

Appendix C

*Emissions Inventory Development
For Two Georgia Counties in
Chattanooga Nonattainment Area*

Emissions inventory development for two Georgia Counties in the Chattanooga Nonattainment Area

Emissions inventories for two Georgia counties in the Chattanooga Nonattainment Area (i.e. Catoosa County and Walker County) were developed for attainment year 2007 and future years 2017 and 2025. Direct PM_{2.5} emissions and PM_{2.5} precursor emissions (SO₂ and NO_x), as defined in the Clean Air Fine Particle Implementation Rule (72 FR 20586), were included in the inventories. The majority of the 2007 attainment year emissions inventory was prepared as part of SESARM's contracted Southeastern Modeling, Analysis, and Planning (SEMAP) project. The majority of the projected emissions inventories was prepared by Georgia EPD. The attainment year and future year emissions were prepared for four source categories using different methods. The four source categories are:

- Point sources (EGU and Non-EGU)
- Nonpoint sources (including fire)
- Nonroad mobile sources (including marine, aircraft and railroad)
- Onroad mobile sources

1.0 Attainment Year Point Sources

Emissions estimates for point sources in 2007 were obtained from SEMAP point source inventory v1.10. This inventory includes emissions estimates for 74 very large sources in 2007, 109 additional facilities in 2008, and 66 additional facilities in 2005, which were all submitted to EPA by the state of Georgia. This inventory also includes 19 facilities in CAMD database which were not included in the state submittal. For facilities with 2005 and 2008 emissions (but no 2007 emissions), 2007 emissions were estimated based on a linear interpolation between facility level 2005 and 2008 emissions on a pollutant-by-pollutant basis to calculate facility level 2007 emissions. For facilities with only 2008 data (no 2007 or 2005 data available), the SIC growth factors from the VISTAS Best&Final inventory were used to backcast 2008 reported emissions to 2007. For facilities with only 2005 data (no 2007 or 2008 data available), the SIC growth factors from the VISTAS Best&Final inventory were used to project 2005 reported emissions to 2007. After the above backcasting and projecting was performed, additional adjustments were made for facilities where only 2005 data were available and the facility did not operate in 2007 or operated for only part of 2007. Facilities that did not operate in 2007 were removed from the NIF files. For facilities that operated for part of 2007, the 2005 emissions were approximated for 2007 by multiply the 2005 emissions by a scaling factor of the number of days the facility operated in 2007 divided 365 days of full year operation. Also, the end date in the NIF EM and PE tables were changed to reflect the actual date that the facility ceased operation. In addition, PM augmentation was performed to generate missing emissions estimates for filterable and primary PM_{2.5}, filterable and primary PM₁₀, and condensable PM.

The SEMAP inventory went through review using EPA's Basic Format and Content Checker tool (EPA 2004); which was used to verify the data was in the correct format, to check for referential integrity and duplicate record issues, and to check certain fields for proper valid codes and ranges. This inventory also went through several rounds of quality assurance (QA) reviews by State and local (S/L) agencies, as well as a review by SEMAP stakeholders. For more information regarding the SEMAP point inventory, please refer to Appendix C-1 (AMEC, 2012).

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1.1 EGU Point Sources

There are no EGU facilities in either Catoosa or Walker County.

1.2 Non-EGU Point Sources

Emissions estimates for non-EGU point sources in 2007 were obtained from SEMAP point source inventory v1.10, as described in the section for base year point sources. Emissions in future years 2017 and 2025 were estimated using SCC- and county-specific growth factors generated with the USEPA’s Economic Growth Analysis System version 5.0 (EGAS 5.0). Appendix C-6 contains a summary of the SCC-specific growth factors for Catoosa and Walker County. There is only one Non-EGU point source in Walker County: Crystal Springs Print Works, Inc. Tables 1 shows facility-specific SO₂, NO_x, and PM_{2.5} emissions for 2007, 2017, and 2025. These emissions are not subject to additional controls in the future years 2017 and 2025.

