains/$10^6 ft^3$. The filterable PM10 and PM2.5 emission factors are identical as all PM (from natural gas combustion) is assumed to be less than 1.0 micrometers in diameter.

2.7.2 Liquified Petroleum Gas (LPG)

LPG emissions are considered to be similar to natural gas. Most of the emission factors were obtained from Section 1.5 in AP-42 (Liquefied Petroleum Gas Combustion, 1996 version). PM10, PM2.5 (condensable and filterable) and VOC emission factors are the same as those for natural gas; NO_x emissions are approximately 50 percent higher than those for natural gas. The SO_2 emission factor is 0.10(S) $lb/10^3$ gallon of fuel combusted. Based on prior discussions with EPA, a national sulfur fuel content for LPG of 0.54 grains/100 ft^3 was assigned. Table 5 presents the selected emission factors for residential LPG combustion.

Table 5. Emission Factors for Residential LPG Combustion

Pollutant	Emission Factor ($lb/10^3$ gallons)	AP-42 Table	Publication Date
CO	3.2	1.5-1	10/96
NO_x	13.0	1.4-2	07/98
SO_2	0.10	1.5-1	10/96
VOC	0.5	1.5-1	10/96
PM10 (Filterable)	0.17	1.4-2	07/98
PM2.5 (Filterable)	0.17	1.4-2	07/98
PM2.5 Condensable	0.51	1.4-2	07/98

Note: Emission factors have been converted from $lb/10^6 ft^3$ to $lb/10^3$ gallons.

Whenever natural gas emission factors were used it was necessary to convert them from $lb/ft^3 10^6$ to $lb/10^3$ gallons.

2.7.3 Distillate (No. 2) Fuel Oil

Distillate fuel oil emission factors were obtained from Section 1.3 of AP-42 (Fuel Oil Combustion, 1998 version). The emission factors are based on No. 2 fuel oil with a heating value of 140,000 Btu/gal. A sulfur content value of 0.30%$_w$ was assigned on a national basis for fuel oil as explained in section 2.1.2 of this report. This was determined to be a conservative value for distillate fuel sulfur contents. The emission factors selected for residential distillate fuel oil combustion are presented in Table 6.

Table 6. Emission Factors for Residential Distillate Fuel Oil Combustion

Pollutant	Emission Factor (lb/10^3 gallons)	AP-42 Table	Publication Date
CO	5.0	1.3-1	09/98
NOx	18.0	-1	09/98
SO_2	42.6	1.3-1	09/98
VOC as NMTOC	0.7	1.3-3	09/98
PM10 (Filterable)	1.08	1.3-7	09/98
PM2.5 (Filterable)	0.83	1.3-7	09/98
PM Condensable	1.3	1.3-2	09/98

The CO, NO_X and SO_2 emission factors are specific to residential furnaces. All condensable particulate matter from distillate fuel oil combustion is considered to be less than 1.0 micrometers in diameter; therefore, PM10 and PM condensable emission factors are identical. The emission factors for filterable PM10 and PM2.5 are specific to commercial/ institutional boilers having a design capacity of less than 10 million Btu/hr. Based on capacity, this was determined to be the boiler size range most similar to those that may be found in residential settings.

2.7.4 Kerosene

AP-42 does not contain kerosene-specific emission factors. Therefore, distillate fuel oil factors were multiplied by the ratio of kerosene and distillate fuel oil heat contents (135,000 / 140,000). In addition, the same assumption regarding fuel oil sulfur contents was used (0.30%$_w$). Table 7 contains the emission factors for residential kerosene combustion, which are approximately 4 percent lower than the emission factors for distillate fuel oil combustion for all pollutants except PM10 filterable.

Table 7. Emission Factors for Residential Kerosene Combustion

Pollutant	Emission Factor ($lb/10^3$ gallons)	AP-42 Table	Publication Date
CO	4.8	1.3-1	09/98
NOx	17.4	1.3-1	09/98
SOx	41.1	1.3-1	09/98
VOC	0.7	1.3-3	09/98
PM10 (Filterable)	1.08	1.3-1	09/98
PM2.5 (Filterable)	0.83	1.3-7	09/98
PM Condensable	1.3	1.3-2	09/98

2.7.5 Anthracite Coal

Anthracite coal emission factors were obtained from Section 1.2 of AP-42 (Anthracite Coal Combustion, 1996 version). The SO_2 emission factor is dependent upon the sulfur content of coal. The particulate matter emission factor is dependent upon the ash content of the coal. The method used for determining State-specific coal sulfur and ash content is described in Section 2.3 of this report.

The SO_2 and NO_x emission factors are for residential space heaters. The PM10 filterable emission factor was selected because it is for hand-fired units. It is assumed that most residential heating units are hand-fired and do not use more complicated firing mechanisms. The PM condensable emission factor is identical for both PM2.5 and PM10, as all condensable emissions are assumed to be less than 1.0 micrometers in diameter. The filterable PM2.5 emission factor is for uncontrolled commercial/institutional dry bottom boilers firing pulverized anthracite coal. This factor was selected because it is the only anthracite coal specific PM2.5 emission factor available in AP-42.

A conservative emission factor for CO was selected because AP-42 States that emissions from improperly operated or maintained coal-burning units may be "one or two orders of magnitude higher" than the listed factors. We assumed that many residential coal-burning units would be improperly operated or maintained. In addition, a 1986 version of AP-42 states emission factors are interchangeable, "based on the similarity of anthracite and bituminous coal." The NEI was also queried to ascertain which emission factors were being used to estimate CO emissions from anthracite coal burning boilers. The factor listed in Table 8 for CO was found in the NEI to be used for both coal types, further bolstering the argument for using this factor for estimating CO emissions from both types of coal.

Table 8. Emission Factors for Residential Anthracite Coal Combustion

Pollutant	Emission Factor (lb/ton)	AP-42 Table	Publication Date
CO	275	1.1-3	09/98
NOx	3.0	1.2-1	10/96
SOx	39S	1.2-1	10/96
VOC	10	1.1-19	09/98
PM10 (Filterable)	10.0	1.2-3	10/96
PM2.5 (Filterable)	0.6A	1.2-4	10/96
PM Condensable	0.08A	1.2-3	10/96

2.7.6 Bituminous Coal

Emission factors for bituminous coal combustion are from Section 1.1 of AP-42 (Bituminous Coal Combustion, 1998 version). AP-42 does not contain any residential-specific emission factors for bituminous coal combustion. Therefore, emission factors were selected based on boiler firing configuration and size. The SO_2 emission factor selected is for commercial/institutional hand-fed units, and therefore potentially similar to residential units. The CO emission factor selected was chosen for hand-fed units and it provides a conservative emission estimate. The emission factor used for VOC is for commercial/institutional hand-fed units and based

on total NMOC. The filterable PM10 emission factor chosen is for hand-fed commercial/institutional units. The filterable PM2.5 and condensable PM emission factor are for uncontrolled commercial/institutional underfeed stoker boilers. AP-42 states that in the absence of data for hand-fed units, the underfeed stoker emission factor can be used. In addition, it is the only factor for uncontrolled coal combustion.

Table 9. Emission Factors for Residential Bituminous Coal Combustion

Pollutant	Emission Factor (lb/ton)	AP-42 Table	Publication Date
CO	275	1.1-3	09/98
NOx	9.1	1.1-3	09/98
SOx	31S	1.1-3	09/98
VOC	10	1.1-19	09/98
PM10 (Filterable)	6.2	1.1-4	09/98
PM2.5 (Filterable)	3.8	1.1-10	09/98
PM Condensable	0.04	1.1-5	09/98

3.0 METHODOLOGY

Spreadsheets were developed in Microsoft® Excel to calculate emissions from residential fuel combustion at the State and county levels. Six fuel-specific spreadsheets were developed to estimate emissions at the State level. Six additional fuel-specific spreadsheets estimate emissions at the county level. The county spreadsheets are linked to the State spreadsheet so that updates to fuel consumption and emission factors can be performed at the State level only and will automatically roll down to the county level.

3.1 State-Level Emissions Calculations

The State-level spreadsheets use DOE fuel consumption figures to calculate emissions. The spreadsheets use the emission factors presented in the previous sections. In addition, NEI State totals have been inserted in columns next to the calculated values to allow for easy data comparisons. The spreadsheets have been sorted by decreasing order of carbon monoxide emissions. The EIIP and NEI State emission estimates have also been totaled to enable easier data comparisons.

3.2 County-Level Emissions Calculations

The county specific spreadsheets are similar to those developed for the States. The county spreadsheets have links to the State spreadsheets for emission factors and fuel consumption. Therefore, any updates to fuel consumption or emission factors need only be performed to the State spreadsheets.

The county spreadsheets integrate the U.S. Census Bureau data for allocating fuel consumption to the county level. The spreadsheets use the number of houses burning a particular fuel reported by county to calculate a ratio of the number of houses per county burning a specific fuel type to the number of houses in State burning fuel x. The total fuel consumed by a State is then multiplied by the county ratio to yield the county consumption. The county consumption figure is then multiplied by the emission factor to calculate emissions for

that county. Included, as the sixth column, is the percent of the total fuel consumption that is allocated to each county.

The U.S. Census Bureau only reports the number of houses per county burning "primary fuels." In the case of coal, it does not distinguish among the various grades of coal. The Census Bureau merely reports the number of houses per county burning coal as their primary fuel. Therefore, it was necessary to assign the same Census data to both anthracite and bituminous coal. A similar situation was encountered with distillate fuel oil and kerosene consumption. In the case of coal, DOE made anthracite and bituminous coal consumption estimates available. In the case of distillate fuel oil and kerosene, the DOE provided separate estimates that were apportioned using the same Census Bureau data.

3.3 QA/QC of Emissions Calculation Worksheets

The State and county worksheets were imported into an MS FoxPro database to facilitate a thorough QA/QC check of the worksheets. A QA/QC routine was developed that checked the county totals against the State totals. Corrections to the worksheets were made whenever it was determined that State and county totals were not consistent.

