

SECTION 1 INTRODUCTION AND EMISSIONS SUMMARIES

1.1 Introduction

In 1990 the state of Louisiana produced the Base Year SIP Emissions Inventory for the Baton Rouge and Calcasieu Ozone Nonattainment Area which at that time was considered a serious area for ozone. This inventory addressed VOC, NO_x, and CO emissions for stationary point, stationary nonpoint (which at that time was referred to as stationary area), nonroad, and onroad mobile sources. This inventory served as the baseline inventory for the previous one hour ozone standard. According to the Clean Air Act (CAA) section 182(a)(3)(A), a designation of “serious” requires subsequent inventories to be submitted every three years. These periodic emissions inventories (PEI) were submitted for the years of 1993, 1996, 1999, and 2002. It should be noted that due to the implementation of the Consolidated Emissions Reporting Rule (CERR), 40 CFR Part 51, the 2002 PEI was submitted but not required.

This document presents the 2002 Louisiana 8-Hour Ozone National Ambient Air Quality Standard Base Year Emissions Inventory. This inventory replaces the 1990 Base Year SIP Emissions Inventory of the Baton Rouge and Calcasieu Ozone Nonattainment Area referred to previously. Accordingly, as Calcasieu reached attainment in 1997 (62 FR 24036) this inventory reports emissions for the Baton Rouge Ozone Nonattainment Area, which includes Ascension, Iberville, East Baton Rouge, Livingston, and West Baton Rouge Parishes. It addresses volatile organic compounds (VOC), oxides of nitrogen (NO_x) and carbon monoxide (CO) emissions from stationary point, stationary nonpoint, nonroad mobile, and onroad mobile emission sources as required by CAA according to the *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*.

1.2 Peak Ozone Season Exceedances and Emissions

The Peak Ozone Season (POS) is the consecutive five-month period with the highest frequency of National Ambient Air Quality Standards (NAAQS) exceedances occurring in the inventory area. The POS for the Baton Rouge Area includes the months of May, June, July, August, and September. Ozone season emissions are therefore separated from the rest of the

year and given special consideration. Pollutants emitted during ozone season are calculated based on an eight hour average. The method by which this is accomplished ranges depending on the source category in question. Point source ozone daily emissions can be calculated using the facility's average monthly throughput information for the peak ozone season. An alternative method and the method employed in this base year inventory is to divide the annual emissions by 365 as most point sources, barring upsets and maintenance, run constantly year round and thus the average throughput is relatively constant. Some stationary nonpoint sources, on the other hand, have special ozone season emissions factors that must be considered when calculating ozone season daily emissions. Seasonal adjustment factors have been integrated into the stationary nonpoint source calculations. The methods for calculating ozone season daily emission for mobile sources are integrated into the models used to obtain year emissions.

Table 1.2-1 displays the 8- hour ozone exceedance days for the Baton Rouge Area for the three-year period 2001 thru 2003.

Table 1.2-1: 8- Hour Ozone Exceedance Days for the Baton Rouge Ozone Nonattainment Area

	2001	2002	2003
Months	Exceedance Days	Exceedance Days	Exceedance Days
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	5
May	2	1	2
June	1	2	1
July	1	1	2
August	3	0	1
September	1	2	2
October	1	0	3
November	0	0	0
December	0	0	0
Total	9	6	16

Table 1.2-2 illustrates ozone season daily totals for the POS in the Baton Rouge Non-Attainment Area.

Table 1.2-2: 2002 Peak Ozone Season Daily Average Emissions in tons per day

Parish	Point Sources			Nonpoint Sources			Nonroad Sources			Onroad Sources		
	CO	NO _x	VOC	CO	NO _x	VOC	CO	NO _x	VOC	CO	NO _x	VOC
Ascension	19.05	35.55	9.37	14.10	0.78	4.14	9.52	7.61	0.84	47.43	7.31	3.34
East Baton Rouge	34.91	34.88	19.58	5.98	1.26	13.47	71.69	12.62	5.14	172.45	18.10	12.01
Iberville	16.48	43.08	6.50	21.98	1.00	3.96	4.32	5.41	0.54	25.06	4.23	1.71
Livingston	1.41	0.58	1.24	15.83	0.50	5.16	8.83	1.24	1.24	54.00	8.62	3.83
West Baton Rouge	4.26	4.69	3.48	6.54	0.36	2.98	27.20	7.13	7.23	32.29	5.33	2.08
TOTAL	76.11	117.91	40.17	64.43	3.90	29.71	121.56	34.01	14.99	331.23	43.59	22.97

