

# Atlanta Nonattainment Area Emissions Inventory for the 2008 8-Hour Ozone NAAQS

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On April 30, 2012, EPA designated 15 counties in Georgia (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, and Rockdale) as “Marginal” nonattainment for the 2008 8-Hour Ozone NAAQS (75 ppb). Section 182(a)(1) of the Clean Air Act (CAA) requires a current and comprehensive inventory of actual emissions for all sources of ozone precursors to be included in a State Implementation Plan (SIP). To address this requirement, the Georgia Environmental Protection Division (GA EPD) prepared a 2011 annual and summer day emissions inventory for nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), and carbon monoxide (CO) for the 15 counties in Atlanta that were designated “Marginal” nonattainment for the 2008 8-Hour Ozone NAAQS.

Since 2011 is the most recent year for which a complete National Emission Inventory (NEI) is available for all emission sources (NEI2011), the Georgia Environmental Protection Division (GA EPD) feels that 2011 is an appropriate base year for the emissions inventory in this SIP revision. Complete national emission inventories are prepared every three years and are primarily based on data and inputs provided by state, local, and tribal agencies for sources within their jurisdictions. The NEI includes emissions from large point sources at specific locations, emissions from fire events, and county-level emissions of onroad mobile sources, nonroad mobile sources, and other nonpoint (area) sources. GA EPD has been actively working together with the United States Environmental Protection Agency (U.S. EPA) on the NEI2011 to ensure high quality emission estimates for sources in Georgia (e.g., submitting emission estimates developed with better local data sources and/or estimation methods, sharing local activity data/modeling inputs, and reviewing and providing comments on the EPA estimates). The emission estimates in NEI2011 for Georgia are considered the best available data source to develop 2011 annual and summer day emissions for the 15 Atlanta nonattainment counties. This document describes how GA EPD calculated the annual and summer day emissions using various methods for different source categories. Annual and summer day NO<sub>x</sub>, VOC, and CO emissions are summarized by facilities for point sources and by Source Classification Codes (SCCs) for other source categories.

## Annual Emissions

NO<sub>x</sub>, VOC and CO emissions in the 15 Atlanta nonattainment counties for 2011 were prepared using various methods for different source categories such as EGU point sources, non-EGU point sources, nonpoint sources, onroad and nonroad mobile sources, fire events, and biogenics. The development of these emission inventories are described in the following sub-sections. Detailed calculations can be found in the Appendix A organized by each source category.

### EGU point sources

NO<sub>x</sub> emissions from three power plants in the Atlanta 15 counties: Plant Bowen, Plant McDonough/Atkinson, and Plant Yates were calculated using the continuous emissions monitoring system (CEMS) data which include hourly measurements for NO<sub>x</sub> and sulfur dioxide (SO<sub>2</sub>) emissions and

heat inputs. U.S. EPA used this data in the EPA 2011 modeling platform. The hourly NOx emissions measured by the CEMS during 2011 are summed up to get annual 2011 emissions. For VOC and CO emissions, annual 2011 emissions which were reported by facilities, reviewed by both GA EPD and U.S. EPA, and submitted to the NEI2011 (U.S. EPA, 2013) were used. Specifically, the data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- CEMS data: HOUR\_UNIT\_2011\*.txt
- NEI2011: nonpeak\_2011NEIv1\_POINT\_20130723\_revised\_ptipm\_19aug2013\_v0.csv.

### **Non-EGU point sources**

Emissions from 76 non-EGU facilities in the 15 Atlanta nonattainment counties were based on the annual 2011 emissions in NEI2011 (U.S. EPA, 2013), which were reported by facilities and reviewed by both GA EPD and U.S. EPA. In addition, the non-EGU point sources in NEI2011 include aircraft and railyard sources. Since these sources are usually treated as part of the nonroad mobile source category, emissions from these sources were removed from this source category and included as part of the nonroad source category. The data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- 2011NEIv1\_POINT\_20130723\_revised\_ptnonipm\_15aug2013\_v3.csv.

### **Nonpoint sources**

Emissions from nonpoint sources are obtained from NEI2011 (U.S. EPA, 2013) via the U.S. EPA Emissions Inventory System (EIS). The Georgia emissions estimates in NEI2011 are the result of collaborative efforts from GA EPD and U.S. EPA, and represent the best available information for Georgia. GA EPD reviewed the emissions estimates for nonpoint sources developed by U.S. EPA. When the U.S. EPA emissions for specific nonpoint SCCs in NEI2011 were considered to be of better quality than the GA EPD estimates, GA EPD used the EPA emissions. For the remaining nonpoint sources, GA EPD developed emission estimates and submitted them to the EIS to be included as part of NEI2011. More detailed information can be found in Appendix B.

Emissions from Petroleum and Petroleum Product Storage, Stage 2 (SCC: 2501060100 and 2501070100) were estimated by running Motor Vehicle Emission Simulator (MOVES), instead of the estimates in NEI2011. More detailed information about MOVES simulations can be found in the “Onroad mobile sources” section. In addition, emissions for nonpoint sources in NEI2011 include emissions from railroad. Therefore, the railroad emissions were removed from the nonpoint source category and added to the nonroad mobile source category.

### **Onroad mobile sources**

Emissions from onroad mobile sources are estimated using MOVES2010b. MOVES was run at the county level for each of the Atlanta 15 counties in inventory mode with 2011 meteorological inputs, fuel formulation and supply input data provided by U.S. EPA. The other inputs (such as vehicle population, vehicle miles traveled (VMT) by source types, road type distribution, speed distributions, ramp fractions, and hourly VMT fractions) were developed by GA EPD with local data and are described in details in

Appendix C. These inputs were submitted to U.S. EPA through the EIS gateway for as part of the NEI2011 development. The MOVES input/output databases and run specification setup files can be found in Appendix A.

Annual emissions are calculated by summing typical weekday and weekend day emissions for each month. The calculations for annual emissions consist of 4 steps:

1. Aggregate emissions output into a 24-hr day by daytype (weekday or weekend) for each month in MySQL browser.
2. For each month, take the weekday 24-hr aggregated emissions value and multiply by number of weekdays in the month and take the weekend 24-hr aggregated emissions value and multiply by number of weekend days in the month.
3. Take all the values calculated in step 2 and sum them.
4. Repeat same steps for each county and SCC (this can be conducted in Excel using the “sumif” formula command).

In addition, VOC emissions from refueling were calculated using MOVES2010b. These emissions correspond to evaporative emissions for processes #18 and #19 (refueling vapor displacement loss and refueling spillage loss) in the MOVES outputs, and are included as part of nonpoint source category, instead of the onroad mobile sources.

### **Nonroad mobile sources**

Emissions from NONROAD model category are obtained from NEI2011. Specifically, the data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- Georgia\_2011ec\_nonroad .csv.

These emissions are estimated using National Mobile Inventory Model (NMIM) with updated NCD files from GA EPD. More detailed modeling information can be found in the U.S. EPA NEI2011 technical document (U.S. EPA, 2013), and more detailed information about the GA EPD updated NCD files can be found in Appendix D.

Emissions from aircraft and railyards were obtained from NEI2011. Specifically, the data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- 2011NEIv1\_POINT\_20130723\_revised\_ptnonipm\_15aug2013\_v3.csv.

These emissions were included as part of the point data category. These estimates were developed by U.S. EPA (U.S. EPA, 2013) and have been reviewed by GA EPD, except the emissions from the Hartsfield-Jackson Atlanta International Airport were obtained from the City of Atlanta/Department of Aviation. Detailed documentation about the emission inventory development for the Hartsfield-Jackson Atlanta International Airport can be found in the Appendix E.

Emissions from railroads were obtained from the NEI2011 via EIS. These emissions were included as part of nonpoint data category and were estimated by U.S. EPA (U.S. EPA, 2013). GA EPD has reviewed the U.S. EPA estimates and regards them as the best available estimates.

## Fire events

Wildland fires (including both wildfires and prescribed fires) in Georgia emit large amounts of air pollutants. These emissions have been quantified by GA EPD in calendar years 2005 and 2008, and through collaborative projects for the SESARM states in 2002 and 2007. For NEI2011, GA EPD shared the detailed 2011 burn records which were collected from the Georgia Forestry Commission (GFC), military bases, U.S. Forest Service (USFS), and Fish and Wildlife Service (FWS) with U.S. EPA and USFS to support the development of the 2011 national wildland fire emission inventories. After reviewing the 2011 national wildland fire emission inventory, GA EPD decided to develop and submit Georgia 2011 wildland fire emission estimates.

GA EPD developed wildland fire emissions using fire records collected from the Georgia Forestry Commission (GFC), military bases and federal agencies (USFS and FWS) when their fire activities were not included in the GFC database. Also, GA EPD collected detailed burning records for the Okefenokee area fire. The detailed burning records showed burned area per day. No satellite fire detection data were used in GA EPD 2011 wildland fire emission inventory development. Then, GA EPD followed the same methods used to develop SEMAP 2007 fire inventory (AMEC, 2012) to develop the Georgia 2011 fire emissions. The fuel consumption and emission factors used in the SEMAP 2007 fire inventory development are considered to be the most accurate based on the feedback from fire and forest managers in the southeast.

## Biogenic sources

Biogenic emissions are obtained from NEI2011. Specifically, the data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- beis\_daily\_2011ed\_21jan2014.zip

The daily biogenic emissions summary by county was used. These emissions were estimated using the Biogenic Emission Inventory System (BEIS) version 3.14 model within Sparse Matrix Operator Kernel Emissions model (SMOKE) with 2011 meteorological data from the Weather Research and Forecasting (WRF) Model. Detailed document can be found in the U.S. EPA NEI2011 technical support document (U.S. EPA, 2013).

## Summer Day Emissions

The summer day emissions were calculated as the average of emissions during weekdays in July 2011. The weekdays (Monday - Friday) during July 2011 are listed in Table 1. Since July 4<sup>th</sup> is a holiday and is treated the same as Sunday during SMOKE modeling, the calculation here also treats July 4<sup>th</sup> (Monday)

as Sunday. The calculation varies among source categories due to availability of different data sources, and is described in detail below. The detailed calculations by source categories can be found in Appendix A.

**Table 1. List of weekdays during July 2011**

Day	Dates	# of days	# of days with holiday correction
Monday	7/4/2011*, 7/11/2011, 7/18/2011, 7/25/2011	4	3
Tuesday	7/5/2011, 7/12/2011, 7/19/2011, 7/26/2011	4	4
Wednesday	7/6/2011, 7/13/2011, 7/20/2011, 7/27/2011	4	4
Thursday	7/7/2011, 7/14/2011, 7/21/2011, 7/28/2011	4	4
Friday	7/1/2011, 7/8/2011, 7/15/2011, 7/22/2011, 7/29/2011	5	5
Saturday	7/2/2011, 7/9/2011, 7/16/2011, 7/23/2011, 7/30/2011	5	5
Sunday	7/3/2011, 7/10/2011, 7/17/2011, 7/24/2011, 7/31/2011	5	6

\*7/4/2011 is a Monday, but is treated as Sunday in SMOKE modeling.