4.0 RESULTS

4.1 State Level Emissions Calculations

Within the Excel file that contains the emissions calculation spreadsheet, the first six worksheets contain emissions totals by fuel type and State. When reviewing the fuel specific emissions totals, it is apparent that the largest discrepancies exist among the Emission Inventory Improvement Program (EIIP) and NEI NO_x totals. For example, for natural gas, using the EIIP method, the NO_x totals are 140,024 tons lower than those reported in the NEI. This trend is also observed for LPG, and distillate fuel oil. Other emissions totals are more consistent. For example, there is only a 342-ton difference in the SO_2 emissions totals for all States for natural gas combustion.

4.2 County Level Emission Calculations

The final six worksheets in the emissions calculation spreadsheet contain county level results. These were not compared with NEI reported values. When summed, the county emissions are consistent with the State totals for all pollutants. As it was necessary to use the same Census Bureau data for coal(s), distillate fuel oil, and kerosene, some of the worksheets provide information on houses burning a particular fuel but show no fuel consumption. This will occur when, for example, a State has DOE-reported distillate fuel consumption but no kerosene consumption. In this case, the Census Bureau will have provided aggregated information on the number of houses burning either kerosene or distillate fuel oil.

4.3 SCC 2199 Analysis

It was determined that the NEI contains emissions data for five States using the 2199 SCC. An analysis was conducted to determine the origin of the emissions data. By doing this, it was found that the only State that

submitted data using these SCC codes was California. The other States (listed in Table 11) had flagged data that indicated that the EPA had inserted it into the NEI.

The State of California reports data to the NEI using two SCC codes beginning with 2199: 2199001000 (Resource Recovery, Unspecified Fuel) and 2199004000 (Manufacturing and Industrial, IC Reciprocating Engines, Unspecified Fuel). These code definitions do not match with the official EPA SCC master list. California has developed its own system, called the Emission Inventory Criteria (EIC), and has prepared a crosswalk of EIC – SCC codes.

A total of 66,457 tpy of emissions were reported to the NEI using SCC codes with the 2199 prefix. Table 11 provides a breakdown of the pollutants and their associated emissions as reported in the Final 1999 NEI.

Table 10. States Containing Emissions Data in the Final 1999 NEI

SCC	Fuel Type	Combustion Device Type	CA	FL	MD	MI	PA
2199001000	Anthracite Coal	All Boiler Types	x				
2199004000	Distillate Oil	Boilers and IC Engines	x	x	x		
2199004002	Distillate Oil	All Boilers Types	x				
2199005000	Residual Oil	All Boiler Types		x	x		
2199006000	Natural Gas	Boilers and IC Engines		x	x		x
2199007000	LPG	All Boiler Types		x	x		
2199011000	Kerosene	All Heater Types	x	x		x	

Note: Only California submitted emissions data using SCC beginning with 2199.

Table 11. Emissions Reported Using SCC 2199 in the Final 1999 NEI (v2)

State	Pollutant (tpy)						
	CO	NOx	PM10 Fil	PM25 Fil	SO_2	VOC	Total
California	4,839.98	17,081.47	1,393.64	171.05	1,210.38	1,351.26	26,048
Florida	654.11	5,780.73	na	na	na	153.30	6,588
Maryland	2,981.67	11,349.46	na	na	na	427.84	14,759
Michigan	1,330.54	44.49	na	na	na	50.58	1,426
Pennsylvania	2,759.91	13,847.56	na	na	na	1,028.64	17,636
Totals	12,566	48,104	1,394	171	1,210	3,012	66,457

na – not available

Except for California, it is not known what emissions were reported using the SCCs with the 2199 prefix. It is possible that residential fuel combustion emissions are reported using these SCC codes. Using the emissions estimates developed for this project will reduce the uncertainty of the emissions reported using SCC 2199s in the 1999 NEI.

5.0 CONCLUSION

It has been determined that methods for estimating and reporting residential fuel combustion emissions to the NEI are inconsistent among States due to discrepancies in the emission factors and reported emissions. This is based on the fact that States report inconsistent emission factors and emissions to the 1999 NEI. It has also been determined that the NEI contains substantial area source emissions that are reported using SCC 2199. Therefore, there is an identifiable need for the development of a consistent methodology for estimating area source residential fuel combustion emissions.

The methodology developed for this project and described in this report enables a simple and consistent approach to calculating emissions from residential fuel combustion. In addition, the spreadsheets that have been developed are easy to maintain and update. For example, it should be very simple to replace the 1990 Census Housing Data with the new 2000 Census data once it becomes available. Similarly, it should be very easy and straightforward to replace the DOE consumption estimates with more current data. The worksheets within the spreadsheet can also be modified to calculate HAP emissions.

The emissions calculations and corresponding results are more consistent than those reported to the NEI by individual States. By substituting the State reported NEI emissions with those developed by this project, a more robust and consistent data set will be made available via the NEI. Therefore, EPA proposes to replace existing State-reported residential fuel combustion emission estimates with those developed using the methodology described in this project.

APPENDIX D
METHODOLOGIES FOR ESTIMATING 1999 NEI EMISSIONS FOR AREA SOURCE CATEGORIES

PAVED ROADS

SCC

2294000000

Emission Factors

Reentrained road dust emissions for paved roads were estimated using paved road vehicle miles traveled (VMT) and PART5 emission factors. PART5 reentrained road dust emission factors depend on the road surface silt loading and the average weight of all vehicles traveling on the roadways. The equation used in PART5 to calculate particulate matter (PM) emission factors is a generic paved road dust formula from AP-42, shown below.

$$E = k * (sL/2)^{0.65} * (W/3)^{1.5}$$

where: E = paved road dust emission factor
k = particle size multiplier (7.3 g/VMT for PM-10 and 1.8 g/VMT for PM-2.5)
sL = road surface silt loading (g/m^2)
W = average weight (tons) of all vehicles traveling the road

Paved road silt loadings were assigned to each of the twelve functional roadway classifications (six urban and six rural) based on the average annual traffic volume of each functional system by State.

Correction factors were applied to the emission factors to account for the number of days with a sufficient amount of precipitation to prevent road dust resuspension. Corrected emission factors were developed by month at the State and road type level for the average vehicle fleet using the following equation and data from the National Climatic Data Center.

$$E_{corr} = E * [(D-(0.5*p))/D]$$

where: E_{corr} = paved road dust emission factor corrected for precipitation effects
E = uncorrected emission factor
D = number of days in the month
p = number of days in the month with greater than 0.01 inches of precipitation

Activity

VMT by road type estimates are obtained from the Federal Highway Administration's (FHWA) annual *Highway Statistics* report. Paved road VMT is calculated by subtracting the State/road type-level unpaved road VMT from total State/road type-level VMT. Because of differences in the methodologies for calculating total and unpaved VMT, there are instances where unpaved VMT is higher than total VMT. For these instances, unpaved VMT is reduced to total VMT and paved road VMT is assigned a value or zero. The paved road VMT are temporally allocated by month using the National Acid Precipitation Assessment Program (NAPAP) temporal allocations factors for VMT.

Allocation

The paved road PM emissions were allocated to the county level according to the fraction or total VMT in each county for the specific road type, shown by the following equation.

$$EMIS_{x,y} = EMIS_{ST,y} * VMT_{x,y} / VMT_{ST,y}$$

where: $EMIS_{x,y}$ = paved road PM emissions (tons) for county x and road type y
$EMIS_{ST,y}$ = paved road PM emissions (tons) for the entire State for road type y
$VMT_{x,y}$ = total VMT (million miles) in county x and road type y
$VMT_{ST,y}$ = total VMT (million miles) in entire State for road type y

Controls

A control efficiency of 79 percent was assumed. This control efficiency is based on vacuum sweeping of paved roads twice per month. This control was applied to urban and rural roads in serious PM nonattainment areas and to urban roads in moderate PM nonattainment areas. The assumed rule penetration varies by road type and nonattainment classification (serious or moderate).

UNPAVED ROADS

SCC

2296000000

Emission Factors

Reentrained road dust emissions for unpaved roads were estimated using unpaved road VMT and the emission factor equation from AP-42:

$$E = [k * (s/12)^a * (W/3)^b] / (M/0.2)^c$$

where k, a, b, and c are empirical constants given in Table D-1 and

E = size specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content under dry uncontrolled conditions (%)

Average State-level unpaved silt content values, developed as part of the 1985 NAPAP Inventory, were obtained from the Illinois State Water Survey. Silt contents of over 200 unpaved roads from over 30 States were obtained. Average silt contents of unpaved roads were calculated for each sate that had three or more samples for that State. For States that did not have three or more samples, the average for all samples from all States was used.

A default value of 2.2 tons is used nationally as the mean vehicle weight. The value of 1 percent for M was chosen to be representative of national conditions.

Correction factors were applied to the emission factors to account for the number of days with a sufficient amount of precipitation to prevent road dust resuspension. Monthly corrected emission factors by State and roadway classification were calculated using the following equation:

$$E_{corr} = E * [(D-p)/D]$$

where: E_{corr} = paved road dust emission factor corrected for precipitation effects
E = uncorrected emission factor
D = number of days in the month
p = number of days in the month with greater than 0.01 inches of precipitation

The number of days with more that 0.01 inches of precipitation in each month was obtained from the National Climatic Data Center. Data were collected from a meteorological station selected to be representative or rural areas within the State.

Activity

Unpaved roadway mileage estimates are obtained from the FHWA's annual *Highway Statistics* report. Separate calculations of VMT are performed for county and noncounty (State or federally) maintained roadways. State-level, county-maintained roadway mileage are organized by surface type, traffic volume, and population category. From these data, State-level unpaved roadway mileage estimates are derived for the volume and population categories listed in Table D-2. The following equations is then used to calculate State-level unpaved road VMT estimates.

$$VMTUP = ADTV * FSRM * 365 \text{ days/year}$$

where: VMTUP = VMT on unpaved roads (miles/year)
ADTV = average daily traffic volume (vehicles/day/mile)
FSRM = functional system roadway mileage (miles)

State and federally maintained road mileage is categorized by arterial classification, not roadway traffic volume; therefore, the VMT is calculated differently. The ADTV is assumed to not vary by roadway maintenance responsibility, so the ADTV calculated from county-maintained VMT and mileage (ADTV = VMT / Mileage) is used with noncounty-maintained roadway mileage to calculate VMT in the above equation.