1.3 Geographic Area

The inventory submitted for the Baton Rouge Area, designated as marginal, consists of emissions for the five parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge. The Mesoscale Model (MM5) is nested within the 12/4 km domains for the Baton Rouge 8- hour ozone modeling study. (see Map 1.3-1)

Map 1.3-1: The Mesoscale Model (MM5) for the Baton Rouge Area

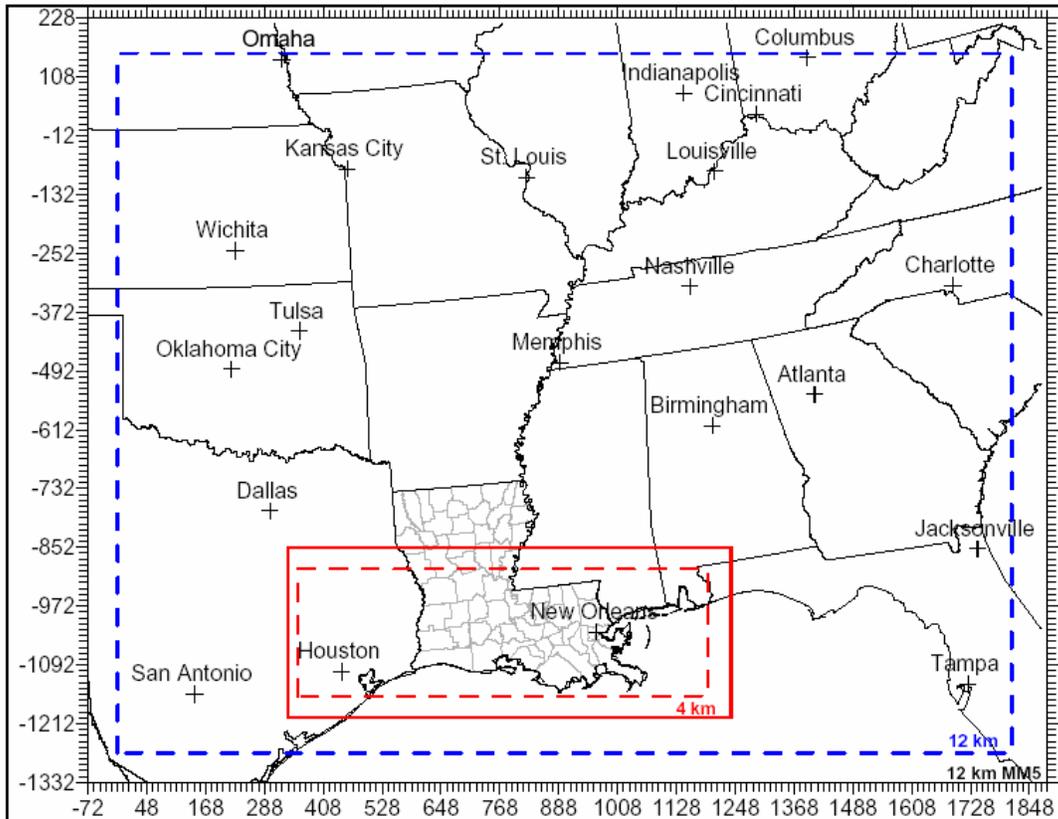


Figure 4-1b. Nested 12/4 km modeling domains for the Baton Rouge 8-hour ozone modeling study. Dotted line domains are for CAMx/EPs that are nested in the MM5 solid line domains.