The summer day emission calculations were performed following the latest EPA emissions inventory guidance (U.S. EPA, 2014). In the guidance, it states that “Summer day emissions means an average day’s emissions for a typical summer work weekday. The state will select the particular month(s) in the summer and the day(s) in the work week to be represented. The selection of conditions should be coordinated with the conditions assumed in the development of reasonable further progress (RFP plans, rate of progress plans and demonstrations, and/or emissions budgets for transportation conformity), to allow comparability of daily emission estimates.” July is a typical summer month for the 15 Atlanta nonattainment counties. In addition, the July weekday emissions have been traditionally used to develop motor vehicle emission budget (MVEB) for transportation conformity.

### EGU Point sources

The summer day NOx emissions from EGU point sources are calculated by summing the hourly CEMS NOx emission measurements during the 20 weekdays in July and then dividing by 20 days. The summer day VOC and CO emissions are calculated by multiplying the annual VOC or CO emissions with fractions of average heat input during July weekdays to annual total heat input.

$$emis_{summer-day} = emis_{annual} \times \frac{\sum_j HeatInput_j / 20}{\sum_i HeatInput_i}$$

Where *i* refers to every hour during 2011 and *j* refers to every hours during July weekdays listed in Table 1. Specifically, the above data are downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- CEMS data: HOUR\_UNIT\_2011\*.txt
- NEI2011: nonpeak\_2011NEIv1\_POINT\_20130723\_revised\_ptipm\_19aug2013\_v0.csv.

Detailed calculation can be found in Appendix A.

## Non-EGU point sources

The summer day emissions from non-EGU point sources were calculated by applying the emissions fractions from the SMOKE monthly and weekly temporal profiles to the annual non-EGU point source emissions. The SMOKE monthly temporal profiles include weighting factors by month, and the weekly profiles include weighting factors by day of week. These profiles vary with SCCs. More detailed information can be found in the SMOKE manual (<https://www.cmascenter.org/smoke/>). Specifically, emissions during July are first calculated with the following equation:

$$emis_{july} = emis_{annual} \times \frac{wf_{july}}{\sum_{i=1}^{12} wf_i}$$

where  $wf_{july}$  refers to weighting factor for July and  $wf_i$  refers to weighting factor for each month. Then, the summer day emissions are calculated with the following equation:

$$emis_{summer-day} = emis_{july} \times \frac{\sum_{j=1}^5 n_j wf_j}{\sum_{i=1}^7 n_i wf_i} \div 20$$

where  $i$  refers to everyday in a week,  $j$  refers to every weekday,  $wf_i$  or  $wf_j$  refers to the weighting factors for a specific day, and  $n_i$  or  $n_j$  refers to the number of days for a specific day during July. The temporal reference and profiles are downloaded from the EPA 2011 modeling Platform ftp site:

- [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/reports/temporal\\_profiles/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/reports/temporal_profiles/)
- “tref\_2011.xlsx”
- “tpro\_2011.xlsx”.

Detailed calculation can be found in Appendix A.

## Nonpoint sources

The summer day emissions from nonpoint sources are calculated by applying the emission fractions from the SMOKE monthly and weekly temporal profiles to the annual nonpoint source emissions (refer to the “Non-EGU point sources” section for details). In addition, summer day emissions from agriculture burning and land clearing were calculated using emissions during July and the SMOKE weekly profiles. The summer day emissions from Petroleum and Petroleum Product Storage, Stage 2 (SCC: 2501060100 and 2501070100) were estimated by running MOVES for a July weekday. More detailed information about MOVES simulations can be found in the “Onroad mobile sources” section.

## Onroad mobile sources

The summer day emissions from onroad mobile sources were calculated using MOVES2010b for a July weekday using the same inputs as described in the section for calculating annual emissions for onroad mobile sources. The MOVES input/output databases and run specification setup files can be found in Appendix A.

## Nonroad mobile sources

The summer day emissions from NONROAD model category are calculated by applying the SMOKE weekly temporal profiles to the monthly emission during July, which are available in NEI2011. Specifically, the data was downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- Georgia\_2011ec\_nonroad .csv.

Please refer to the “Non-EGU point sources” for details on applying the weekly profiles.

The summer day emissions from aircraft and railroad locomotives were calculated by applying the emissions fractions from the SMOKE monthly and weekly temporal profiles to the annual emissions (refer to the “Non-EGU point sources” for details).

## Event Fires

The summer day emissions from event fires were calculated by summing the daily emissions from fires occurred during the 20 July weekdays and then dividing the total emissions during July weekdays by 20 days.

## Biogenic sources

The summer day emissions from biogenic sources were calculated by summing the daily emissions during the 20 weekdays in July and then dividing the total emissions by 20 days. The daily biogenic emissions are downloaded from the EPA 2011 modeling Platform ftp site:

- <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions>
- beis\_daily\_2011ed\_21jan2014.zip.

## Emission Summaries by Counties

Annual and summer day 2011 emissions of NO<sub>x</sub>, VOC and CO for the 15 Atlanta nonattainment counties for point sources are summarized by facilities in Table 2 and Table 3. Detailed emissions summaries by SCC and county for nonpoint, mobile onroad, and nonroad sources can be found in Appendix F. Emissions summaries by county and source category can be found in Tables 4 - 9, Figure 1, and Figure 2.

**Table 2. Annual and typical summer day 2011 NOx, VOC, and CO emissions by facilities for EGUs in 15 Atlanta counties**

region_cd	facility_id	agy_facility_id	facility_name	Annual (tons/year)			Summer Daily (tons/day)		
				NOX	VOC	CO	NOX	VOC	CO
13015	2813011	01500011	Ga Power Company - Plant Bowen	8,367.4	188.1	1,569.2	16.85	0.70	5.85
13067	3699211	06700003	Ga Power Company - Plant McDonough/Atkinson	3,162.3	27.2	226.0	8.84	0.10	0.79
13077	3703111	07700001	Ga Power Company - Plant Yates	6,762.8	61.4	478.0	19.45	0.21	1.65

**Table 3. Typical summer day 2011 NOx, VOC, and CO emissions by facilities for non-EGU point sources in 15 Atlanta counties (tons/day)**

region_cd	facility_id	agy_facility_id	facility_name	Annual (tons/year)			Summer Daily (tons/day)		
				NOX	VOC	CO	NOX	VOC	CO
13015	2813011	01500011	Ga Power Company - Plant Bowen	3.84	0.03	0.78	0.0110	0.0001	0.0022
13015	2813111	01500061	Anheuser-Busch Inc	102.26	119.95	26.40	0.2585	0.3269	0.0663
13015	2813211		Bartow County Ph1 Sif			0.67			0.0018
13015	552911	01500008	Chemical Products Corporation	22.67	1.53	16.83	0.0603	0.0041	0.0448
13015	553311	01500032	Gerdau Ameristeel US Inc.	79.82	11.06	277.11	0.2107	0.0292	0.7315
13057	3563211	05700052	International Marble		7.75			0.0210	
13057	3694911	05700008	American Proteins, Inc.	2.50	70.95	0.48	0.0067	0.1907	0.0013
13057	3695011	05700036	Atlanta Gas Light Company	29.61	9.58	43.95	0.0793	0.0258	0.1180
13063	3698311		Clayton County SR 3 Lovejoy Landfill			0.82			0.0022
13063	534911	06300008	Sherwin-Williams Co	1.13	18.75	0.95	0.0030	0.0504	0.0025
13063	536411	06300059	Delta Air Lines Inc - Atlanta Station	5.52	10.98	3.55	0.0143	0.0295	0.0090
13063	536511	06300105	Delta Airlines - Technical Operations	87.59	165.35	42.51	0.2348	0.4444	0.1133
13063	9749111	06300026	Griffin Industries, Inc. of Georgia	11.29	62.97	9.47	0.0299	0.2095	0.0251
13067	3699211	06700003	Ga Power Company - Plant McDonough/Atkinson	0.13	0.00	0.04	0.0004	0.0000	0.0001
13067	3699311	06700015	Boral Bricks - Atlanta Plant	5.18	0.04	14.53	0.0139	0.0001	0.0391
13067	3699411	06700027	Lockheed Martin Aeronautics Company	29.50	62.41	35.55	0.0791	0.1678	0.0956
13067	3699511	06700032	Marathon Petroleum Company LP - Powder Springs Terminal	1.41	32.06	7.69	0.0038	0.0863	0.0208
13067	3699611	06700074	Colonial Pipeline Company - Atlanta Junction		151.83			0.4081	
13067	3699711	06700078	Metal Coaters		12.14			0.0341	
13067	554511	06700022	Caraustar Industries Inc	176.44	14.65	35.77	0.4743	0.0394	0.0962
13077	3703211	07700010	Bon L Manufacturing Company, Inc.	25.29	23.47	17.13	0.0681	0.0637	0.0462
13077	3703311	07700039	Yamaha Motor Manufacturing Corporation	6.71	35.28		0.0173	0.0939	
13089	10678611	08900299	Seminole Road MSW Landfill	44.70	19.98	251.10	0.1202	0.0537	0.6750
13089	15534911	08900313	Carlyle Compressor Remanufacturing		10.80			0.0293	
13089	3713311	08900047	Graphic Packaging International, Inc.		64.73			0.1746	
13089	3979511	08900130	Bp Products North America Inc		48.72			0.1308	
13089	4239711	08900085	Magellan Terminal Holdings, L.P. - Doraville I Terminal	6.19	98.43	15.47	0.0167	0.2625	0.0418
13089	4239911	08900097	New WinCup Stone Mountain	8.36	76.80	12.83	0.0225	0.2065	0.0345
13089	4240011	08900121	MagellanTerminal Holdings, L.P. - Doraville II Terminal	3.70	69.74	9.26	0.0100	0.1880	0.0250
13089	4240111	08900127	Citgo Petroleum Corp		49.05	8.11		0.1318	0.0218