Allocation

The State/road type-level unpaved road emissions were then allocated to each county using estimates of county rural and urban land area from the U.S. Census Bureau.

$$EMIS_{x,y} = (CL_{urb,x} / SL_{urb}) * EMIS_{ST,urb,y} + (CL_{rur,x} / SL_{rur}) * EMIS_{ST,rur,y}$$

where: $EMIS_{x,y}$ = unpaved road PM emissions (tons) for county x and road type y
$CL_{urb,x}$ = urban land area in county x
SL_{urb} = urban land area in State
$EMIS_{ST,urb,y}$ = unpaved road PM emissions in the entire State for urban road type y
$CL_{rur,x}$ = rural land area in county
SL_{rur} = rural land area in the State
$EMIS_{ST,rur,y}$ = unpaved road PM emissions in entire State for rural road type y

Controls

The controls assumed for unpaved roads varied by PM nonattainment classification and by urban and rural areas. On urban unpaved roads in moderate PM nonattainment areas, paving of the unpaved road was assumed, and a control efficiency of 96 percent and a rule penetration ro 50 percent were applied. Chemical stabilization, with a control efficiency or 75 percent and a rule penetration of 50 percent, was assumed for rural areas in serious PM nonattainment areas. A combination of paving and chemical stabilization, with a control efficiency of 90 percent and a rule penetration of 75 percent, was assumed for urban unpaved roads in serious PM nonattainment areas.

Table D-1. Constants for Unpaved Roads Reentrained Dust Emission Factor Equation

Constant	PM-2.5	PM-10
k (lb/VMT)	0.38	2.6
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source : AP-42

Table D-2. Assumed Values for Average Daily Traffic Volume by Volume Group

Rural Roads				
Volume Category (vehicles per day per mile)	< 50	50-199	200-499	> 500
Assumed ADTV	5*	125**	350**	550***
Urban Roads				
Volume Category (vehicles per day per mile)	< 200	200-499	500-1999	> 2000
Assumed ADTV	20*	350**	1250**	2200***

Notes: *10% or volume group's maximum range endpoint
** Average of volume group's range endpoints
*** 110% or volume group's minimum

AGRICULTURAL TILLING

SCC

2801000003

Agricultural tilling emissions for 1999 were calculated using growth factors determined for each of the five tillage types. The number of acres tilled by tillage type was interpolated from national-level actual data obtained from the Conservation Technology Information Center (CTIC) for 1998 and 2000. Using the actual acres tilled for 1998 and the interpolated acres tilled for 1999, growth factors were calculated for each tillage type. These growth factors were then applied to 1998 county-level data by tillage type to estimate the 1999 county-level emissions.

ANIMAL HUSBANDRY

SCC

2805020000	Cattle and Calves
2805025000	Hogs and Pigs
2805030000	Poultry
2805040000	Sheep
2805035000	Horses and Ponies
2805045001	Goats

Ammonia (NH3) emissions for animal husbandry are estimated using activity data published by the Census of Agriculture and NH3 emission factors. The Census of Agriculture publishes county-level estimates of number of head for the following livestock: cattle and calves, goats, hogs and pigs, horses and ponies, poultry, and sheep. The activity data used to determine NH3 emissions from poultry includes activity data for broilers, ducks, geese, layers and pullets, turkeys, and other poultry. The activity data used to determine NH3 emissions from sheep include activity data for sheep and lambs. The activity data used to determine NH3 emissions from cattle used in animal husbandry (SCC 2805020000) correspond to the inventory of all cattle and calves, which includes beef and milk cows, heifer and heifer calves, and steer and bulls and their calves. The Census of Agriculture contains activity data for the years 1987, 1992 and 1997. In some States, county activity data are not reported or were withheld, but the State total is reported. To accurately reflect the total activity for a specific category and State, such data are apportioned to each county equally within a State that had withheld or not reported data. Further, there are also cases where the data are reported under a general county code designation of *all other counties*. Data reported under this county code are added to the withheld totals for the State before distributing the State totals to counties.

However, there are several States that withheld State-level activity data. In these cases, State totals are first estimated by calculating the total activity corresponding to all States combined that withheld data. This value is calculated by subtracting the category-specific totals from all States that reported data from the national total. The remaining activity data are then equally distributed to the States that had withheld data, and then evenly distributed to each county in that State based upon the number of counties in the State.

Once county-level activity data are estimated for 1987, 1992 and 1997, activity data for the interim years (1988-1991 and 1993-1996) are estimated using linear interpolation. To estimate activity data for 1999, linear interpolation is also used using activity estimates for the years 1992 through 1997, and applying a fraction as a multiplier for each of these three years. For 1999, 7/5 is the multiplier used. For example, the equation to estimate 1999 activity data is [Activity data (1992) + (Activity data (1997) - Activity Data (1992)) *(7/5)]. In certain cases, this method returned a negative result. This is usually due to either activity data being reported in 1992 but not in 1997, or declining activity from 1992 to 1997. In these cases, an average of the 1996 and 1997 activity data is used to estimate 1998 activity data, an average of the 1997 and 1998 activity data is used to estimate 1999 activity data, and an average of the 1998 and 1999 activity data is used to estimate 2000 activity data (i.e., 2000 activity data = [1999+(1999-1998)/2]). In a few cases, this equation also produced a negative result. In these cases, a default value of zero is assigned.

The emission factors used to calculate emissions are taken from a study of NH3 emissions conducted in the Netherlands, and are listed in Table D-3. Before applying the emission factors, the county-level activity data for livestock operations is divided by 2000, since the emission factors are in units of pounds per head (lb/head).

BEEF CATTLE FEEDLOTS

SCC

2805001000

1999 PM10 emissions from beef cattle feedlots are estimated using the number of head of beef cows published by the Census of Agriculture and a national PM10 emission factor. County-level activity data for beef cattle feedlots are obtained from the Census of Agriculture using the same methodology that is used to obtain animal husbandry activity data.

PM2.5 emissions are determined by multiplying the PM10 emissions for each year by a particle size multiplier of 0.15.

Emission Factors

PM10 : 17 (tons/1,000 head)
PM2.5 : PM10 emissions * 0.15

CONSTRUCTION

SCC

2311010000 Residential Construction
2311020000 Non-Residential Construction
2311030000 Roadway Construction

Residential Construction

For residential construction, housing permit data for single-family units, two-family units, and apartments were obtained at the county level from the U.S. Department of Commerce's (DOC) Bureau of the Census. Adjusted county permit data to equal regional housing starts data which was also obtained from the Bureau of the Census. Estimated the number of buildings in each category, and then estimated the total acres disturbed by construction by applying conversion factors to the housing starts data for each category as follows:

- Single family - 1/4 acre/building
- Two-family - 1/3 acre/building
- Apartment - ½ acre/building

Housing construction PM10 emissions are calculated using an emission factor of 0.032 tons PM10/acre/month, the number of housing units created, a units-to-acres conversion factor, and the duration of construction activity. The duration of construction activity for houses is assumed to be 6 months.

Apartment construction emissions are calculated separately using an emission factor of 0.11 tons PM10/acre/month. A duration of 12 months was assumed for apartment construction.

For areas in which basements are constructed, an average value of 2000 square feet is assumed for both single-family and two-family homes to estimate the cubic yards of dirt moved per house. Multiplying the average total square feet by an average basement depth of 8 feet and adding in 10 percent of the cubic feet calculated for peripheral dirt removed produces an estimate of the cubic yards of earth moved during residential construction. The percentage of single-family houses with basements was obtained from the DOC. The percentage of houses per Census region (Northeast, Midwest, South, and West) that contain full or partial basements is applied to the housing start estimates for each of these respective regions. The best available control measures (BACM) Level 2 equation (emission factor of 0.011 tons PM10/acre/month plus 0.059 tons PM10/1000 cubic yards of on-site cut/fill) is applied once the number of acres disturbed due to the estimated

number of houses built with basements is determined.

Non-Residential Construction

PM10 emissions produced from the construction of nonresidential buildings are estimated using the value of construction put in place. The national value of construction put in place is obtained from the Bureau of the Census, and is allocated to counties using construction employment data for SIC 154. The Bureau of Labor Statistics (BLS) county employment data were supplemented with Dun & Bradstreet (D&B) county employment data. The BLS included employment data in State totals that were withheld (not reported) for many counties. D&B reported employment data for many counties for which BLS data were not available. Thus, used D&B county proportion of State total and applied proportion to BLS State total to estimate county employment for counties where employment was withheld. These data were used to allocate national expenditure data for non-residential construction to counties.

A conversion factor of 1.6 acres/10^6 dollars ($) is applied to the construction valuation data. This conversion factor is developed by adjusting the 1992 value of 2 acres/10^6 to 1999 constant dollars using the Price and Cost Indices for Construction. The duration of construction activity for nonresidential construction is estimated to be 11 months.

Roadway Construction

PM10 emissions produced by road construction are estimated using an emission factor for heavy construction and the State capital outlay for new road construction. To estimate the acres disturbed by road construction, obtained 1999 Federal Highway Administration (FHWA) State expenditure data for capital outlay according to the following six classifications:

- Interstate, urban;
- Interstate, rural;
- Other arterial, urban;
- Other arterial, rural;
- Collectors, urban; and
- Collectors, rural

Obtained data from the North Carolina Department of Transportation (NCDOT) on the $/mile spent on various road construction projects. For interstate expenditures, used an average of $4 million/mile corresponding to freeways and interstate projects listed for: 1) new location; 2) widen existing 2-lane shoulder section; and 3) widen existing 4-lane w/ median. For expenditures on other arterial and collectors, used an average of $1.9 million/mile corresponding to all other projects (excluding freeways and interstate projects) listed for: 1) new location; 2) widen existing 2-lane shoulder section; and 3) widen existing 4-lane w/ median.