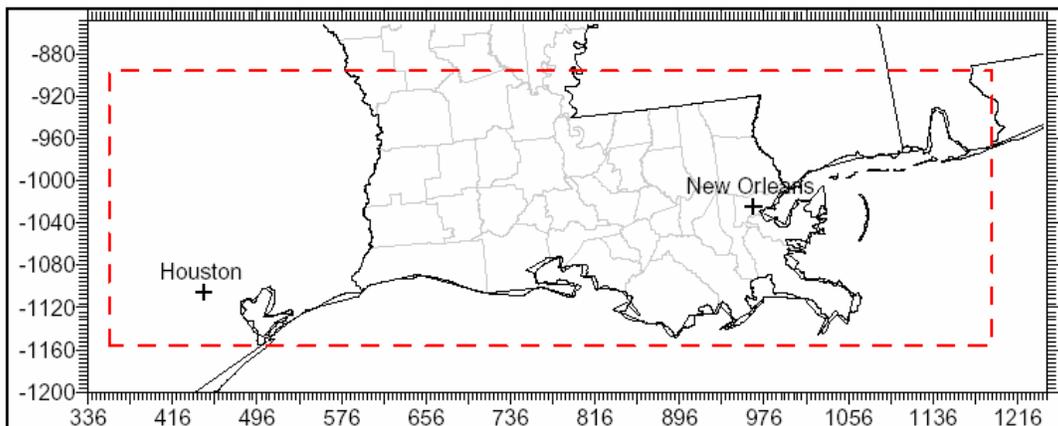


Figure 4-1c. 4-km Louisiana modeling domain for the Baton Rouge 8-hour ozone modeling study. Red dotted line domain is for CAMx/EPs that are nested in the MM5 domain.

1.4 2002 Louisiana 8-Hour Ozone National Ambient Air Quality Standard Base Year Emissions Inventory Format

The Cover and Title page indicate the responsible agency and report date. The Table of Contents illustrates the order and page numbers of each section, table, chart and/or figure. Section 1 presents an introduction to the inventory, as well as defining the scope of the inventories identifying data sources, and summarizing the results. Table 1.8 summarizes the emissions from the Baton Rouge Area by pollutant, source, and parish. Chart 1.8 Summarizes emission contributions from each source category per pollutant. Section 2 pertains to the stationary point sources and contains an emissions summary for the Baton Rouge Area. Sections 3, 4, and 5 address the stationary nonpoint sources, the nonroad mobile sources, and onroad mobile sources, respectively. The appendices contain;

- Appendix A - Acronyms
- Appendix B - Sample Emissions Inventory Report
- Appendix C - 2002 Point Source Emissions by Parish and Facility
- Appendix D - *Consolidation of Emissions Inventories (Schedule 9; Work Item 3) Final (CENRAP)*
- Appendix E - Methodology for Applying Rule Effectiveness
- Appendix F - Stationary Nonpoint Source Daily Ozone Precursor Calculations
- Appendix G - *Emissions Inventory Development for Mobile and Agricultural Dust Sources for Central States (CENRAP)*
- Appendix H - 2002 Base Year HPMS-Based VMT by Parish and Functional Class
- Appendix I - 2002 Onroad Mobile Source Emissions by Parish for Baton Rouge Area
- Appendix J – Public Notice and Participation

1.5 Contacts Responsible for Inventory

The Louisiana Department of Environmental Quality's (LDEQ), Office of Environmental Assessment (OEA), Air Quality Assessment Division (AQAD), Data Collection and Evaluation Group (DCE) has responsibility for preparation and submission of this inventory. Cedric C. Mellion is the contact person for the emissions inventory in its entirety.

1.6 Contributing Agencies, Associations, and Organizations

Various other federal, state, and local agencies contributed information that was necessary for preparation of the emissions estimates. The Office of Planning and Budget, Division of Administration for the State of Louisiana provided population statistics. The 2002 population estimates were based on data from the 2000 census as stated in the United States Census Bureau's website population projections for Louisiana parishes. All assisting agencies and associations are listed below:

- East Baton Rouge Mosquito Abatement
- Louisiana Department of Agriculture and Forestry
 - Forestry Office
 - Pesticides
 - Soil & Conservation
- Louisiana Department of Employment and Training
 - Research & Statistics
- Louisiana Department of Environmental Quality
 - Air Permits Division
 - Solid Waste Section
 - Water Resources Section
 - Underground Storage Tanks
- Louisiana Department of Natural Resources
 - Pipeline Division
- Louisiana Department of Public Safety and Corrections
 - Office of Motor Vehicles
 - Office of the State Fire Marshal
- Louisiana Department of Revenue and Taxation
 - Excise Taxes
- Louisiana Department of Transportation and Development
 - Environmental Technology Unit
 - Material Lab
 - Motor Fuels Unit
 - Traffic & Planning
- Louisiana Department of Wildlife and Fisheries
 - Motorboat Registration
- Louisiana Farm Bureau Marketing
- Louisiana Oil Marketers Association
- Louisiana Planning and Budgets
 - Area Resources Information System
- Louisiana State University
 - Cooperative Extension
- State of Louisiana, Office of Planning and Budget, Division of Administration
- United States Department of Agriculture
 - Agricultural Research Statistics