region_cd	facility_id	agy_facility_id	facility_name	Annual (tons/year)			Summer Daily (tons/day)		
				NOX	VOC	CO	NOX	VOC	CO
13089	4240211	08900128	Transmontaigne Operating Co LP		41.06	5.38		0.1103	0.0145
13089	4240311	08900226	Woodbridge Foam Corp	7.92	47.26	3.35	0.0205	0.1270	0.0087
13089	4240411	08900227	International Paper Company		14.94			0.0399	
13089	4240511	08900239	Earthgrains Baking Co., Inc.	2.65	40.80	2.20	0.0068	0.1090	0.0057
13089	4240611	08900263	Waste Management Inc/Live Oak Landfill	0.31	0.00	1.37	0.0008	0.0000	0.0037
13089	4316611		Atlanta / Key Road Landfill			0.60			0.0016
13089	532711	08900131	Motiva Enterprises LLC	10.07	64.17		0.0271	0.1725	
13089	532811	08900224	Dart Container Corporation of Georgia	14.91	422.47	12.53	0.0395	1.1356	0.0332
13089	536011	08900233	Emory University	31.08			0.0823		
13089	8353011	08900100	Chevron Products Co.-Doraville Term.		30.68			0.0823	
13089	9742511	08900120	Marathon Petroleum Company LP - Doraville Terminal		19.04			0.0512	
13113	3712411		Roberts Road Landfill			0.10			0.0003
13113	9736111	11300013	Certaineed Corporation		0.39	6.20		0.0010	0.0167
13113	9736211	11300010	Avery Dennison - Fasson Roll North America	7.44	26.20	6.18	0.0195	0.0704	0.0162
13117	15544211	11700025	Scientific Games International		13.83			0.0370	
13117	4302711	11700005	American Proteins Inc	34.52	81.11	45.46	0.0723	0.2180	0.0940
13117	4302911		Forsyth County / Hightower Rd Ph 1&3 Landfill			6.20			0.0167
13121	15546611	12100036	Atlanta Utoy Creek Wpcp	12.78	2.65	114.93	0.0346	0.0072	0.3116
13121	4303711	12100021	Owens Corning Insulating Systems, LLC	19.68	29.38	172.57	0.0521	0.0780	0.4575
13121	4303911	12100221	BP Products North America - Atlanta Terminal		37.94			0.1018	
13121	4304211	12100558	Geiger International, Inc.		12.10			0.0325	
13121	4304411	12100705	Spurlin Industries		43.85			0.1161	
13121	4316211		Fulton County / Merk / Miles Landfill			0.29			0.0008
13121	4316311		Atlanta / Cascade Road Sanitary Landfill			0.48			0.0013
13121	4316811		Bolton Road Landfill			0.18			0.0005
13121	4317511	12100715	Scholle Chemical Corp		15.94			0.0411	
13121	536111	12100020	Owens Brockway Glass Container Inc.	350.46	3.14	14.27	0.9280	0.0084	0.0378
13121	7322111	12100070	Mead Packaging		50.88			0.1368	
13121	8353611	12100807	Delta Airlines - General Office Facilities	6.41	0.24	2.32	0.0175	0.0007	0.0062
13121	8499911	12100268	R. M. Clayton Water Reclamation Center	52.63	28.21	178.02	0.1425	0.0762	0.4821
13121	931211	12100254	PPG Industries Inc.	1.15	15.46		0.0030	0.0416	
13121	9779911	12100779	Sun Chemical Corp.		14.40			0.0399	
13135	12686111	13500170	MTI Whirlpools Inc.		15.85			0.0426	
13135	2607511	13500219	UWL/Richland Creek Road Sanitary Landfill			127.92			0.3439
13135	539111	13500185	Bj Sanitary Landfill & Recyclihg Center			0.32			0.0009
13135	8499711	13500139	Dolco Packaging	1.20	43.93	1.01	0.0032	0.1181	0.0027
13151	2653511	15100025	Transcontinental Gas Pipe Line Company, LLC - Compressor Station 120	2,258.82	404.12	684.30	6.0719	1.0863	1.8394
13151	2654011	15100021	Briggs & Stratton Power Products Group, LLC	7.58	18.96	13.00	0.0203	0.0510	0.0349
13151	554611	15100022	Toppan Interamerica Inc	5.77	150.27	4.84	0.0154	0.4064	0.0129
13217	12686611	21700020	FiberVisions Incorporated		69.67			0.1873	

region_cd	facility_id	agy_facility_id	facility_name	Annual (tons/year)			Summer Daily (tons/day)		
				NOX	VOC	CO	NOX	VOC	CO
13217	15604511	21700033	General Mills Operations, Inc	22.14	2.78	18.60	0.0638	0.0077	0.0536
13217	2686611		Newton County Landfill			0.94			0.0025
13217	930311	21700024	Pactiv Corp	0.98	322.68	0.66	0.0026	0.8674	0.0018
13247	2548111	24700030	Cellofoam North America, Inc.	4.06	22.46	3.41	0.0102	0.0604	0.0086
13247	2548211	24700033	Tegrant Diversified Brands, Inc.	1.60	62.02	1.01	0.0040	0.1667	0.0026
13247	2548311	24700037	Visy Paper Inc	45.24	46.22		0.1216	0.1242	

**Table 4. Annual 2011 NOx emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	8,367	209	125	4,232	1,168	11	72	14,184
Cherokee	13057	0	32	201	3,138	1,029	5	42	4,448
Clayton	13063	0	106	290	4,172	5,331	3	46	9,947
Cobb	13067	3,162	213	979	9,485	3,463	0	68	17,369
Coweta	13077	6,763	32	162	2,510	756	60	62	10,344
DeKalb	13089	0	130	951	10,447	2,338	0	48	13,914
Douglas	13097	0	0	125	2,326	486	4	33	2,975
Fayette	13113	0	7	130	1,358	604	1	43	2,143
Forsyth	13117	0	35	144	2,753	998	0	41	3,971
Fulton	13121	0	443	1,533	17,040	5,499	4	69	24,588
Gwinnett	13135	0	1	878	10,927	4,259	0	85	16,151
Henry	13151	0	2,272	160	3,642	1,254	4	61	7,394
Newton	13217	0	23	85	2,408	512	19	48	3,094
Paulding	13223	0	0	107	1,607	708	6	38	2,465
Rockdale	13247	0	51	105	1,516	359	2	43	2,075
Total		18,292	3,553	5,975	77,560	28,762	119	799	135,061

**Table 5. Annual 2011 VOC emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	188	133	1,549	1,481	775	23	13,737	17,885
Cherokee	13057	0	88	1,944	1,630	837	9	13,318	17,827
Clayton	13063	0	258	2,591	1,975	1,426	6	5,630	11,885
Cobb	13067	27	273	7,312	5,382	3,014	0	10,284	26,292
Coweta	13077	61	59	1,420	1,007	368	126	14,639	17,680
DeKalb	13089	0	1,119	7,371	4,780	1,393	0	7,812	22,474
Douglas	13097	0	0	1,532	1,047	250	8	8,513	11,350
Fayette	13113	0	27	1,064	826	528	2	8,096	10,543
Forsyth	13117	0	95	1,685	1,335	1,304	0	7,581	12,001
Fulton	13121	0	254	9,925	7,141	3,063	7	13,013	33,403
Gwinnett	13135	0	60	8,461	5,647	3,847	0	12,251	30,267
Henry	13151	0	573	1,726	1,554	602	9	9,274	13,738
Newton	13217	0	395	1,168	1,218	393	37	9,608	12,818
Paulding	13223	0	0	1,153	906	299	12	10,837	13,207
Rockdale	13247	0	131	859	646	262	4	6,629	8,531
Total		277	3,464	49,761	36,574	18,362	245	151,220	259,902

**Table 6. Annual 2011 CO emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	1,569	322	566	15,582	5,389	388	1,367	25,182
Cherokee	13057	0	44	465	16,334	9,931	163	1,242	28,179
Clayton	13063	0	57	448	22,827	16,307	102	535	40,275
Cobb	13067	226	94	1,548	56,715	36,911	5	1,083	96,582
Coweta	13077	478	17	1,427	10,438	4,397	2,350	1,389	20,496
DeKalb	13089	0	322	1,606	55,642	15,429	1	804	73,804
Douglas	13097	0	0	259	11,355	3,259	106	774	15,753
Fayette	13113	0	12	230	8,030	5,457	41	706	14,476
Forsyth	13117	0	52	330	13,635	15,378	4	726	30,125
Fulton	13121	0	483	2,575	84,667	36,565	83	1,314	125,688
Gwinnett	13135	0	129	1,596	59,952	54,840	4	1,166	117,688
Henry	13151	0	702	338	16,333	5,594	120	902	23,989
Newton	13217	0	20	510	10,850	3,109	555	994	16,038
Paulding	13223	0	0	607	8,664	3,401	246	1,068	13,986
Rockdale	13247	0	4	211	6,926	3,441	72	646	11,301
Total		2,273	2,260	12,714	397,951	219,408	4,241	14,714	653,561

**Table 7. 2011 summer day NOx emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	16.85	0.54	0.17	11.18	3.48	0.00	0.34	32.55
Cherokee	13057	0.00	0.09	0.12	8.53	3.49	0.00	0.17	12.39
Clayton	13063	0.00	0.28	0.19	11.60	15.84	0.00	0.19	28.09
Cobb	13067	8.84	0.57	0.69	26.86	11.15	0.00	0.31	48.41
Coweta	13077	19.45	0.09	0.12	6.67	2.39	0.00	0.26	28.98
DeKalb	13089	0.00	0.35	0.65	29.24	7.68	0.00	0.20	38.12
Douglas	13097	0.00	0.00	0.08	6.39	1.56	0.00	0.15	8.19
Fayette	13113	0.00	0.02	0.09	3.86	1.96	0.00	0.18	6.11
Forsyth	13117	0.00	0.07	0.11	7.62	3.36	0.00	0.18	11.34
Fulton	13121	0.00	1.18	1.38	47.49	17.53	0.00	0.30	67.87
Gwinnett	13135	0.00	0.00	0.67	30.64	14.37	0.00	0.38	46.07
Henry	13151	0.00	6.11	0.11	9.86	4.03	0.00	0.25	20.36
Newton	13217	0.00	0.07	0.10	6.49	1.70	0.00	0.20	8.55
Paulding	13223	0.00	0.00	0.07	4.41	2.20	0.00	0.17	6.85
Rockdale	13247	0.00	0.14	0.09	4.14	1.19	0.00	0.18	5.75
Total		45.14	9.49	4.63	214.98	91.92	0.00	3.45	369.63

**Table 8. 2011 summer day VOC emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	0.70	0.36	4.09	4.52	2.22	0.00	88.53	100.42
Cherokee	13057	0.00	0.24	5.36	4.73	2.72	0.00	85.92	98.96
Clayton	13063	0.00	0.73	7.01	5.86	4.33	0.00	32.40	50.33
Cobb	13067	0.10	0.74	20.49	15.83	10.26	0.00	63.54	110.96
Coweta	13077	0.21	0.16	3.71	2.94	1.17	0.00	83.79	91.99
DeKalb	13089	0.00	3.00	20.51	14.29	4.25	0.00	46.69	88.74
Douglas	13097	0.00	0.00	4.12	3.09	0.80	0.00	49.86	57.88
Fayette	13113	0.00	0.07	2.92	2.42	1.67	0.00	46.12	53.20
Forsyth	13117	0.00	0.25	4.72	3.89	4.27	0.00	47.93	61.06
Fulton	13121	0.00	0.68	26.97	21.46	10.06	0.00	77.42	136.59
Gwinnett	13135	0.00	0.16	24.03	16.74	13.97	0.00	76.09	130.98
Henry	13151	0.00	1.54	4.67	4.61	1.87	0.00	53.31	66.01
Newton	13217	0.00	1.06	3.08	3.71	1.15	0.00	56.67	65.68
Paulding	13223	0.00	0.00	3.05	2.61	0.95	0.00	66.80	73.42
Rockdale	13247	0.00	0.35	2.34	1.92	0.88	0.00	39.80	45.29
Total		1.01	9.35	137.06	108.62	60.56	0.00	914.88	1231.50