Miles are converted to acres for each of the 6 road types using the following estimates of acres disturbed per mile:

- Interstate, urban and rural; Other arterial, urban - 15.2 acres/mile
- Other arterial, rural - 12.7 acres/mile
- Collectors, urban - 9.8 acres/mile
- Collectors, rural - 7.9 acres/mile

State-level estimates of acres disturbed are distributed to counties according to the housing starts per county, estimated for the residential construction category.

An emission factor of 0.42 tons/acre/month is used to account for the large amount of dirt moved during the construction of roadways. The duration of construction activity for road construction is estimated to be 12 months.

Correction Parameters

The following correction parameters are applied to all construction emissions.

Soil Moisture Level

To account for the soil moisture level, base emissions were multiplied by 24 divided by the precipitation-evaporation (PE) value. Precipitation-Evaporation (PE) values were obtained from Thornthwaite's PE Index. Average PE values for each State were estimated based on PE values for specific climatic divisions within a State.

Silt Content

To account for the silt content, base emissions were multiplied by percent dry silt content in soil divided by 9 percent. County-level dry silt values were applied to PM10 emissions for each county.

Control Efficiency

For 1999 construction emissions, a control efficiency of 50 percent is used for both PM10 and PM2.5 for PM nonattainment areas.

PM2.5 Emissions

PM2.5 emissions are estimated by applying a particle size multiplier of 0.20 to PM10 emissions.

Ozone Season Daily (OSD) emissions calculated by multiplying annual emissions by 0.25 then dividing by 92.

COTTON GINNING

SCC

2801000000

Ginning activity occurs in sixteen States from August/September through March, covering parts of two calendar years. The majority of the ginning facilities are located in Arkansas, California, Louisiana, Mississippi, and Texas. Cotton ginning estimates for 1999 were calculated using the following methodology. The number of bales of cotton ginned was obtained from U.S. Department of Agriculture (USDA) *Cotton Ginnings* report, which reports data on the amount of cotton ginned by State, district, and county for each crop year. Since the activity data are reported as running totals for the growing season, the number of bales ginned for a calendar year needed to be determined using data from two crop years. The amount of cotton ginned from January 1 to the end of the season (March) for calendar year *x* (crop year *x*) and the amount of cotton ginned from the beginning of the season (August/ September) for calendar year *x* (crop year *y*) is summed to get the calendar year *x* total. To determine the amount ginned from January 1 to the end of the season, the amount ginned by January 1 (in the early January *Cotton Ginnings* report) was subtracted from the total reported in the end of season (March) *Cotton Ginnings* report. To determine the amount ginned from the beginning of the season to January 1, the total recorded by January 1 in the early January *Cotton Ginnings* report was used.

The *Cotton Ginnings* report may not show detailed data for a county, but may include those data in the district, State, or U.S. totals. Data for a gin may be considered confidential if (1) there are fewer than three gins operating in the county, or (2) more than 60 percent of the cotton ginned in the county is ginned at one mill. The standard *Cotton Ginnings* report lists the following four footnotes to its table of running bales ginned:

1/ withheld to avoid disclosing individual gins
2/ withheld to avoid disclosing individual gins, but included in State total
3/ excludes some gins' data to avoid disclosing individual gins, but included in the State total
4/ withheld to avoid disclosing individual gins but included in the U.S. total

The following methodology is used for estimating the number of bales ginned from those counties with confidential data.

(1) If all counties in the district show confidentiality, but there is a district total, divide district total by the number of counties to get individual county estimates.

(2) If some (but not all) counties in a district show confidentiality and there is a district total, subtract county totals from district total and divide the remainder by the number of counties showing confidentiality to get estimates for the "confidential" counties.

(3) If both county and district totals are considered confidential within a State, divide the State total by the number of counties to get individual county estimates.

(4) If some (but not all) districts show confidentiality, subtract recorded district totals from the State total and divide the remainder by the number of counties showing confidentiality to get estimates for the "confidential" counties.

In some cases, data in the March report differed from earlier reports for the crop year in both total number of bales ginned and counties where ginning occurred. The January reports showed higher totals for some counties, and subtracting the January totals from the March totals for these counties yielded a negative number. In these cases, the activity for the county for that time period was considered zero. In instances where counties were recorded in the March final report, but not in earlier reports, the activity was assumed to have occurred sometime before January. These counties were then added to the January listing as confidential counties, and distribution of ginning activity was then performed.

Kansas has only one small gin operating in the State, and this gin does not operate every year. Since the amount of cotton ginned at this facility is considered insignificant (less than 0.005 percent of the total cotton ginned in the United States in 1995), no emissions for Kansas were calculated.

Once all the cotton ginning activity was distributed using the methodologies above, PM10 and PM2.5 emissions were calculated using the following equation:

$$E = [(P_c \times B) \times EF_c] + [(P_f \times B) \times EF_f]$$

Where:

P_c	= Percent Crop Full Controls
P_f	= Percent Crop Conventional Controls
B	= Number of Bales Ginned
EF_c	= Full Controls Emission Factor
EF_f	= Conventional Controls Emission Factor

Emission factors for cotton ginning can be found in Table D-4. Estimated Percentage of Crop by Emission Control Method can be found in Table D-5.

FERTILIZERS

SCC

2801700001 Anhydrous Ammonia
2801700002 Aqua Ammonia
2801700003 Nitrogen Solutions
2801700004 Urea
2801700005 Ammonium Nitrate
2801700006 Ammonium Sulfate
2801700007 Ammonium Thiosulfate
2801700008 Other Straight Nitrogen
2801700009 Ammonium Phosphates
2801700010 N-P-K

The activity data used to estimate 1999 NH3 fertilizer emissions was obtained from the Commercial Fertilizers Database compiled by the Tennessee Valley Authority (TVA) which is now maintained by Association of American Plant Food Control Officials. This database includes county-level usage of over 100 different types of fertilizers, including those that emit NH3. Emission factors for fertilizers can be found in Table D-6.

MINING AND QUARRYING

SCC

2325000000

1999 PM10 emissions were estimated by:

1) Obtaining regional metallic and non-metallic crude ore handled at surface mines from the U.S. Geologic Survey;

2) Obtaining coal production data for surface mines from the Energy Information Administration;

3) Estimating State withheld data using known distributions from past years;

4) Applying PM10 emission factors to the activity data to develop emissions for metallic ore, non-metallic ore, and coal mining operations; and,

5) Distributing total emissions from the regional-level to the county-level by dividing regional emissions by the number of counties in each region.

PM2.5 emissions are determined by multiplying 1999 PM10 emissions a particle size adjustment factor of 0.2.

Emission Factors

Metallic Mining PM10 : 0.054761 lb/ton
Non-Metallic Mining PM10* : 0.29328077 lb/ton
Coal Mining PM10* : 0.5133 lb/ton

* Source: *AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants*. EPA-450/4-90-003. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. March 1990.

OPEN BURNING

SCC

2610030000 Residential Municipal Solid Waste Burning
2610000100 Residential Leaf Burning
2610000400 Residential Brush Burning
2610000500 Land Clearing Debris Burning

Residential Municipal Solid Waste (MSW) Burning

Emission estimates for residential MSW burning were developed by first estimating the amount of waste generated for each county in the United States. The amount of waste generated was estimated using a national average per capita waste generation factor, which is 3.31 lbs/person/day. To better reflect the actual amount of household residential waste subject to being burned, non-combustibles (glass and metals) and yard waste generation were subtracted out. This factor was then applied to the portion of the county's total population that is considered rural based on 1990 Census data on rural and urban population, since open burning is generally not practiced in urban areas.

For rural populations, it is estimated that 25 to 32 percent of the municipal waste generated is burned. A median value of

28 percent was assumed for the nation, and this correction factor was applied to the total amount of waste generated.

Controls (or burning bans) were accounted for by assuming that no burning takes place in counties where the urban population is greater than or equal to 80 percent of the total population (i.e., urban plus rural). Zero open burning emissions were attributed to these counties.

Residential Yard Waste Burning

A national per capita waste generation average daily value of 0.56 lbs yard waste/person/day was used as the basis for yard waste open burning emissions for 1999. Of the total amount of yard waste generated, the yard waste composition was assumed to be 25 percent leaves, 25 percent brush, and 50 percent grass by weight. Open burning of grass clippings is not typically practiced by homeowners, and as such only estimates for leaf burning and brush burning were developed. Emissions for leaves and residential brush were calculated separately, since emission factors vary by yard waste type. It was assumed that 28 percent of the total yard waste generated is burned and that burning occurs primarily in rural areas.

To adjust for variations in vegetation, obtained data on the percentage of forested acres from Version 2 of the Biogenic Emissions Land cover Database (BELD2) within EPA's Biogenic Emission Inventory System (BEIS). Determined the percentage of forested acres per county (including rural forest and urban forest). To better account for the native vegetation that would likely be occurring in the residential yards of farming States, subtracted out the agricultural lands before calculating the percentage of forested acres. Then used the following ranges to make adjustments to the amount of yard waste that is assumed to be generated per county:

Percent forested acres per county	Adjustment for yard waste generated
< 10%	Zero out
>=10%, and <50%	Multiply by 50%
>=50%	Assume 100%

Controls (or burning bans) were accounted for by assuming that no burning takes place in counties where the urban population is greater than or equal to 80 percent of the total population (i.e., urban plus rural). Zero open burning emissions were attributed to these counties.

Land Clearing Debris Burning

The number of acres disturbed by residential, non-residential and roadway construction are estimated and then these values are added together to obtain a county-level estimate of total acres disturbed by land-clearing. County-level emissions from land clearing debris are then calculated by multiplying the total acres disturbed by construction by a weighted loading factor and emission factor.