**Table 1. SO₂, NO_x and PM_{2.5} emissions projection for Crystal Springs Print Works, Inc.
(AIRSID: 29500031, tons)**

Pollutant	2007	2017	2025
SO ₂	280.416	287.015	295.006
NO _x	47.611	49.526	51.594
PM _{2.5}	0.000	0.000	0.000

2.0 Nonpoint Sources

Emissions from nonpoint sources in 2007 were obtained from the SEMAP final nonpoint source inventory v1.10 which was developed by Pechan. Pechan created a default 2007 nonpoint source inventory that includes all of the source categories covered by the 2008 nonpoint source NEI. For all source categories except industrial and commercial/institutional (ICI) fuel combustion, Pechan either directly incorporated emissions data from the 2008 nonpoint source NEI (when the NEI represented use of 2007 emissions activity data), or recalculated the NEI emission estimates to reflect 2007 activity levels (when the NEI reflected 2006 or 2008 activity levels) and/or to remove emissions associated with activity reflected in the point source inventory. For ICI fuel combustion, the 2008 nonpoint source NEI only developed emissions activity estimates, not emission estimates. Because of the potential importance of these source categories and the availability of methodological improvements, Pechan utilized an emissions estimation method for ICI fuel combustion incorporates a few refinements to the NEI method. These emissions were supplemented with carry-forward categories from 2005 GA CERR submission grown using EGAS. For more information regarding the SEMAP nonpoint inventory, please refer to Appendix C-2 (TranSystems, 2012).

Emissions in future years 2017 and 2025 were estimated using SCC- and county-specific growth factors generated with the USEPA’s Economic Growth Analysis System version 5.0 (EGAS 5.0). Appendix C-6 contains a summary of the SCC-specific growth factors for Catoosa County and Walker County. These emissions are not subject to additional controls in the future years 2017 and 2025.

Emissions from fires in 2007 were obtained from SEMAP final “actual” fire emissions inventory. This inventory was developed using 2007 burned area data submitted by states, as well as updated fuel

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consumption and emissions factors (MACTEC, SEMAP document is not available yet). Emissions in future years 2017 and 2025 were assumed to be the same as attainment year 2007.

Appendix C-6 contains emissions summary by county and SCC.

3.0 Nonroad Mobile Sources

The nonroad sector is comprised of nonroad engines included in EPA's NONROAD model, such as recreational marine and land-based vehicles, farm, construction and industrial machinery, and lawn and garden equipment. This sector also includes engines not modeled in NONROAD, specifically aircraft, commercial marine vessels, and locomotives.

3.1 NONROAD Model Category

Emissions from NONROAD model source categories in 2007 were obtained from the SEMAP final nonroad mobile sources emissions inventory. These emissions were calculated using NMIM2008, which incorporates EPA's latest NONROAD model (NONROAD2008) released in April 2009, and reflects all of EPA's final nonroad standards to date. The county/monthly gasoline profile assignments in the CountyYearMonth table and the gasoline fuel profiles in the Gasoline table of the 2007 NMIM county-level database (NCD) was updated with data provided by the State of Georgia. For more information regarding the SEMAP nonroad inventory, please refer to Appendix C-2 (TranSystems, 2012).

Emissions in future years 2017 and 2025 were also calculated using NMIM2008, using the same meteorological inputs as for 2007. Defaults in NMIM 2008 were used for other inputs in future years.

Appendix C-6 contains emissions summary by county and SCC.

3.2 Marine, Aircraft, and Locomotives

Emissions from commercial marine vessels (CMV), aircraft, and locomotives in 2007 were obtained from SEMAP final nonroad mobile sources emissions inventory. For more information regarding the SEMAP marine, aircraft, and locomotives inventory, please refer to Appendix C-2 (TranSystems, 2012). Growth and control factors that were used to develop future year emissions were provided by Pechan. For more information regarding the SEMAP marine, aircraft, and locomotives growth and control factors, please refer to Appendix C-4 (Pechan, 2011).

2007 CMV emissions in the SEMAP inventory were based largely on EPA's 2008 NEI, and then were adjusted to represent 2007. Growth factors for residual CMVs were developed using average annual growth rates in USEPA regulatory impact analysis (RIA) to support their category 3 engine rulemaking. Growth factors for diesel engine CMV emissions were based on fuel consumption forecasts published by EIA. Control factors were developed using information from USEPA's RIA. There were no CMV emissions in Catoosa and Walker County.