**Table 9. 2011 summer day CO emissions by county and source categories (tons)**

county_name	fips	Point-EGU	Point-nonEGU	Nonpoint	Onroad	Nonroad	Fires	Biogenic	Total
Bartow	13015	5.85	0.85	0.81	44.61	18.13	0.04	7.48	77.77
Cherokee	13057	0.00	0.12	0.27	41.49	36.10	0.00	6.71	84.69
Clayton	13063	0.00	0.15	0.34	62.61	52.83	0.00	2.74	118.67
Cobb	13067	0.79	0.25	1.29	150.48	136.71	0.00	5.76	295.30
Coweta	13077	1.65	0.05	0.73	27.68	15.42	0.00	7.23	52.76
DeKalb	13089	0.00	0.87	1.32	155.45	48.95	0.00	4.22	210.82
Douglas	13097	0.00	0.00	0.17	31.00	10.95	0.00	4.03	46.15
Fayette	13113	0.00	0.03	0.19	20.92	18.95	0.00	3.61	43.70
Forsyth	13117	0.00	0.11	0.25	34.91	58.19	0.00	3.90	97.36
Fulton	13121	0.00	1.30	2.37	240.62	128.50	0.00	6.91	379.70
Gwinnett	13135	0.00	0.35	1.33	159.55	209.83	0.00	6.23	377.28
Henry	13151	0.00	1.89	0.24	43.98	18.77	0.00	4.61	69.50
Newton	13217	0.00	0.06	0.72	29.15	10.06	0.00	5.16	45.14
Paulding	13223	0.00	0.00	0.45	21.60	11.73	0.00	5.65	39.44
Rockdale	13247	0.00	0.01	0.22	18.73	12.41	0.00	3.39	34.76
Total		8.30	6.03	10.71	1,082.78	787.54	0.05	77.64	1973.03

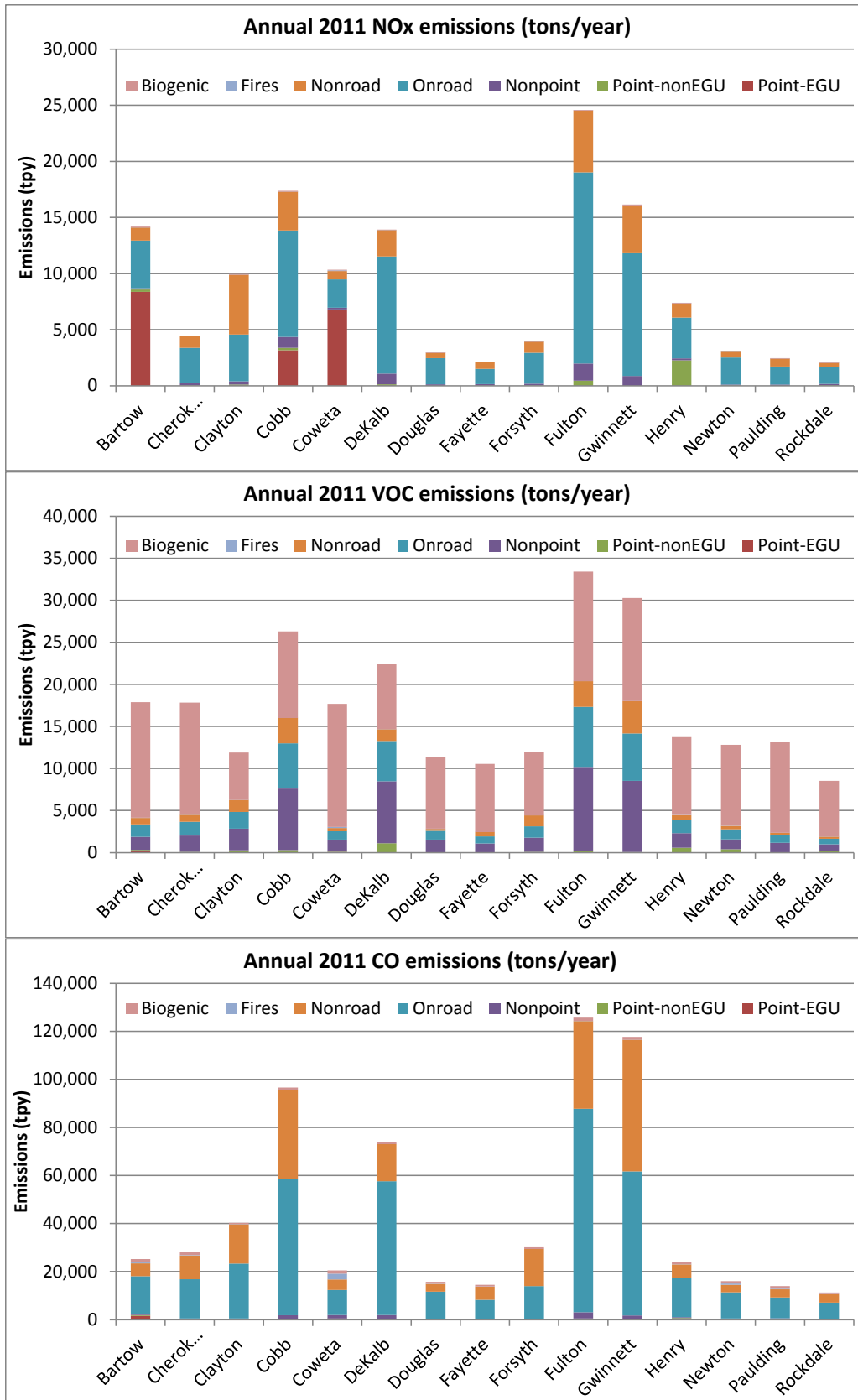


Figure 1. Annual 2011 NOx, VOC and CO emissions by county and source categories

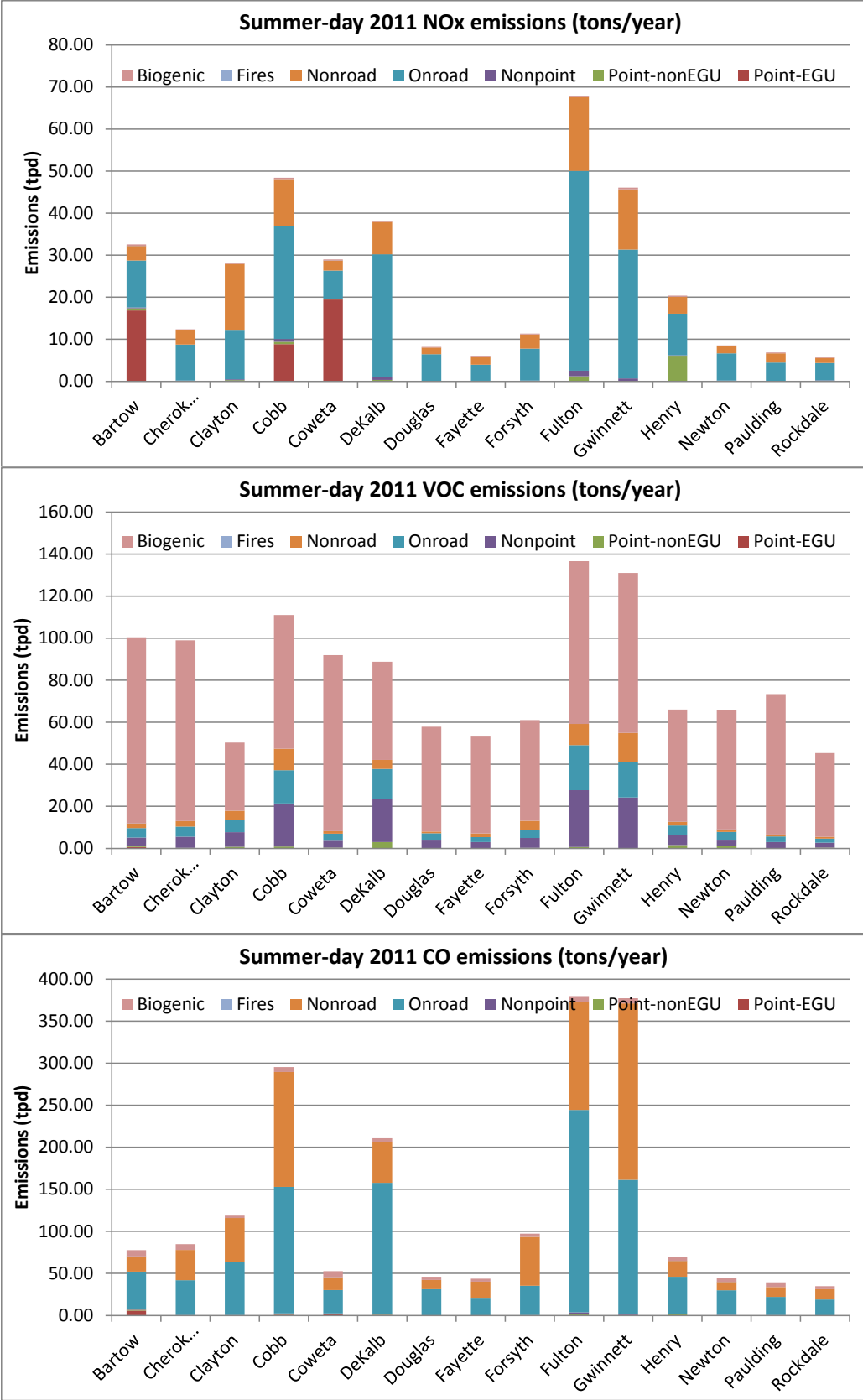


Figure 2. Summer day 2011 NOx, VOC and CO emissions by county and source categories

## QA/QC

Detailed Quality Assurance and Quality Control (QA/QC) efforts for all emission source categories have been documented in the Georgia EPD emission inventory Quality Assurance Project Plan (QAPP). The QAPP is divided into two documents. The first document is titled “Quality Assurance Project Plan for use in the Preparation of Air Emission Inventories” and covers emission inventories for large industrial stationary point sources. The second document is titled “Quality Assurance Project Plan for Georgia’s Emission Inventories for Sources Other Than Large Industrial Stationary Point Sources” and covers emission inventories for nonpoint (area), on-road mobile, non-road mobile, fires, and marine/aircraft/rail (MAR). In addition, point source emissions, nonpoint source emissions, and MOVES and NONROAD model input data have gone through QA checks in the EPA EIS system. Finally, the 2011 emissions were checked by comparing them against emission estimates from previous years.