The BELD2 database in BEIS was used to determine the number of acres of hardwoods, softwoods, and grasses in each county. Average loading factors were weighted according to the percent contribution of each type of vegetation class to the total land area for each county. The loading factors for slash hardwood and slash softwood were further adjusted by a factor of 1.5 to account for the mass of tree that is below the soil surface that would also be subject to burning once the land is cleared. Average loading factors are as follows:

Fuel type	Fuel loading (tons/acre)
Hardwood	99
Softwood	57
Grass	4.5

Emission Factors

Residential MSW and residential yard waste burning emissions factors for VOC, NOX, CO, SO2, PM10 and PM2.5 were obtained from AP-42 (Table 2.5-1 (Municipal Refuse), Table 2.5-5 (Unspecified Forest Residues) and Table 2.5-6 (Unspecified). Land clearing debris burning emissions factors obtained from a USDA Forest Service report and AP-42. (See Table D-7.)

OSD emissions were calculated by multiplying annual emissions by 0.25 and then dividing by 92 days in the ozone season.

PRESCRIBED BURNING

SCC

2810015000 - Please see Appendix E for latest methodology.

STRUCTURE FIRES

SCC

2810030000

Methodology for estimating 1999 emissions for structure fires was revised to follow the methodology used for the 1996 NTI. Calculated 1999 national VOC, NOX, CO, and PM10 emissions by obtaining the total number of residential and non-residential fires from the U.S. Fire Administration National Fire Data Center (NFDC) and applying a fuel loading factor of 1.15 tons/fire and emission factors. The national emissions are then multiplied by the county proportion of the national 2000 population estimate.

PM2.5 emissions were estimated by multiplying PM10 emissions by 0.91.

Ozone Season Daily (OSD) emissions calculated by multiplying annual emissions by 0.25 then dividing by 92.

Emission Factors

Emissions factors for VOC, NOX, CO, and PM10 obtained from AP-42 (Table 18.4-1).

VOC : 11 lb / ton burned
NOX : 1.4 lb / ton burned
CO : 60 lb / ton burned
PM10 : 10.8 lb / ton burned

WILDFIRES

SCC

2810001000 - Please see Appendix E for latest methodology.

Table D-3. Animal Husbandry Ammonia Emission Factors

Category	SCC	Emission Factor (lb NH3/Head)
Cattle and Calves	2805020000	50.5
Pigs and Hogs	2805025000	20.3
Poultry	2805030000	0.394
Sheep	2805040000	7.43
Horses	2805035000	26.9
Goats	2805045001	14.1

Source: Asman, William, A.H., *Ammonia Emissions in Europe: Updated Emission and Emission Variations*, National Institute of Public Health and Environmental Protection, Biltoven, The Netherlands, May 1992.

Table D-4. Cotton Ginning Emission Factors

Control Type	Total PM (lb/bale)	PM10 (lb/bale)	PM2.5 (lb/bale)
Full controls (high-efficiency cyclone)	2.4	0.82	0.024
Conventional controls (screened drums or cages)	3.1	1.2	0.031

Source: AP-42

Table D-5. Estimated Percentage of Crop By Emission Control Method (By State and U.S. Average)

State	Percent Crop- Full Controls	Percent Crop- Conventional Controls
Alabama	20	80
Arizona	50	50
Arkansas	30	70
California	72	28
Florida	20	80
Georgia	30	70
Louisiana	20	80
Mississippi	20	80
Missouri	20	80
New Mexico	20	80
North Carolina	30	70
Oklahoma	20	80
South Carolina	20	80
Tennessee	20	80
Texas	30	70
Virginia	20	80
U. S. Average[a]	**35**	**65**

[a]Average is based on the average crop (average total bales ginned per year) from 1991 to 1995 for these States.

Table D-6. Fertilizer Emission Factors

Fertilizer Type	SCC	Emission Factor (lbs NH3/Ton Nitrogen)
Anhydrous Ammonia	2801700001	24
Aqua Ammonia	2801700002	24
Nitrogen Solutions	2801700003	61
Urea	2801700004	364
Ammonium Nitrate	2801700005	49
Ammonium Sulfate	2801700006	194
Ammonium Thiosulfate	2801700007	64
Other Straight Nitrogen	2801700008	61
Ammonium Phosphates	2801700009	97
N-P-K	2801700010	97

Source: Asman, William, A.H., *Ammonia Emissions in Europe: Updated Emission and Emission Variations*, National Institute of Public Health and Environmental Protection, Biltoven, The Netherlands, May 1992.

Table D-7. Criteria Pollutant Emission Factors For Open Burning, lb/ton

SCC		VOC	NOX	CO	SO2	PM10	PM2.5	Source
2610030000	Residential MSW	30	6	85	1	38[1]	34.8	AP-42, Table 2.5-1
2610000100	Yard waste - leaves	28	NA	112	NA	38	38	AP-42, Table 2.5-6
2610000400	Yard waste - brush	19	NA	140	NA	17	17	AP-42, Table 2.5-5
2610000500	Land clearing debris	11.6	5[2]	169	NA	17	17	Ward, 1989[3]

[1] PM10 and PM2.5 emission factors for residential MSW were obtained from a report, entitled "Evaluation of Emissions from the Open Burning of Household Waste in Barrels."

[2] NOX emission factor for Land Clearing Debris obtained from AP-42, Chapter 13.1.3. Emission factor estimated by taking the rate that NOX is emitted (1 to 4 g/kg), calculating the median value, and converting to lb/ton.

[3] Ward, D.E., C.C. Hardy, D.V. Sandberg, and T.E. Reinhardt. *Mitigation of Prescribed Fire Atmospheric Pollution Through Increased Utilization of Hardwaods, Piled Residues, and Long-Needled Conifers*. Final Report. USDA Forest Service, Pacific Northwest Research Station, Fire and Air Resource Management Project, 1989.

NA = Not available

APPENDIX E
METHODOLOGIES FOR ESTIMATING 1999 NEI EMISSIONS FOR AREA SOURCE CATEGORIES - WILDFIRES and PRESCRIBED BURNING

Table 1 summarizes the revisions that were implemented in developing Forest Wildfire and Prescribed Burning criteria pollutant emission estimates for 1999. Details on the emission methodologies are provided in the following sections, which have been formatted to facilitate incorporation into subsequent comprehensive 1999 criteria pollutant emission methodology documentation.

Table 1. Revisions to Criteria Pollutant Emission Estimation Methodologies

Source Category	Activity Data Revisions	Emission Factor Revisions
2810001000 - Open Burning: Forest Wildfires	Incorporate State-average fuel consumption (tons/acre burned) values reported in Table 4 of EPA, 2003 (exceptions: for South Dakota, use 16 tons/acre for 3 counties [Lawrence, Pennington, and Custer] and 2 tons/acre for remaining counties). Use California fuel consumption value for Hawaii.	Calculate State-level emission factors (EFs) from a combination of the State-level emission factors (EFs) reported in Table 2 of EPA, 2003 and the State-average smoldering augmentation factors reported in Table 4 of EPA, 2003.
2810015000- Open Burning: Prescribed Burning	Incorporate State-average fuel consumption (tons/acre burned) values reported in Table 4 of EPA, 2003 (exceptions: for North Dakota, use 2 tons/acre; for South Dakota, use 16 tons/acre for 3 counties [Lawrence, Pennington, and Custer] and 2 tons/acre for remaining counties). Use California fuel consumption value for Hawaii.	Calculate State-level EFs by weighting the EPA, 2003 Table 2 piled fuel and non-piled fuels EFs by the EPA, 2003 Table 5 fraction of fuels that are piled in each State (non-piled EF was used for all States not listed in Table 5) and combining the result with the State-average smoldering augmentation factors reported in EPA, 2003 Table 4.

EPA, 2003: EC/R Incorporated, "Data Needs and Availability for Wildland Fire Emission Inventories - Short-term Improvements to the Wildland Fire Component of the National Emissions Inventory," prepared for U.S. Environmental Protection Agency, Emission Factor and Inventory Group, June 5, 2003 (minor modifications by EPA on June 18).

NEI Criteria Air Pollutant Methodologies for Miscellaneous Area Sources (Final)

1999 NEI Criteria Pollutant Emissions

WILDFIRES

SCC

2810001000 - Open Burning, Forest Wildfires

Wildfire emissions were calculated for all States as follows:

(1) Obtained 1999 acres burned data at the State-level from the following three U.S. Department of Interior (DOI) agencies: Bureau of Land Management (BLM), National Parks Service (NPS), and U.S. Fish and Wildlife Service (FWS). In addition, the DOI's Bureau of Indian Affairs (BIA) provided wildfire activity at the regional-level. Wildfire activity on State and private lands was provided by the USFS.

(2) Allocated State-level activity to the county-level. This was accomplished using the ratio of county-to-State acreage data for rural and urban forest categories and from brush and grass in the miscellaneous category, which were obtained from Version 2 of BELD2. BIA regional data were first used to proportion emissions to the State-level using the number of acres of tribal land in each State. Activity from all the above agencies was then totaled by State and allocated to the county-level with the BELD2 factors. Because BELD2 does not contain land cover data for Alaska and Hawaii, State to county factors were derived from data contained in the allocation factor file used for the 1996 National Toxics Inventory (NTI) for these two States.

(3) Determined emissions activity throughput in tons by multiplying the county-level acres data from step 2 by the Table 2 State-specific fuel consumption factors (i.e., the amount of fuel actually consumed in the fire).

(4) Calculated emissions by multiplying step 3 county activity by State-level emission factors. The State-level emission factors were calculated as the product of the Table 2 state-specific smoldering augmentation factors and the Table 3 emission factors. Equation 1 displays the emission estimation calculations described in steps 3 and 4 above.

PRESCRIBED BURNING

SCC

2810015000 - Open Burning, Prescribed Burnings

Prescribed fire emissions were calculated for all States as follows:

(1) Obtained 1999 acres burned data at the State-level directly from the four U.S. Dept. of Interior agencies. Activity for the U.S. Forest Service and State/private lands from the National Interagency Fire Center (NIFC) was available only on a regional-level.