2007 aircraft emissions in the SEMAP inventory were primarily based on EPA's 2008 NEI, which were back-cast to 2007 using approach operations by airport and aircraft type compiled from the FAA's Air Traffic Activity Data System (ATADS) (FAA, 2010). Growth factors for all aircraft engine and airport-related SCCs were based on landing and take-off operation (LTO) projections available from the Federal Aviation Administration's Terminal Area Forecasts (TAF) (FAA, 2010). Growth rates for military aircraft were held constant at 2007 levels. No control factors have been applied to aircraft for criteria pollutant forecasts. Appendix C-6 contains a list of specific aircraft sources in Catoosa and

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Walker County and SCC-specific SO₂, NO_x, and PM emissions for 2007, 2017, and 2025 and the associated growth factors.

2007 locomotive emissions in the SEMAP inventory were obtained from the Eastern Regional Technical Advisory Committee for Class I and Class II/III line haul locomotives and railyards. Passenger and commuter rail line emissions were grown from EPA's 2002 NEI to 2007. For Class I and Class II/III line haul and diesel switchyard operations, Pechan calculated growth factors based on freight rail sector fuel consumption forecasts. For passenger and commuter rail, growth factors were developed from national forecasts of intercity rail diesel consumption, and commuter rail diesel consumption. Control factors were based on US EPA's locomotive engine RIA and associated emission factor guidance. Appendix C-6 contain a list of specific locomotive sources in Catoosa and Walker County and SCC-specific SO₂, NO_x, and PM emissions for 2007, 2017, and 2025 and the associated growth and control factors.

4.0 Onroad Mobile

SO₂, NO_x and PM_{2.5} emissions from onroad mobile sources in 2007 and 2025 were developed by Georgia Department of Transportation contractor using MOVES2010a. MOVES was run at county level for Catoosa and the portion of Walker County, GA, within the MPO planning area in emission factor mode for a July day in Year 2007 and 2025. Average 2007 annual daily meteorological inputs were used in both runs. Best available local data for MOVES inputs such as vehicle population, vehicle miles traveled (VMT) by source types, road type distribution, speed distributions, ramp fractions, hourly VMT fractions and age distribution were used. Off-model, HPMS-based modeling techniques were used to calculate emissions for the "donut" portion of Walker County, Georgia, that falls outside of the MPO planning and travel modeling area. "Donut" is a term that refers to areas that fall outside of a metropolitan planning area, but inside the air quality nonattainment area. Please refer to the document "Mobile Source Emissions Modeling for Catoosa and Walker County PM_{2.5} Maintenance Plan" provided by the Georgia DOT contractor in Appendix X5 for more detailed information.

5.0 QA/QC

Detailed QA/QC efforts for point and fire sources were documented in MACTEC 2009 Quality Assurance Project Plan (QAPP, MACTEC, 2009 (Appendix C-7)), and QA/QC efforts for nonroad and area sources can be found in E.H. Pechan 2009 QAPP (Appendix C-8). Onroad mobile source emissions were provided by Georgia Department of Transportation contractor, and were reviewed by running MOVES independently at Georgia EPD. All MOVES input files have been carefully checked.

References

MACTEC, 2009. Quality Assurance Project Plan for Point Source, On-Road, and Fire Base Year, Future Year, and Control Strategy Emissions Inventories.

AMEC, 2012, Development of the Point Source Emission Inventory for 2007 in the SESARM Region (Version 1.10a)

EC/R Incorporated, 1998, Stationary Source Control Techniques Document for Fine Particulate Matter, obtained from <http://www.epa.gov/ttnecat1/dir1/finepmtech.pdf>, accessed on 1/19/2011.

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E.H. Pechan & Associates, Inc. 2009. Quality Assurance Project Plan for Non-Road and Area Source Base Year and Future Year Emissions Inventories.

TranSystems Corporation, Inc. 2012. Area and Nonroad 2007 Base Year Inventories Final Report.

E.H. Pechan & Associates, Inc. 2011. Growth and Control Factor Development for Aircraft, Commercial Marine Vessels, and Locomotives

EPA, 2010. U.S. Environmental Protection Agency, EGAS Version 5.0, available for download from <http://www.epa.gov/ttnecas1/egas5.htm>, accessed March 2010.