## References

AMEC. 2012. Development of the 2007 Base Year and Typical Year Fire Emission Inventory for the Southeastern States Air Resource Managers, Inc. (Final Report)

U.S. EPA, 2013. 2011 National Emissions Inventory, version 1, Technical Support Document, draft

U.S. EPA, 2014. Emissions Inventory Guidance for Implementation of Ozone [and Particulate Matter] National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations

## **Appendix A**

### **Annual and Summer Day 2011 Emission Calculations for the 15 Atlanta Nonattainment Counties**

All emission calculation files are provided in this appendix. They are organized by source categories:

- Biogenic: calculation for biogenic sources.
- CEM: calculation for EGU point sources with CEM data
- Fires: calculation for wildland fires, and for agriculture burning and land clearing in nonpoint source category.
- MOVES: input and output databases, run specification files and outputs analysis files
- Point-Nonpoint-NONROAD: temporal allocation for point, nonpoint and NONROAD categories

Appendix Provided in Electronic Copy Only



## **Appendix B**

### **Emission Estimation Methods for Nonpoint Sources by SCCs**

This section describes how GA's stationary non-point source emission inventory was developed for the AERR 2011 submission.

For each SCC, one of the following methods was used:

1. Linear scaling between 2007 SEMAP and 2018 SEMAP
2. Adopting U.S. EPA's NEI 2011 values
3. Setting emission zero

With the first method, 2011 emissions were estimated by interpolating 2007 SEMAP emissions and 2018 SEMAP emissions (Transystems, 2012a; Transystems, 2012b). This approach was taken for each pollutant. The second method set the Georgia 2011 emissions to be equal to EPA's NEI 2011 emissions. This method was used when GA EPD staff concluded the EPA's approach and/or activity data used in EPA's 2011 NEI were more up-to-date than what GA EPD had available. A detailed description of the U.S. EPA estimates can be found in the NEI2011 technical support document (U.S. EPA, 2013). The third method set emissions to zero. This method was applied to SCCs corresponding to Industrial/Commercial/Institutional coal and wood boilers as well as Industrial LPG boiler. This method was used because GA EPD staff concluded that these emissions were already included in the point source category and did not want to double count these emissions. Tables B1 - B3 list SCCs by the estimation methods used for the 2011NEI submission.

In addition, GA EPD staff developed 2011 emission estimates for land clearing (2610000500) and agriculture burning (2801500000) using burning permit data obtained from Georgia Forestry Commission. For land clearing (2610000500), GA EPD used the same fuel consumption and emission factors as those used to develop SEMAP 2007 fire emission inventory (AMEC, 2012). For agricultural burning (2801500000), GA EPD used the same fuel consumption and emission factors as those used to develop the U.S. EPA agriculture fire inventory (U.S. EPA, 2013).

References:

AMEC. 2012. Development of the 2007 Base Year and Typical Year Fire Emission Inventory for the Southeastern States Air Resource Managers, Inc. (Final Report)

TranSystems Corporation, 2012a. Area and Nonroad 2007 Base Year Inventories Revised Final Report, prepared for Southeastern States Air Resource Managers, Inc.

TranSystems and E.H. Pechan, 2012b. SEMAP Region Area and Nonroad Projection Year Inventories Final Report, prepared for Southeastern States Air Resource Managers, Inc.

U.S. EPA, 2013. 2011 National Emissions Inventory, version 1, Technical Support Document, draft

Table B1. Emissions estimated with linear scaling between 2007 SEMAP and 2018 SEMAP (Method 1)

SCC	SCC Description
2401005000	Solvent Utilization/Surface Coating/Auto Refinishing: SIC 7532/Total: All Solvent Types
2102004000	Stationary Source Fuel Combustion/Industrial/Distillate Oil/Total: Boilers and IC Engines
2102005000	Stationary Source Fuel Combustion/Industrial/Residual Oil/Total: All Boiler Types
2102006000	Stationary Source Fuel Combustion/Industrial/Natural Gas/Total: Boilers and IC Engines
2102011000	Stationary Source Fuel Combustion/Industrial/Kerosene/Total: All Boiler Types
2103004000	Stationary Source Fuel Combustion/Commercial/Institutional/Distillate Oil/Total: Boilers and IC Engines
2103005000	Stationary Source Fuel Combustion/Commercial/Institutional/Residual Oil/Total: All Boiler Types
2103006000	Stationary Source Fuel Combustion/Commercial/Institutional/Natural Gas/Total: Boilers and IC Engines
2103007000	Stationary Source Fuel Combustion/Commercial/Institutional/Liquified Petroleum Gas (LPG)/Total: All Combustor Types
2103011000	Stationary Source Fuel Combustion/Commercial/Institutional/Kerosene/Total: All Combustor Types
2275085000	Mobile Sources/Aircraft/Unpaved Airstrips/Total
2275900000	Mobile Sources/Aircraft/Refueling/All fuels
2301030000	Industrial Processes/Chemical Manufacturing: SIC 28/Process Emissions from Pharmaceutical Manuf (NAPAP cat. 106)/Total
2301040000	Industrial Processes/Chemical Manufacturing: SIC 28/Fugitive Emissions from Synthetic Organic Chem Manuf (NAPAP cat. 102)/Total
2302050000	Industrial Processes/Food and Kindred Products: SIC 20/Bakery Products/Total
2302070005	Industrial Processes/Food and Kindred Products: SIC 20/Fermentation/Beverages/Wineries
2302070010	Industrial Processes/Food and Kindred Products: SIC 20/Fermentation/Beverages/Distilleries
2306000000	Industrial Processes/Petroleum Refining: SIC 29/All Processes/Total
2310000000	Industrial Processes/Oil and Gas Exploration and Production/All Processes/Total: All Processes
2311010000	Industrial Processes/Construction: SIC 15 - 17/Residential/Total
2311020000	Industrial Processes/Construction: SIC 15 - 17/Industrial/Commercial/Institutional/Total
2399000000	Industrial Processes/Industrial Processes: NEC/Industrial Processes: NEC/Total
2401015000	Solvent Utilization/Surface Coating/Factory Finished Wood: SIC 2426 thru 242/Total: All Solvent Types
2401020000	Solvent Utilization/Surface Coating/Wood Furniture: SIC 25/Total: All Solvent Types
2401025000	Solvent Utilization/Surface Coating/Metal Furniture: SIC 25/Total: All Solvent Types
2401030000	Solvent Utilization/Surface Coating/Paper: SIC 26/Total: All Solvent Types
2401040000	Solvent Utilization/Surface Coating/Metal Cans: SIC 341/Total: All Solvent Types
2401045000	Solvent Utilization/Surface Coating/Metal Coils: SIC 3498/Total: All Solvent Types
2401055000	Solvent Utilization/Surface Coating/Machinery and Equipment: SIC 35/Total: All Solvent Types
2401060000	Solvent Utilization/Surface Coating/Large Appliances: SIC 363/Total: All Solvent Types
2401065000	Solvent Utilization/Surface Coating/Electronic and Other Electrical: SIC 36 - 363/Total: All Solvent Types
2401070000	Solvent Utilization/Surface Coating/Motor Vehicles: SIC 371/Total: All Solvent Types
2401075000	Solvent Utilization/Surface Coating/Aircraft: SIC 372/Total: All Solvent Types
2401080000	Solvent Utilization/Surface Coating/Marine: SIC 373/Total: All Solvent Types
2401090000	Solvent Utilization/Surface Coating/Miscellaneous Manufacturing/Total: All Solvent Types
2415000000	Solvent Utilization/Degreasing/All Processes/All Industries/Total: All Solvent Types
2425000000	Solvent Utilization/Graphic Arts/All Processes/Total: All Solvent Types
2501050120	Storage and Transport/Petroleum and Petroleum Product Storage/Bulk Terminals: All Evaporative Losses/Gasoline
2501050120	Storage and Transport/Petroleum and Petroleum Product Storage/Bulk Terminals: All Evaporative

SCC	SCC Description
	Losses/Gasoline
2501055120	Storage and Transport/Petroleum and Petroleum Product Storage/Bulk Plants: All Evaporative Losses/Gasoline
2501060051	Storage and Transport/Petroleum and Petroleum Product Storage/Gasoline Service Stations/Stage 1: Submerged Filling
2501060052	Storage and Transport/Petroleum and Petroleum Product Storage/Gasoline Service Stations/Stage 1: Splash Filling
2501060053	Storage and Transport/Petroleum and Petroleum Product Storage/Gasoline Service Stations/Stage 1: Balanced Submerged Filling
2501060100	Storage and Transport/Petroleum and Petroleum Product Storage/Gasoline Service Stations/Stage 2: Total
2501060201	Storage and Transport/Petroleum and Petroleum Product Storage/Gasoline Service Stations/Underground Tank: Breathing and Emptying
2501070000	Storage and Transport/Petroleum and Petroleum Product Storage/Diesel Service Stations/Total: All Products/All Processes
2505030120	Storage and Transport/Petroleum and Petroleum Product Transport/Truck/Gasoline
2505040120	Storage and Transport/Petroleum and Petroleum Product Transport/Pipeline/Gasoline
2601010000	Waste Disposal, Treatment, and Recovery/On-site Incineration/Industrial/Total
2601020000	Waste Disposal, Treatment, and Recovery/On-site Incineration/Commercial/Institutional/Total
2620030000	Waste Disposal, Treatment, and Recovery/Landfills/Municipal/Total
2630020000	Waste Disposal, Treatment, and Recovery/Wastewater Treatment/Public Owned/Total Processed
2640000000	Waste Disposal, Treatment, and Recovery/TSDFs/All TSDF Types/Total: All Processes
2660000000	Waste Disposal, Treatment, and Recovery/Leaking Underground Storage Tanks/Leaking Underground Storage Tanks/Total: All Storage Types
2801000000	Miscellaneous Area Sources/Agriculture Production - Crops/Agriculture - Crops/Total
2805001000	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle - finishing operations on feedlots (drylots)/Dust Kicked-up by Hooves (use 28-05-020, -001, -002, or -003 for Waste
2805001100	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle - finishing operations on feedlots (drylots)/Confinement
2805001200	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle - finishing operations on feedlots (drylots)/Manure handling and storage
2805001300	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle - finishing operations on feedlots (drylots)/Land application of manure
2805003100	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle - finishing operations on pasture/range/Confinement
2805007100	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - layers with dry manure management systems/Confinement
2805007300	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - layers with dry manure management systems/Land application of manure
2805008100	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - layers with wet manure management systems/Confinement
2805008200	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - layers with wet manure management systems/Manure handling and storage
2805008300	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - layers with wet manure management systems/Land application of manure
2805039100	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - operations with lagoons (unspecified animal age)/Confinement