(2) Allocated the activity to the county-level using BELD2 land cover type acreage for the rural forest category plus the acreage for brush and grass in the

1999 NEI Criteria Pollutant Emissions
miscellaneous category. NIFC regions were matched to U.S. Forest Service (USFS) regions, and BELD2 factors were then developed to allocate both the USFS and State/Private regional data to the State-level. Activity from all agencies were then totaled by State and allocated to the county-level with BELD2 State to county factors. Exceptions: BELD2 does not contain land cover data for AK and HI, so State to county factors were derived from data contained in the allocation factor file used for the 1996 NTI for these two States. Also, to calculate the region to State proportions, BELD2 data for CA were replaced with that from the 1996 NTI, since the USFS's Region 5 contains both HI and CA. (3) Calculated emissions activity throughput in tons by multiplying the county-level acres data from step 2 by the Table 4 State-specific fuel consumption factors (i.e., the amount of fuel actually consumed in the fire). (4) Calculated emissions by multiplying step 3 county activity by State-level emission factors. The State-level emission factors were calculated from a combination of the Table 5 piled and non-piled fuel emission factors and the Table 4 smoldering augmentation factors. First, the Table 5 piled and non-piled emission factors were weighted using the Table 4 fraction of fuels in each State that are piled. The final State-level emission factors were computed as the product of the weighted piled/non-piled State emission factor and the Table 4 State smoldering augmentation factor. Equation 2 displays the calculations for developing the State-level emission factors and Equation 3 identifies the emission calculations.

Table 2. Wildfire Fuel Consumption and Smoldering Augmentation Factors

State (County)	Fuel Consumption Factor (tons/acre)	Fuel Consumption Factor Reference	Smoldering Augmentation Factor
Alabama	10.1	Reference 1	0.147
Alaska	16	Reference 2	0
Arizona	17.7	Reference 1	0.126
Arkansas	10.1	Reference 1	0.167
California	15.5	Reference 1	0.047
Colorado	12.6	Reference 1	0.143
Connecticut	3.1	Reference 1	0.17
Delaware	7.7	Reference 1	0.06
Wash. DC	3.1	Reference 1	0.17
Florida	19.7	Reference 1	0.167
Georgia	13.2	Reference 1	0.163
Hawaii	15.5	Reference 1 (used CA value)	0.047
Idaho	8.1	Reference 1	0.155
Illinois	3.1	Reference 1	0.166
Indiana	2.4	Reference 1	0.154
Iowa	2.8	Reference 1	0.165
Kansas	1	Reference 1	0.038
Kentucky	3.3	Reference 1	0.161
Louisiana	9.1	Reference 1	0.128
Maine	27.8	Reference 1	0.17
Maryland	5.4	Reference 1	0.16
Massachusetts	24	Reference 1	0.17
Michigan	10.1	Reference 1	0.169
Minnesota	13.6	Reference 1	0.168
Mississippi	9.7	Reference 1	0.139
Missouri	2.7	Reference 1	0.156
Montana	4.7	Reference 1	0.102
Nebraska	1.1	Reference 1	0.013
Nevada	3	Reference 1	0
New Hampshire	33.4	Reference 1	0.17
New Jersey	11.6	Reference 1	0.066
New Mexico	14.1	Reference 1	0.134
New York	20.3	Reference 1	0.17
North Carolina	9.6	Reference 1	0.165
North Dakota	0.5	Reference 1	0.134
Ohio	3	Reference 1	0.166
Oklahoma	2.7	Reference 1	0.079
Oregon	12.5	Reference 1	0.155
Pennsylvania	3.2	Reference 1	0.166

State (County)	Fuel Consumption Factor (tons/acre)	Fuel Consumption Factor Reference	Smoldering Augmentation Factor
Rhode Island	3.1	Reference 1	0.17
South Carolina	9.6	Reference 1	0.159
South Dakota (Lawrence Co.)	16	Reference 3	0
South Dakota (Pennington Co.)	16	Reference 3	0
South Dakota (Custer Co.)	16	Reference 3	0
South Dakota (all other counties)	2	Reference 3	0
Tennessee	4.3	Reference 1	0.163
Texas	3.5	Reference 1	0.058
Utah	9.6	Reference 1	0.116
Vermont	51.3	Reference 1	0.17
Virginia	7.7	Reference 1	0.168
Washington	2.6	Reference 1	0.117
West Virginia	4.8	Reference 1	0.17
Wisconsin	7.4	Reference 1	0.168
Wyoming	5	Reference 1	0.112

Table 3. Wildfire Emission Factors (lb/ton of fuel consumed)

Pollutant	Emission Factor
PM-10	28.1
PM-2.5	24.1
VOC	13.6
NOx	6.2
NH_3	1.3
SO2	1.7
CO	289.0

State-level Wildfire emissions = Wildfire acres burned x State-level fuel consumption x [(1 + Table 2 State-level smoldering augmentation factor) x Table 3 wildfire emission factor] (Eq. 1)

Table 4. 1999 Activity Data for Wildfires by State: Number of Acres Burned by Land Ownership Category

State	USFS	S&P	DOI	TOTAL		NPS	BLM	FWS	BIA
AK	22.0	145,805.6	612,042.8	757,870.4		244,156.0	209,876.0	158,010.8	0.0
AL	2,437.0	49,006.7	118.1	51,561.8		6.2	0.0	102.2	9.7
AR	2,099.0	24,659.0	2,040.4	28,798.4		1,824.5	0.0	215.9	0.0
AZ	10,690.0	8,722.0	56,588.5	76,000.5		9,609.2	39,792.0	498.5	6,688.8
CA	673,424.0	277,750.0	119,139.6	1,070,313.6		30,937.3	79,565.0	357.2	8,280.1
CO	1,573.0	33,255.0	14,132.2	48,960.2		119.9	12,991.0	0.0	1,021.3
CT	0.0	1,733.1	26.6	1,759.6		0.0	0.0	0.0	26.6
DC	0.0	0.0	2.1	2.1		2.1	0.0	0.0	0.0
DE	0.0	231.0	507.0	738.0		0.0	0.0	507.0	0.0
FL	83,556.0	352,643.3	19,812.6	456,011.9		10,067.8	0.0	3,265.2	6,479.6
GA	7,021.0	57,671.0	68,849.9	133,541.9		32.6	0.0	68,814.0	3.3
HI	0.0	20,375.8	0.3	20,376.1		0.3	0.0	0.0	0.0
IA	0.0	3,560.0	135.8	3,695.8		0.0	0.0	128.1	7.7
ID	46,158.0	78,641.0	312,789.0	437,588.0		0.5	306,070.0	2.2	6,716.3
IL	190.0	3,570.0	306.7	4,066.7		0.0	0.0	306.7	0.0
IN	321.0	11,711.0	322.2	12,354.2		322.2	0.0	0.0	0.0
KS	618.0	25,688.0	497.2	26,803.2		0.0	0.0	300.8	196.4
KY	11,519.0	139,109.1	59.5	150,687.6		59.5	0.0	0.0	0.0
LA	4,060.0	23,311.6	8,763.3	36,134.9		0.0	0.0	8,738.5	24.8
MA	0.0	7,603.0	2.0	7,605.0		1.5	0.0	0.0	0.5
MD	0.0	2,934.7	8.6	2,943.3		0.7	0.0	7.9	0.0
ME	0.0	1,066.0	6,289.8	7,355.8		0.0	0.0	0.7	6,289.1
MI	3,623.0	8,228.0	361.8	12,212.8		5.6	0.0	0.0	356.2
MN	343.0	16,675.0	6,176.1	23,194.1		1.1	0.0	1,549.6	4,625.4
MO	6,235.0	17,670.0	159.4	24,064.4		113.1	0.0	13.0	33.3
MS	6,937.0	40,006.0	1,356.4	48,299.4		53.5	0.0	433.6	869.3
MT	9,190.0	87,605.0	19,832.2	116,627.2		10,818.5	5,174.0	280.3	3,559.4
NC	9,222.0	0.0	4,781.6	14,003.6		165.1	0.0	2,233.9	2,382.6
ND	59,659.0	160,272.3	9,976.2	229,907.5		0.1	0.0	2,678.2	7,297.9
NE	780.0	177,024.0	2,991.2	180,795.2		1.5	0.0	2,899.7	90.0
NH	16.0	428.0	0.0	444.0		0.0	0.0	0.0	0.0
NJ	0.0	16,440.0	647.0	17,087.0		631.3	0.0	1.0	14.7
NM	6,808.0	52,446.0	6,568.8	65,822.8		13.1	3,666.0	7.8	2,881.9
NV	22,434.0	2,161.0	1,275,720.8	1,300,315.8		38.8	1,234,407.0	40,186.2	1,088.8
NY	0.0	5,437.0	3,254.5	8,691.5		143.6	0.0	33.8	3,077.1
OH	703.0	6,010.0	0.0	6,713.0		0.0	0.0	0.0	0.0
OK	1,278.0	51,573.0	3,307.9	56,158.9		0.0	0.0	62.4	3,245.5
OR	8,213.0	9,604.0	36,937.2	54,754.2		6.1	28,226.0	5,255.5	3,449.6
PA	25.0	6,835.0	424.4	7,284.4		405.3	0.0	19.1	0.0
RI	0.0	182.0	81.7	263.7		0.0	0.0	0.0	81.7
SC	4,065.0	35,147.6	456.0	39,668.6		212.0	0.0	214.0	30.0
SD	1,321.0	71,989.0	16,734.5	90,044.5		147.6	0.0	75.5	16,511.4