SCC	SCC Description
2805039200	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - operations with lagoons (unspecified animal age)/Manure handling and storage
2805039300	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - operations with lagoons (unspecified animal age)/Land application of manure
2805047100	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - deep-pit house operations (unspecified animal age)/Confinement
2805047300	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - deep-pit house operations (unspecified animal age)/Land application of manure
2805053100	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production - outdoor operations (unspecified animal age)/Confinement
2810030000	Miscellaneous Area Sources/Other Combustion/Structure Fires/Unspecified
2810050000	Miscellaneous Area Sources/Other Combustion/Motor Vehicle Fires/Unspecified

Table B2. Emissions set same as EPA's NEI 2011 values (Method 2)

SCC	SCC Description
2325000000	Industrial Processes/Mining and Quarrying: SIC 14/All Processes/Total
2401008000	Solvent Utilization/Surface Coating/Traffic Markings/Total: All Solvent Types
2461021000	Solvent Utilization/Miscellaneous Non-industrial: Commercial/Cutback Asphalt/Total: All Solvent Types
2104001000	Stationary Source Fuel Combustion/Residential/Anthracite Coal/Total: All Combustor Types
2104002000	Stationary Source Fuel Combustion/Residential/Bituminous/Subbituminous Coal/Total: All Combustor Types
2104004000	Stationary Source Fuel Combustion/Residential/Distillate Oil/Total: All Combustor Types
2104006000	Stationary Source Fuel Combustion/Residential/Natural Gas/Total: All Combustor Types
2104007000	Stationary Source Fuel Combustion/Residential/Liquified Petroleum Gas (LPG)/Total: All Combustor Types
2104011000	Stationary Source Fuel Combustion/Residential/Kerosene/Total: All Heater Types
2294000000	Mobile Sources/Paved Roads/All Paved Roads/Total: Fugitives
2296000000	Mobile Sources/Unpaved Roads/All Unpaved Roads/Total: Fugitives
2302002100	Industrial Processes/Food and Kindred Products: SIC 20/Commercial Cooking - Charbroiling/Conveyorized Charbroiling
2302002200	Industrial Processes/Food and Kindred Products: SIC 20/Commercial Cooking - Charbroiling/Under-fired Charbroiling
2302003000	Industrial Processes/Food and Kindred Products: SIC 20/Commercial Cooking - Frying/Deep Fat Frying
2302003100	Industrial Processes/Food and Kindred Products: SIC 20/Commercial Cooking - Frying/Flat Griddle Frying
2302003200	Industrial Processes/Food and Kindred Products: SIC 20/Commercial Cooking - Frying/Clamshell Griddle Frying
2311030000	Industrial Processes/Construction: SIC 15 - 17/Road Construction/Total
2401001000	Solvent Utilization/Surface Coating/Architectural Coatings/Total: All Solvent Types
2401085000	Solvent Utilization/Surface Coating/Railroad: SIC 374/Total: All Solvent Types
2401100000	Solvent Utilization/Surface Coating/Industrial Maintenance Coatings/Total: All Solvent Types
2401200000	Solvent Utilization/Surface Coating/Other Special Purpose Coatings/Total: All Solvent Types
2420000000	Solvent Utilization/Dry Cleaning/All Processes/Total: All Solvent Types
2460100000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All Personal Care Products/Total: All Solvent Types
2460200000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All Household Products/Total: All Solvent Types
2460400000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All Automotive Aftermarket Products/Total: All Solvent Types
2460500000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All Coatings and Related Products/Total: All Solvent Types
2460600000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All Adhesives and Sealants/Total: All Solvent Types
2460800000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/All FIFRA Related Products/Total: All Solvent Types
2460900000	Solvent Utilization/Miscellaneous Non-industrial: Consumer and Commercial/Miscellaneous Products (Not Otherwise Covered)/Total: All Solvent Types
2461022000	Solvent Utilization/Miscellaneous Non-industrial: Commercial/Emulsified Asphalt/Total: All Solvent Types

SCC	SCC Description
2461850000	Solvent Utilization/Miscellaneous Non-industrial: Commercial/Pesticide Application: Agricultural/All Processes
2501080050	Storage and Transport/Petroleum and Petroleum Product Storage/Airports : Aviation Gasoline/Stage 1: Total
2501080100	Storage and Transport/Petroleum and Petroleum Product Storage/Airports : Aviation Gasoline/Stage 2: Total
2610000100	Waste Disposal, Treatment, and Recovery/Open Burning/All Categories/Yard Waste - Leaf Species Unspecified
2610000400	Waste Disposal, Treatment, and Recovery/Open Burning/All Categories/Yard Waste - Brush Species Unspecified
2610030000	Waste Disposal, Treatment, and Recovery/Open Burning/Residential/Household Waste (use 26-10-000-xxx for Yard Wastes)
2801000003	Miscellaneous Area Sources/Agriculture Production - Crops/Agriculture - Crops/Tilling
2801700001	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Anhydrous Ammonia
2801700002	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Aqueous Ammonia
2801700003	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Nitrogen Solutions
2801700004	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Urea
2801700005	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Ammonium Nitrate
2801700006	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Ammonium Sulfate
2801700007	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Ammonium Thiosulfate
2801700010	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/N-P-K (multi-grade nutrient fertilizers)
2801700011	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Calcium Ammonium Nitrate
2801700012	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Potassium Nitrate
2801700013	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Diammonium Phosphate
2801700014	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Monoammonium Phosphate
2801700015	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Liquid Ammonium Polyphosphate
2801700099	Miscellaneous Area Sources/Agriculture Production - Crops/Fertilizer Application/Miscellaneous Fertilizers
2805002000	Miscellaneous Area Sources/Agriculture Production - Livestock/Beef cattle production composite/Not Elsewhere Classified
2805009100	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - broilers/Confinement
2805009200	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - broilers/Manure handling and storage
2805009300	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - broilers/Land application of manure

SCC	SCC Description
2805010100	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - turkeys/Confinement
2805010200	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - turkeys/Manure handling and storage
2805010300	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry production - turkeys/Land application of manure
2805018000	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle composite/Not Elsewhere Classified
2805019100	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - flush dairy/Confinement
2805019200	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - flush dairy/Manure handling and storage
2805019300	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - flush dairy/Land application of manure
2805021100	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - scrape dairy/Confinement
2805021200	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - scrape dairy/Manure handling and storage
2805021300	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - scrape dairy/Land application of manure
2805022100	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - deep pit dairy/Confinement
2805022200	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - deep pit dairy/Manure handling and storage
2805022300	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - deep pit dairy/Land application of manure
2805023100	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - drylot/pasture dairy/Confinement
2805023200	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - drylot/pasture dairy/Manure handling and storage
2805023300	Miscellaneous Area Sources/Agriculture Production - Livestock/Dairy cattle - drylot/pasture dairy/Land application of manure
2805025000	Miscellaneous Area Sources/Agriculture Production - Livestock/Swine production composite/Not Elsewhere Classified (see also 28-05-039, -047, -053)
2805030000	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry Waste Emissions/Not Elsewhere Classified (see also 28-05-007, -008, -009)
2805030007	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry Waste Emissions/Ducks
2805030008	Miscellaneous Area Sources/Agriculture Production - Livestock/Poultry Waste Emissions/Geese
2805035000	Miscellaneous Area Sources/Agriculture Production - Livestock/Horses and Ponies Waste Emissions/Not Elsewhere Classified
2805040000	Miscellaneous Area Sources/Agriculture Production - Livestock/Sheep and Lambs Waste Emissions/Total
2805045000	Miscellaneous Area Sources/Agriculture Production - Livestock/Goats Waste Emissions/Not Elsewhere Classified
2810060100	Miscellaneous Area Sources/Other Combustion/Cremation/Human
2501011011	Storage and Transport/Petroleum and Petroleum Product Storage/Residential Portable Gas Cans/Permeation

SCC	SCC Description
2501011012	Storage and Transport/Petroleum and Petroleum Product Storage/Residential Portable Gas Cans/Evaporation (includes Diurnal losses)
2501011013	Storage and Transport/Petroleum and Petroleum Product Storage/Residential Portable Gas Cans/Spillage During Transport
2501011014	Storage and Transport/Petroleum and Petroleum Product Storage/Residential Portable Gas Cans/Refilling at the Pump - Vapor Displacement
2501011015	Storage and Transport/Petroleum and Petroleum Product Storage/Residential Portable Gas Cans/Refilling at the Pump - Spillage
2501012011	Storage and Transport/Petroleum and Petroleum Product Storage/Commercial Portable Gas Cans/Permeation
2501012012	Storage and Transport/Petroleum and Petroleum Product Storage/Commercial Portable Gas Cans/Evaporation (includes Diurnal losses)
2501012013	Storage and Transport/Petroleum and Petroleum Product Storage/Commercial Portable Gas Cans/Spillage During Transport
2501012014	Storage and Transport/Petroleum and Petroleum Product Storage/Commercial Portable Gas Cans/Refilling at the Pump - Vapor Displacement
2501012015	Storage and Transport/Petroleum and Petroleum Product Storage/Commercial Portable Gas Cans/Refilling at the Pump - Spillage
2104008100	Stationary Source Fuel Combustion/Residential/Wood/Fireplace: general
2104008210	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: fireplace inserts; non-EPA certified
2104008220	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: fireplace inserts; EPA certified; non-catalytic
2104008230	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: fireplace inserts; EPA certified; catalytic
2104008310	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: freestanding, non-EPA certified
2104008320	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: freestanding, EPA certified, non-catalytic
2104008330	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: freestanding, EPA certified, catalytic
2104008400	Stationary Source Fuel Combustion/Residential/Wood/Woodstove: pellet-fired, general (freestanding or FP insert)
2104008610	Stationary Source Fuel Combustion/Residential/Wood/Hydronic heater: outdoor
2104009000	Stationary Source Fuel Combustion/Residential/Firelog/Total: All Combustor Types
2102001000	Stationary Source Fuel Combustion/Industrial/Anthracite Coal/Total: All Boiler Types
2102002000	Stationary Source Fuel Combustion/Industrial/Bituminous/Subbituminous Coal/Total: All Boiler Types
2102007000	Stationary Source Fuel Combustion/Industrial/Liquified Petroleum Gas (LPG)/Total: All Boiler Types
2102008000	Stationary Source Fuel Combustion/Industrial/Wood/Total: All Boiler Types
2103001000	Stationary Source Fuel Combustion/Commercial/Institutional/Anthracite Coal/Total: All Boiler Types
2103002000	Stationary Source Fuel Combustion/Commercial/Institutional/Bituminous/Subbituminous Coal/Total: All Boiler Types
2103008000	Stationary Source Fuel Combustion/Commercial/Institutional/Wood/Total: All Boiler Types



Table B3. Emissions zeroed out (Method 3)

SCC	SCC Description
2102001000	Stationary Source Fuel Combustion/Industrial/Anthracite Coal/Total: All Boiler Types
2102002000	Stationary Source Fuel Combustion/Industrial/Bituminous/Subbituminous Coal/Total: All Boiler Types
2102007000	Stationary Source Fuel Combustion/Industrial/Liquified Petroleum Gas (LPG)/Total: All Boiler Types
2102008000	Stationary Source Fuel Combustion/Industrial/Wood/Total: All Boiler Types
2103001000	Stationary Source Fuel Combustion/Commercial/Institutional/Anthracite Coal/Total: All Boiler Types
2103002000	Stationary Source Fuel Combustion/Commercial/Institutional/Bituminous/Subbituminous Coal/Total: All Boiler Types
2103008000	Stationary Source Fuel Combustion/Commercial/Institutional/Wood/Total: All Boiler Types

## Appendix C

### MOVES input data for NEI2011

This appendix documents how MOVES input data were prepared for NEI2011.

#### **Age Distribution**

Replaced EPA default data with input data used for our recently submitted maintenance SIP for the Atlanta metropolitan area (ARC). Age distribution data has been developed from registration data from R.L. Polk & Co.'s National Vehicle Population Profile (current as of October 2002) and R.L. Polk and Co's TIPNet (current as of March 2003) and assumed not to vary by year so applied to 2011. The county by county data was aggregated into representative 13 county and 7 county age distributions (e.g., each county in the 13 county area and each county in the 7 county area has the same age distribution). The assumption made here is that people travel between these counties in each region every day so age distributions should be very similar within each region. Also, the distribution is based on a larger pool of data, therefore more reliable. The 13 counties refer to these county IDs; 13057, 13063, 13067, 13077, 13089, 13097, 13113, 13117, 13121, 13135, 13151, 13223, and 13247. The 7 counties refer to 13013, 13015, 13045, 13139, 13217, 13255, 13297.

#### **Annual Average VMT (hpmsvtypeyear)**

ARC Travel Demand Model (TDM) output provides overall annual average daily VMT (AADVMT) for each county by road type. In order to get it into MOVES ready format of annual average VMT by 6 HPMS vehicle types, the following process was employed:

1. The TDM AADVMT output which is split by roadtype is further divided into the 6 HPMS vehicle types using Georgia Department of Transportation (GDOT) HPMS data which distributes AADVMT by vehicle type for each road type. Since the distribution of AADVMT by vehicle type differ by road type, the relevant vehicle type split must be applied to the matching TDM output road type. This initially results in 4 subtotals for AADVMT for each vehicle type (by the 4 road types). These subtotals for each vehicle type are summed together to get total AADVMT by vehicle type. As an additional note, the GDOT categorization was modified to include MOVES default light duty vehicle splits of type 20 (passenger cars) and 30 (light duty trucks) since GDOT HPMS data splits for those two types were based on different criteria than was desired.
2. AADVMT developed in step 1 is used to calculate an annual average VMT (hpmsvtypeyear). Annual average VMT was calculated by multiplying AADVMT by 365. The TDM networks available for Atlanta were 2010 and 2016 from which 2011 was interpolated for annual average VMT.

#### **Hour VMT Fractions**

Hourly VMT fractions are produced by the TDM based on road type and the assumption is that these fractions are the same for all vehicle types. The remainder (if there are any gaps or lack of data for a

specific vehicle type) is MOVES/EPA defaults. The TDM was calibrated using HPMS data from the Georgia Department of Transportation. The TDM networks available for Atlanta were 2010 and 2016. For hour VMT fractions, 2010 (just a year off and these fractions varied little from year to year) numbers were used. Also in the case of any counties where a TDM was used, weekend MOVES/EPA default data (e.g., VMT hourly fraction) was used for inputs as investigations demonstrated that they resembled reality and there were not any studies that provided any improvement to this data.

### **Source Type Population**

Replaced EPA default with input data developed using the same methodology as mentioned in recently submitted maintenance SIPs for the Atlanta metropolitan area (ARC). Source type population data has been developed from registration data from R.L. Polk & Co.'s National Vehicle Population Profile (current as of October 2002) and R.L Polk and Co's TIPNet (current as of March 2003). This data through the help of EPA converters was modified from being sorted by MOBILE 6 vehicle types into being based on MOVES based vehicle types.

This data had already been "grown" from 2002-2003 values to 2007 values for use in ARC's transportation conformity analyses and application to SIP revisions. The data can be grown either based on human population growth trends over the time period or growth trends in vehicle population from the Georgia vehicle registration database (only trends can be used not exact numbers due to difficulty of matching vehicle types in the Georgia motor vehicle registration data to the vehicle types used in R.L Polk and Co's data). Table 1 below lists the vehicle type and preferred method. Using this table is consistent with what has been in used in the previous NEI compilation and with regards to any SIP motor vehicle budget determinations with MOVES. As indicated in Table C1, human population is adequate for all vehicle types except motorcycles, buses and combination long haul trucks. For motorcycles and buses, ratio of vehicle population is used instead. For example, if source type population is grown from 2007 to 2011 then the 2007 data is multiplied by 2011 human population/2007 human population unless a bus or motorcycle where it will be multiplied by 2011 vehicle population/2007 vehicle population.

The ARC summarized this process (only using human population growth and their 20 county population numbers) in a "Source Type Population Growth Table" which was used to grow the source type population data from the previously produced 2007 numbers to the final 2011 value for this data set for everything except buses, motorcycles and long haul combination trucks. For motorcycles and buses, the 2007 vehicle population numbers in the "Source Type Population Growth Table" were multiplied by the ratio of vehicle populations from 2011 and 2007 contained in the Georgia motor vehicle registration database. Handling combination long haul trucks is discussed at the end of the source type population section. The vehicle registration data for 2007 and 2011 for every county in Georgia can be extracted from the "Georgia Statistics System – University of Georgia" website, [www.georgiastats.uga.edu](http://www.georgiastats.uga.edu).

**Table C1. List of different growth factors used by vehicle types**

<b>Vehicle types</b>	<b>Growth factor</b>
11 (Motorcycles)	Georgia registration data (2007 and 2011), Motorcycles
21 (Passenger cars)	Population 2007 and 2011
31 (Passenger truck)	Population 2007 and 2011
32 (Light commercial truck)	Population 2007 and 2011
41 (Intercity Bus)	Georgia registration data (2007 and 2011), Buses
42 (Transit Bus)	Georgia registration data (2007 and 2011), Buses
43 (School Bus)	Georgia registration data (2007 and 2011), Buses
51 (Refuse Truck)	Population 2007 and 2011
52 (Single Unit Short Haul Truck)	Population 2007 and 2011
53 (Single Unit Long Haul Truck)	Population 2007 and 2011
54 (Motor Home)	Population 2007 and 2011
61 (Combination Short Haul Truck)	Population 2007 and 2011
62 (Combination Long Haul Truck)	Special methodology (see below)

**For all cases with vehicle type 62-long haul combination trucks**, a special determination is required because these vehicles do not reside in the areas investigated but usually just pass through the area along interstate routes. So, local population and vehicle registration data is not going to help since these vehicles are not part of the local population or registered in the state, but how far they all travel while they are in Georgia and how far an average vehicle travels yearly in the U.S. are helpful. Local annual average **total** VMT for vehicle type 62 and national annual average VMT **per vehicle 62** are required (this latter term is directly from MOVES). MOVES **national default** total population of vehicle type 61 and 62 plus estimated local annual VMT of HPMS based vehicle type 60 are required as well for preliminary calculations. The original data is in terms of HPMS vehicle type 60 (which includes vehicle types 61 and 62) and one needs to know what fraction of this VMT amount is from vehicle type 62. This preliminary calculation is:

local annual average total VMT by vehicle type 62=  
 HPMS vehicle type 60 VMT x national default population vehicle type 62/(sum of national default population vehicle type 61+62))

The final calculation is:  
 vehicle type 62 population= local annual average total VMT for vehicle 62/national average VMT per vehicle 62.

HPMS vehicle type 60 VMT data used in this calculation is from TDM model-based annual VMT output data for the 20 county ARC region.

**Road Type (Ramp fraction) and Road Type Distribution**

ARC TDM output provided VMT for ramps and AADVMT by MOVES road type to be used for the road type distribution. VMT by road type varies by vehicle type as shown in the GDOT HPMS data described earlier in the “Annual Average VMT (hpmstvtypeyear)’ section of this documentation. The TDM output, which did not split VMT by vehicle type, needed to be refined more to provide us our local road type distributions by vehicle type. Therefore, the road type distribution from the TDM was modified through the use of GDOT HPMS data and MOVES default splits for passenger cars and light duty trucks (these two data sets described earlier in the documentation). For instance, combination trucks (especially long-haul) travel mostly on rural interstates unlike other types of vehicles as indicated in the HPMS data, so the road type distribution from the TDM was modified to reflect this through weighting rural interstates higher for that type of vehicle. In the end, 6 different road type distributions specific to each of the GDOT HPMS vehicle types were produced from the overall TDM distribution and inserted into the NEI for each county. These 6 different road type distributions were easily mapped to 13 MOVES vehicle types since MOVES vehicle types are a subset of the 6 HPMS vehicle types (e.g., HPMS vehicle type 30 incorporates MOVES vehicle types 31 and 32, HPMS vehicle type 40 incorporates MOVES vehicle type 41, 42, and 43 etc.). Therefore, the road type distribution for a given MOVES vehicle type is exactly the same as its overarching HPMS vehicle type. There is no data available at this time that can split VMT by road type specifically down to 13 different distributions, just 6 as of now.

Ramp fraction determination was made by summing by county the total ramp AADVMT by road type and dividing it by total AADVMT by the same road type and county. If there was a case where there was no data provided for ramp fractions or a scarcity of data, aggregated ramp fraction data was employed (e.g., used 13 county aggregated data if data gap was for one of these 13 counties; if data gap is for a county not part of the original 13 county non-attainment area then used the 7 county aggregated input file, see earlier section titled “Age Distribution” for more details on aggregated data).

In all these cases, interpolation between TDM network years was applied as described in the “Annual Average VMT (hpmstvtypeyear)” section. Each distribution described above was determined separately for years 2010 and 2016, interpolated to 2011.

### **Average Speed Distribution**

ARC TDM output provided average speed and speed bins by road type and source type. The distributions were developed from this output by adding up all the VHT from all the relevant traffic links for a given speed bin, hour, and road type and dividing this value by the total VHT for all speed bins at that same hour for the same road type. The distribution adds up to 1. The same network years were chosen as with hour VMT fractions described above (i.e., used the 2010 data for 2011). Average speed distributions have been found to vary little from year to year. The average speed distribution data was aggregated into 13-county or 7-county annualized profiles, applied to the relevant county. This is the same data prepared by the ARC for conformity work for that road type and source type. It is assumed that the congestion level and typical speeds do not vary significantly within the 13-county and 7-county areas and among source types.