TN	4,208.0	0.0	747.8	4,955.8		692.7	0.0	55.1	0.0
TX	340.0	23,408.0	19,474.3	43,222.3		560.2	0.0	18,889.3	24.8
UT	11,934.0	56,177.0	83,435.4	151,546.4		1,333.3	78,920.0	216.7	2,965.4
VA	1,694.0	12,118.5	4,833.5	18,646.0		4,763.7	0.0	13.1	56.7
VT	12.0	274.0	0.0	286.0		0.0	0.0	0.0	0.0
WA	1,326.0	6,796.0	15,872.8	23,994.8		214.0	1,043.0	1,347.9	13,267.9
WI	362.0	3,853.0	941.7	5,156.7		0.1	0.0	27.3	914.3
WV	547.0	31,462.0	5.3	32,014.3		5.3	0.0	0.0	0.0
WY	1,977.0	37,260.0	4,497.2	43,734.2		407.1	2,150.0	0.0	1,940.1
TOTAL	**1,006,940.00**	**2,206,128.16**	**2,742,009.90**	**5,955,078.06**		**317,873.00**	**2,001,880.00**	**317,748.70**	**104,508.20**

Table 5. Wildfire Region-to-State Proportions for Bureau of Indian Affairs (BIA) Lands

BIA Region	State	State Tribal Acres	Region Tribal Acres	Proportion
Alaska	AK	86000	86000	1.0
Eastern	NJ	350	461083	0.0007590824211692910
Eastern	MO	793	461083	0.0017198638856778500
Eastern	LA	591	461083	0.0012817648883172900
Eastern	AL	230	461083	0.0004988255910541050
Eastern	VA	1350	461083	0.0029278893387958400
Eastern	SC	714	461083	0.0015485281391853500
Eastern	NY	73213	461083	0.1587848608601920000
Eastern	NC	56688	461083	0.1229453265464140000
Eastern	MS	20683	461083	0.0448574334772698000
Eastern	ME	149637	461083	0.3245337607328830000
Eastern	MA	12	461083	0.0000260256830115185
Eastern	GA	78	461083	0.0001691669395748700
Eastern	FL	154169	461083	0.3343627936835670000
Eastern	CT	632	461083	0.0013706859719399800
Eastern	RI	1943	461083	0.0042139918409483800
Eastern Oklahoma	OK	1470559	1470559	1.0
Great Plains	SD	5052222	7312806	0.6908732434581200000
Great Plains	ND	2233047	7312806	0.3053611705274280000
Great Plains	NE	27537	7312806	0.0037655860144519100
Midwest	MN	2595419	3312637	0.7834903130044130000
Midwest	WI	513023	3312637	0.1548684627986710000
Midwest	MI	199895	3312637	0.0603431646751516000
Midwest	IA	4300	3312637	0.0012980595217646800
Navajo	NM	3578900	16972427	0.2108655409152740000
Navajo	AZ	13393527	16972427	0.7891344590847260000
Northwest	ID	1639250	5719512	0.2866066195857270000
Northwest	OR	841948	5719512	0.1472062651498940000
Northwest	WA	3238314	5719512	0.5661871152643790000
Pacific	CA	577402	577402	1.0
Rocky Mountain	WY	4536016	12858139	0.3527739123056610000
Rocky Mountain	MT	8322123	12858139	0.6472260876943390000
Southern Plains	KS	37186	41891	0.8876847055453440000
Southern Plains	TX	4705	41891	0.1123152944546560000
Southwest	NM	3578900	4992687	0.7168284332664960000
Southwest	CO	1413787	4992687	0.2831715667335040000
Western	NV	1306915	11563236	0.1130232920957420000
Western	UT	3559558	11563236	0.3078340699783350000
Western	AZ	6696763	11563236	0.5791426379259230000

Notes: 1) Split Arizona acreage to 33% in Western Region and 66% in Navajo Region

2) Split New Mexico acreage to 50% in Southwest Region and 50% in Navajo Region

3) USE CAUTION WITH AZ AND NM IN DOING ALLOCATIONS--MAKE SURE ACRES FOR THESE STATES ARE SUMMED AFTER THEY ARE ALLOCATED FROM THE REGIONS

Table 6. Wildfire U.S. Forest Service Region-to-State Proportions

USFS Region	State	Proportion
Alaska (R-10)	Alaska	1.0
California (R-5)	California	0.9548436947005770000
California (R-5)	Hawaii	0.0451563052994233000
Intermountain (R-4)	Nevada	0.5519301282471400000
Intermountain (R-4)	Utah	0.4480698717528600000
North Central (R-9)	Connecticut	0.0121004903658835000
North Central (R-9)	Delaware	0.0027175772045970400
North Central (R-9)	Wash. DC	0.0000761659954151922
North Central (R-9)	Illinois	0.0284097840307711000
North Central (R-9)	Indiana	0.0289215360959145000
North Central (R-9)	Iowa	0.0153290492246096000
North Central (R-9)	Maine	0.1031648159565980000
North Central (R-9)	Maryland	0.0174727687582398000
North Central (R-9)	Massachusetts	0.0209382242482899000
North Central (R-9)	Michigan	0.1054265431727710000
North Central (R-9)	Minnesota	0.0999779300209672000
North Central (R-9)	Missouri	0.0857226823976314000
North Central (R-9)	New Hampshire	0.0284092927399224000
North Central (R-9)	New Jersey	0.0146341449207064000
North Central (R-9)	New York	0.0922710471410363000
North Central (R-9)	Ohio	0.0516782333150510000
North Central (R-9)	Pennsylvania	0.1031163769005860000
North Central (R-9)	Rhode Island	0.0026078155593873900
North Central (R-9)	Vermont	0.0255936099305570000
North Central (R-9)	West Virginia	0.0704815815644412000
North Central (R-9)	Wisconsin	0.0909503304566266000
Northern (R-1)	Idaho	0.3412879772849290000
Northern (R-1)	Montana	0.5939482373473460000
Northern (R-1)	North Dakota	0.0647637853677249000
Pacific Northwest (R-6)	Oregon	0.6220467830957730000
Pacific Northwest (R-6)	Washington	0.3779532169042270000
Rocky Mountain (R-2)	Colorado	0.3156228415862490000
Rocky Mountain (R-2)	Kansas	0.0961264325630086000
Rocky Mountain (R-2)	Nebraska	0.0995288754485312000
Rocky Mountain (R-2)	South Dakota	0.1519944993095380000
Rocky Mountain (R-2)	Wyoming	0.3367273510926720000
Southern (R-8)	Alabama	0.0710653019044971000
Southern (R-8)	Arkansas	0.0571354770560406000
Southern (R-8)	Florida	0.0631522901679666000
Southern (R-8)	Georgia	0.0782001061447690000
Southern (R-8)	Kentucky	0.0416277638005868000
Southern (R-8)	Louisiana	0.0467786678446073000
Southern (R-8)	Mississippi	0.0550584228894246000
Southern (R-8)	North Carolina	0.0626265976179865000
Southern (R-8)	Oklahoma	0.0573384702000264000
Southern (R-8)	South Carolina	0.0397398676256533000
Southern (R-8)	Tennessee	0.0442018350789039000
Southern (R-8)	Texas	0.3309467029943790000
Southern (R-8)	Virginia	0.0521284966751689000
Southwestern (R-3)	Arizona	0.4503289463232680000
Southwestern (R-3)	New Mexico	0.5496710536767320000

Table 7. Prescribed Burning Fuel Consumption, Smoldering Augmentation Factors and Piled Fuel Fractions

State (County)	Fuel Consumption Factor (tons/acre)	Fuel Consumption Factor Reference	Smoldering Augmentation Factor	Piled Fuel Fractions
Alabama	7.5	Reference 1	0.074	
Alaska	12.6154	Reference 2	0	
Arizona	8.7	Reference 1	0.063	0.51
Arkansas	6.8	Reference 1	0.084	
California	6.3	Reference 1	0.024	0.16
Colorado	6.9	Reference 1	0.071	0.26
Connecticut	3.1	Reference 1	0.085	
Delaware	7.5	Reference 1	0.03	
Wash. DC	3.1	Reference 1	0.085	
Florida	17.2	Reference 1	0.084	
Georgia	9.9	Reference 1	0.082	
Hawaii	6.3	Reference 1	0.024	
Idaho	12.3	Reference 1	0.078	0.41
Illinois	3	Reference 1	0.083	
Indiana	2.4	Reference 1	0.077	
Iowa	2.8	Reference 1	0.082	
Kansas	1	Reference 1	0.019	
Kentucky	3	Reference 1	0.081	
Louisiana	6.6	Reference 1	0.064	
Maine	11	Reference 1	0.085	
Maryland	4.4	Reference 1	0.08	
Massachusetts	9.8	Reference 1	0.085	
Michigan	5.2	Reference 1	0.084	
Minnesota	6.3	Reference 1	0.084	
Mississippi	7.1	Reference 1	0.069	
Missouri	2.6	Reference 1	0.078	
Montana	9.3	Reference 1	0.051	0.73
Nebraska	1.1	Reference 1	0.007	
Nevada	5.7	Reference 1	0	0.04
New Hampshire	12.8	Reference 1	0.085	
New Jersey	11.3	Reference 1	0.033	
New Mexico	6.4	Reference 1	0.067	0.06
New York	8.6	Reference 1	0.085	
North Carolina	6.7	Reference 1	0.082	
North Dakota	2	Reference 4	0.067	0
Ohio	2.9	Reference 1	0.083	
Oklahoma	2.3	Reference 1	0.039	
Oregon	8.6	Reference 1	0.077	0.59
Pennsylvania	3.1	Reference 1	0.083	
Rhode Island	3.1	Reference 1	0.085	
South Carolina	6.7	Reference 1	0.08	

State (County)	Fuel Consumption Factor (tons/acre)	Fuel Consumption Factor Reference	Smoldering Augmentation Factor	Piled Fuel Fractions
South Dakota (Lawrence Co.)	16	Reference 3	0	0
South Dakota (Pennington Co.)	16	Reference 3	0	0
South Dakota (Custer Co.)	16	Reference 3	0	0
South Dakota (all other counties)	2	Reference 3	0	0
Tennessee	3.5	Reference 1	0.081	
Texas	2.9	Reference 1	0.029	
Utah	3	Reference 1	0.058	0
Vermont	18.5	Reference 1	0.085	
Virginia	5.6	Reference 1	0.084	
Washington	4.5	Reference 1	0.058	0.76
West Virginia	4	Reference 1	0.085	
Wisconsin	4.3	Reference 1	0.084	
Wyoming	4.5	Reference 1	0.056	0