Since TDMs assume weekday patterns, average speed distribution for the weekend was developed by revising the speed distribution for weekdays during traffic hours. That is, the average speed distribution for weekends during hour 7-10 and hour 16-22 was set to the speed distribution for hour 11 for weekdays. The speed distribution for weekend during the rest of time is the same as the speed distribution for weekdays.

### **I/M coverage**

The original 13 county Atlanta non-attainment area for the 1-hour based ozone NAAQS has an ongoing I/M program. GA EPD has provided an “imcoverage” table which includes the EPA/MOVES default data set to “useIMyn=N”(not used). The replacement Georgia local data is provided with “useIMyn=Y” (used). This local I/M data is provided from the Georgia EPD Mobile & Area Sources program’s I/M unit. 2 counties (Bartow (13015) and Newton (13217)) have no I/M program so defaults (i.e., empty table) are sufficient.

### **Day VMT Fractions and Month VMT Fractions**

GDOT provided, based on the Georgia Department of Transportation (GDOT)’s ***Georgia Roadway Mileage and Characteristics Reports (400 Reports)*** data series, a breakdown of VMT by weekend/weekday as well as month. The data processed by GDOT provides day VMT fractions (weekend versus weekday) by sourcetype, month and roadtype. Due to data limitations, these fractions are not for every county, but by regions (3 regions are “Northern District”, “Central District”, and “Southern District”). Counties in each region will have the same day VMT fractions. The month VMT fractions provided by GDOT are sorted by vehicle type and whether it is a leap year (“isLeapYear=N”). As required for formatting purposes, data was included for “isLeapYear”=Y as placeholders with each month VMT fraction 0.0833333 (or 1/12).

### **County Year- Stage II vapor recovery efficiency**

For SIP work and transportation conformity assessments the state of Georgia has assumed, for the 13 county area, a vapor recovery efficiency of 81% during refueling with regards to any vapors released into the air. A 0% reduction in fuel spillage benefit has been determined. This differs from the assumption in the MOVES default database (86% for vapor, 50% for spillage) so the county year table in the MOVES default table has to be altered to reflect this change. 2 counties (Bartow (13015) and Newton (13217)) do not have Stage II vapor recovery so defaults (0% for vapor and spillage) are used .

All remaining tables and databases not mentioned in this discussion related to the EPA default database were not replaced; MOVES/EPA defaults were used.

## Appendix D

### Modified Georgia NCD files for NONROAD modeling in NEI2011

The NCD for Georgia for nonroad mobile sources up to now has been all defaults. After investigating the contents of this default database it has been found that updates and modifications can be made to this database for submission to the 2011 NEI. In all cases the modifications consist of checking the same data sources as used for the default tables as described in EPA's *Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005), except that the data extracted from these sources are more recent.

The NCD database consists of 11 tables labeled as follows

- County
- County YearMonthHour
- CountyNRFile
- CountyYear
- CountyYearMonth
- Diesel
- Gasoline
- Natural Gas
- State
- BaseYearVMT
- CountyVMTMonthAllocation

Of these 11 tables it was found that updates would only be needed for CountyNRFile. The table lists external input files provided by the state (or defaults by EPA) to be used in determining the nonroad inventory using NMIM (National Mobile Inventory Model). These files have to be formatted and use naming conventions as listed in Tables A-2 and A-3 in TranSystems/Pechan's *Instructions to State and Local Agencies for Updating the County-Level Database From EPA's National Mobile Inventory Model-Technical Memorandum*. In the CountyNRFile table, the external filenames are listed by state and county under the column heading "CountyNRFile". "FileTypeID" is a two or three level code describing what type of nonroad system is addressed in the given external file.

10 external files were modified from the defaults, comprising 10 different nonroad sectors or references. All files modified are "allocation" files with .alo extension (allocating sources to each nonroad sector). These 10 sectors/references (with filenames in parenthesis followed by FileTypeID) are:

- Farming equipment (13000frm.alo, frm)
- Golf equipment (13000gc.alo, gc)
- Wholesale establishment (13000com.alo, com)
- Logging equipment (13000log.alo, log)
- Commercial Landscaping equipment (13000lsc.alo, lsc)
- Manufacturing equipment (13000mfg.alo, mfg)

- Oil Production equipment (13000oil.alo, oil)
- Recreation Vehicle Parks (13000rvp.alo, rvp)
- Human Population (applied to all data, 13000pop.alo, pop)
- Households (applied to Residential Lawn and Garden equipment, 13000hou.alo, hou)

Updates/modifications to the default nonroad mobile database are based on using past methodology, but simply with newer data. Any additional information and what years are used are provided below. Modifications to the tables are as follows:

### **Farming Equipment**

Updated defaults by replacing 2002 USDA Census of Agriculture *Harvested Cropland* data with 2007 data. Cropland harvested was found to be the best available indicator of farm equipment usage by county according to the EPA (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The USDA Census is updated every 5 years. This data is located in the U.S. Census Bureau website.

### **Golf Equipment**

This sector consists of mainly golf carts and the data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under table "Golf Courses and Country Clubs" (CBP NAICS 713910). Number of golf carts was found to correlate with number of golf courses and country clubs (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data.

### **Wholesale Establishment**

The wholesale establishment data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under table "Wholesale Establishments" (CBP NAICS 42----). Number of wholesale establishments was found to correlate with nonroad mobile emissions from businesses (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data.

### **Logging Equipment**

The logging equipment data is extracted from the *2009 Timber Product Output (cu ft), Table C10* from the US Forest Service TPO database located at <http://www.fia.fs.fed.us/program-features/tpo/>. Timber output data was found to be the best indicator of nonroad emissions levels from logging (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2009 data.



### **Commercial Landscaping Equipment**

The data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under table "Employees in Landscaping Services" (CBP NAICS 561730). Number of landscaping employees was found to correlate with commercial landscaping equipment use (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2009 data. Future plans are to use a better indicator than number of employees when data is available. Not all data was specifically provided, with some counties providing a range. As was done by EPA for the default database (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)), the midpoint of the range was used and then normalized so that all the county numbers equaled the overall state number. A further small adjustment was made to ensure that the number of employees fit within the range of bins provided. The bins consisted of number of businesses in each county with a certain range of employees (1-4, 5-9, 10-19, 20-49, 50-99, 100-249, 250-499, 500-999, 1000+). Therefore, for instance, if there were 2 businesses with 5-9 employees, there had to be at least 10 total employees listed in the dataset for that county otherwise the number was adjusted up to 10 with normalization repeated to maintain a sum equaling the state total.

### **Manufacturing Equipment**

The data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under a variety of tables representing varying manufacturing subsectors (wood product, paper, printing, plastics, rubber, nonmetallic mineral, metas etc.) all labeled "Number of Employees in Manufacturing" (CBP NAICS 31----, 321///, 322///, 323///, 324///, 325///, 326///, 327///, 331///,332///, 333///, 334///, 335///, 336///, 337///, 339///, and 5111//). Number of employees in manufacturing was found to correlate with manufacturing equipment use (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data. Future plans are to use a better indicator than number of employees when data is available. Not all data was specifically provided, with some counties providing a range. As was done by EPA for the default database (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)), the midpoint of the range was used and then normalized so that all the county numbers equaled the overall state number. A further small adjustment was made to ensure that the number of employees fit within the range of bins provided. The bins consisted of number of businesses in each county with a certain range of employees (1-4, 5-9, 10-19, 20-49, 50-99, 100-249, 250-499, 500-999, 1000+). Therefore, for instance, if there were 2 businesses with 5-9 employees, there had to be at least 10 total employees listed in the dataset for that county otherwise the number was adjusted up to 10 with normalization repeated to maintain a sum equaling the state total. All the tables were adjusted separately and then the employee values were summed up by county.

### **Oil Production Equipment**

This oil production equipment data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under table "Employees in Oil & Gas Extraction, and Drilling Oil & Gas Wells (CBP NAICS 211/// and 213111). Number of employees in oil and gas extraction and drilling has been shown to correlate with oil production equipment use (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data. Not all data was specifically provided, with some counties providing a range. As was done by EPA for the default database (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)), the midpoint of the range was used and then normalized so that all the county numbers equaled the overall state number.

### **Recreational Vehicle Parks**

This recreational vehicle parks data is extracted from the U.S. Census Bureau's website under *County Business Patterns (CBP)*, under table "RV (Recreational Vehicle) Parks and Campgrounds" (CBP NAICS 72121/). Number of recreational vehicle parks was found to best describe emissions from recreational equipment (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data.

### **Human Population**

The data is extracted from the Georgia Statistics Site at Univ of GA <http://www.georgiastats.uga.edu/sasweb/cgi-bin/broker>, which processes human population data by state from the U.S. Census. Human population is useful in determining emissions levels for nonroad mobile sources (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)). The data was updated from the default database by replacing 2002 data with 2010 data.

### **Housing**

The data was extracted from the U.S. Census data repository located at <http://factfinder2.census.gov/> under table "Census H1: Housing Units Census 2010 Summary File 1". Used this data for percent occupancy (no personal lawn equipment used in unoccupied housing) and total housing units. For percentage of total housing that is 1-2 units, used the same website under table "Selected Housing Characteristics: 2010 American Community Survey 1-Year Estimates". For counties not in the survey, the state average was used. In summary, the formula used (all from these two tables) is:

Single/Double Family Homes=Total Housing Units\*Fraction 1-2 units\*Fraction Occupancy

Housing data best describes emissions from residential landscaping equipment according to the EPA (*Geographic Allocation of NonRoad Engine Population Data to the State and County Level* (EPA420-R-05-021, December 2005)).

**Appendix E**  
**Hartsfield-Jackson Atlanta International Airport**

**Documentation for the CY 2011 Criteria Air Pollutant Emission  
Inventory**

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## **Appendix F**

### **Emission Summaries**

This appendix contains Excel emission summaries for:

- Point sources by county and facility,
- Nonpoint sources by county and SCC,
- Onroad and nonroad mobile sources by county and SCC,
- Fires by county and SCC, and
- Biogenic sources.

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## **Appendix G**

### **Georgia QAPP Documents**

This appendix contains documents for:

- Georgia EPD's 2012 QAPP, and
- Georgia's Emission Inventory QAPP approval.

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## **Appendix H**

### **SESARM Documents**

This appendix contains documents for:

- The final report for SESARM's 2007 base year fire methods,
- The final report for SESARM's Base Year Revised Report, March 2012, and
- The final report for SESARM's Projection Year Revised Report, January 28 2013.

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## **Appendix I**

### **Emission Inventory Technical Support Documents**

This appendix contains technical support documents for:

- 2011 National Emissions Inventory, version 1, November 2013, DRAFT, and
- Emissions Inventory Guidance for Implementation of Ozone [*and Particulate Matter*]\* National Ambient Air Quality Standards (NAAQS) and Regional Haze, April 11, 2014, DRAFT.

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