Table 8. Prescribed Burning Emission Factors (lb/ton of fuel consumed)

Pollutant	Piled Fuels	Non-Piled Fuels
PM-10	8.0	28.1
PM-2.5	8.0	24.1
VOC	6.3	13.6
NOx	6.2	6.2
NH_3	0.5	1.3
SO2	1.7	1.7
CO	74.3	289.0

$$\text{State-level prescribed fire emission factor} = [\,(\text{Fraction of fuel not piled} \times \text{Non-piled fuel prescribed fire emission factor}) + (\text{Fraction of fuel piled} \times \text{Piled fuel prescribed fire emission factor})\,] \times [\,1 + \text{State-level smoldering augmentation factor}\,] \quad \text{(Eq. 2)}$$

$$\text{State-level prescribed fire emissions} = \text{Prescribed fire acres burned} \times \text{State-level fuel loading factor} \times \text{State-level prescribed fire emission factor} \quad \text{(Eq. 3)}$$

Table 9. 1999 Activity Data for Prescribed Burning by State: Number of Acres Burned by Land Ownership Category

State	USFS	S&P	DOI	TOTAL		NPS	BLM	FWS	BIA
AL	60,105.2	1,772.3	134.8	62,012.3		86.0	0.0	48.8	0.0
AK	567.0	1,960.0	39,102.0	41,629.0		0.0	37,541.0	1,561.0	0.0
AZ	55,122.7	542.5	135,133.5	190,798.7		14,178.5	22,280.0	14,403.0	84,272.0
AR	48,752.1	1,437.6	5,900.0	56,089.7		3,545.0	0.0	2,355.0	0.0
CA	63,923.0	0.0	27,550.4	91,473.4		13,270.9	4,414.0	9,645.5	220.0
CO	16,546.7	1,092.4	14,186.4	31,825.5		873.4	10,517.0	1,920.0	876.0
CT	167.3	22.4	0.0	189.7		0.0	0.0	0.0	0.0
DE	38.8	5.2	47.0	91.0		0.0	0.0	47.0	0.0
DC	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
FL	52,117.4	1,536.8	86,392.6	140,046.8		65,615.4	0.0	20,777.2	0.0
GA	66,101.1	1,949.1	22,301.1	90,351.3		0.0	0.0	22,301.1	0.0
HI	3,023.0	0.0	113.4	3,136.4		98.4	0.0	15.0	0.0
ID	32,053.7	1,810.5	28,895.5	62,759.7		0.0	27,380.0	1,515.0	0.5
IL	405.9	54.3	303.0	763.2		0.0	0.0	303.0	0.0
IN	424.2	56.8	841.1	1,322.1		200.1	0.0	641.0	0.0
IA	227.3	30.4	3,416.6	3,674.3		159.3	0.0	3,257.3	0.0
KS	5,022.1	331.6	14,336.6	19,690.3		9,970.0	0.0	4,366.6	0.0
KY	35,406.6	1,044.0	0.0	36,450.6		0.0	0.0	0.0	0.0
LA	39,665.2	1,169.6	18,120.1	58,954.9		0.0	0.0	18,120.1	0.0
ME	1,586.5	212.4	175.1	1,974.0		0.0	0.0	175.1	0.0
MD	248.6	33.3	4,547.6	4,829.5		0.0	0.0	4,547.6	0.0
MA	290.3	38.9	9.0	338.2		9.0	0.0	0.0	0.0
MI	1,589.1	212.7	63.5	1,865.3		3.5	0.0	60.0	0.0
MN	1,521.4	203.7	24,574.1	26,299.2		776.5	0.0	23,797.6	0.0
MS	46,994.9	1,385.8	10,258.1	58,638.8		515.9	0.0	9,742.2	0.0
MO	1,300.5	174.1	2,815.0	4,289.6		2,075.0	0.0	740.0	0.0
MT	55,791.2	3,151.3	14,600.2	73,542.7		9.0	9,295.0	2,362.5	2,933.7
NE	5,234.5	345.6	4,589.5	10,169.6		102.0	0.0	4,412.5	75.0
NV	45,860.1	4,794.9	6,674.5	57,329.5		12.0	4,586.0	2,076.5	0.0
NH	434.1	58.1	58.6	550.8		0.0	0.0	58.6	0.0
NJ	189.6	25.4	173.0	388.0		0.0	0.0	173.0	0.0
NM	67,325.3	662.5	29,976.4	97,964.2		2,664.0	15,786.0	5,860.6	5,665.8
NY	1,386.2	185.6	475.6	2,047.4		170.0	0.0	305.6	0.0
NC	52,820.9	1,557.5	12,383.0	66,761.4		0.0	0.0	12,383.0	0.0
ND	6,075.0	343.1	20,827.6	27,245.7		1,531.5	0.0	19,296.1	0.0
OH	755.4	101.1	0.0	856.5		0.0	0.0	0.0	0.0
OK	48,576.7	1,432.4	9,433.7	59,442.8		104.8	0.0	9,328.4	0.5
OR	81,952.5	0.0	62,820.0	144,772.5		2,108.0	48,864.0	8,462.4	3,385.6
PA	1,539.8	206.1	16.8	1,762.7		0.0	0.0	16.8	0.0
RI	36.3	4.9	0.0	41.2		0.0	0.0	0.0	0.0
SC	33,555.9	989.5	15,045.0	49,590.4		299.5	0.0	14,745.5	0.0
SD	7,990.5	527.5	12,898.4	21,416.4		6,284.4	0.0	6,544.0	70.0
TN	37,084.4	1,093.5	364.0	38,541.9		364.0	0.0	0.0	0.0
TX	281,429.6	8,298.6	44,555.1	334,283.3		5,434.3	0.0	39,120.8	0.0
UT	37,214.9	3,891.1	20,482.7	61,588.7		2,704.7	14,122.0	2,556.0	1,100.0
VT	393.8	52.7	39.0	485.5		0.0	0.0	39.0	0.0
VA	43,786.0	1,291.1	1,748.0	46,825.1		1,466.0	0.0	282.0	0.0
WA	49,469.5	0.0	7,368.0	56,837.5		98.0	24.0	1,425.0	5,821.0
WV	1,082.8	145.0	0.0	1,227.8		0.0	0.0	0.0	0.0
WI	1,389.1	186.0	4,667.7	6,242.8		0.0	0.0	4,270.7	397.0
WY	17,706.2	1,168.9	34,062.2	52,937.3		3,975.2	29,807.0	0.0	280.0
TOTAL	**1,412,280.9**	**47,588.8**	**742,475.5**	**2,202,345.2**		**138,704.3**	**224,616.0**	**274,058.1**	**105,097.1**

Table 10. Prescribed Burning U.S. Forest Service Region-to-State Proportions

USFS Region	State	Proportion
Alaska (R-10)	Alaska	1.0
California (R-5)	California	0.95484369470057700000
California (R-5)	Hawaii	0.04515630529942330000
Intermountain (R-4)	Nevada	0.55203195619386400000
Intermountain (R-4)	Utah	0.44796804380613600000
North Central (R-9)	Connecticut	0.01114645713275250000
North Central (R-9)	Delaware	0.00258463545270704000
North Central (R-9)	Wash. DC	0.00000122464965057574
North Central (R-9)	Illinois	0.02704909800979140000
North Central (R-9)	Indiana	0.02826495609992120000
North Central (R-9)	Iowa	0.01514307230302830000
North Central (R-9)	Maine	0.10571821446198600000
North Central (R-9)	Maryland	0.01656790250569600000
North Central (R-9)	Massachusetts	0.01934691735726030000
North Central (R-9)	Michigan	0.10589256199737600000
North Central (R-9)	Minnesota	0.10137875514249700000
North Central (R-9)	Missouri	0.08665767630510280000
North Central (R-9)	New Hampshire	0.02892640870043320000
North Central (R-9)	New Jersey	0.01263229910557920000
North Central (R-9)	New York	0.09236752141116590000
North Central (R-9)	Ohio	0.05033652845632930000
North Central (R-9)	Pennsylvania	0.10260850927756500000
North Central (R-9)	Rhode Island	0.00242153873952090000
North Central (R-9)	Vermont	0.02624367615894350000
North Central (R-9)	West Virginia	0.07215086028942750000
North Central (R-9)	Wisconsin	0.09256118644326920000
Northern (R-1)	Idaho	0.34128739749039400000
Northern (R-1)	Montana	0.59402947575082800000
Northern (R-1)	North Dakota	0.06468312675877710000
Pacific Northwest (R-6)	Oregon	0.62358307288252000000
Pacific Northwest (R-6)	Washington	0.37641692711748100000
Rocky Mountain (R-2)	Colorado	0.31517596955509900000
Rocky Mountain (R-2)	Kansas	0.09565969454231190000
Rocky Mountain (R-2)	Nebraska	0.09970420584269870000
Rocky Mountain (R-2)	South Dakota	0.15219981508134200000
Rocky Mountain (R-2)	Wyoming	0.33726031497854800000
Southern (R-8)	Alabama	0.07101306801624100000
Southern (R-8)	Arkansas	0.05759957826580590000
Southern (R-8)	Florida	0.06157570988717320000
Southern (R-8)	Georgia	0.07809711035492220000
Southern (R-8)	Kentucky	0.04183223542124770000
Southern (R-8)	Louisiana	0.04686366942582060000
Southern (R-8)	Mississippi	0.05552351827597190000
Southern (R-8)	North Carolina	0.06240682470083290000
Southern (R-8)	Oklahoma	0.05739241896370090000
Southern (R-8)	South Carolina	0.03964562394257670000
Southern (R-8)	Tennessee	0.04381448355340900000
Southern (R-8)	Texas	0.33250350877101000000
Southern (R-8)	Virginia	0.05173225042129530000
Southwestern (R-3)	Arizona	0.45017201014845300000
Southwestern (R-3)	New Mexico	0.54982798985154700000

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