-Agricultural Statistics Services
-Economic Research Services
-Research & Technology
United States Department of Commerce
-Bureau of the Census

1.7 Guidance Documents and Reference Documents

The following guidance documents were referenced during preparation of the 2002 Louisiana 8-Hour Ozone National Ambient Air Quality Standard Base Year Emissions Inventory:

1. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, AP-42; Fifth Edition.
2. Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources, AP-42; Fourth Edition.
3. Emission Inventory Requirements for Ozone State Implementation Plans, EPA-450/4-91-010.
4. Example Emission Inventory Documentation for Post-1987 Ozone State Implementation Plans (Sips), EPA-450/4-89-018.
5. Guidance for Initiating Ozone/CO SIP Emission Inventories Pursuant to the 1990 Clean Air Act Amendments, EPA, 1991.
6. Nonroad Engine and Vehicle Emission Study - Report 21A- 2001, November 1991.
7. Procedures for Emission Inventory Preparation, Volume III: Area Sources, EPA-450/4-81-026c.
8. Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, EPA-450/4-81-026d.
9. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone - Volume I: General Guidance for Stationary Sources, EPA-450/4-91-016.
10. Procedures for Estimating and Applying Rule Effectiveness In Post-1987 Base Year Emission Inventories for Ozone and Carbon Monoxide State Implementation Plans, EPA-Policy Development Section, Office of Air Quality Planning and Standards, June 1989.
11. Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Volume I: Chapters and Volume II: Appendices, EPA 450-3/91-022a.
12. 1990 Base Year Ozone Emission Inventory: On-Road Mobile Sources for Baton Rouge and Lake Charles, Louisiana Ozone Nonattainment Area, Trinity Consultants, Inc., September 1992.
13. Letter on Periodic Emission Inventory Preparation, from Thomas H. Diggs, Chief Planning Section, EPA region 6, to Marie B. Walsh, July 20, 1994.
14. Guidance on Projection of Nonroad Inventories to Future Years, memorandum to Directors, Air Management Divisions, Region I-X, from Philip A. Lorang, Director, Emission Planning and Strategies Division.
15. 1990 Base Year Ozone Emission Inventory for Volatile Organic Compounds, Oxides of Nitrogen, and Carbon Monoxide Emissions, September 1994, prepared by LDEQ-AQD,

- Technical Services Section, Baton Rouge, Louisiana.
16. Experimental Population Projections of Louisiana Parishes to the Year 2010, Michael Irwin, Department of Sociology and Center for Life Course and Population Studies, Louisiana State University, for the Office of Planning and Budget, Division of Administration, 1991.
 17. Airport Activity Statistics of Certified Route Aircarriers, FAA-APO-94-9, Office of Airline Statistics, Research and Special Programs Administration, Statistics and Forecast Branch, APO 110 -FAA Washington, D.C.
 18. FAA Air Traffic Activity Book, Airport Operations at Airports with FAA-operated Traffic Control Towers by Regions and by State and Aviation Category. Fiscal year 1993, APO-94-10, Washington, D.C.
 19. Commercial Marine Vessels Contribution to Emission Inventory Study, Booz-Allen and Hamilton, EPA-OMS, October 1991.
 20. Consumer and Commercial Product Report to Congress, Docket No. A-94-65, Office Air Quality Planning and Standards.
 21. Memorandum on VOC Emissions Factors for UST's and Open Burning, from Radian Corporation-RTP, to Marie Walsh, May 1992.
 22. CENRAP, 2004: Methods for Consolidation of Emission Inventories (Schedule 9; Work Item 3), Draft. Prepared by E.H. Pechan & Associates, Inc. and Carolina Environmental Program for the Central Regional Air Planning Association (CENRAP), August 23, 2004.
 23. CENRAP, 2004B: Quality Assurance Project Plan (QAPP) for Consolidation of Emissions Inventories (Schedule 9; Work Plan Item 3), Final. Prepared by E.H. Pechan & Associates, Inc. and Carolina Environmental Program for the Central regional Air Planning Association (CENRAP), October 14, 2004.
 24. EPA, 2002 Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion, U.S. Environmental Protection Agency, Emission Factor and Inventory Group, Emissions Monitoring and Analysis Division, Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina, September 2002.
(<http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html>)
 25. EPA, 2003: Enhanced Particulate Matter Controlled Emissions Calculator, User's Manual, U.S. Environmental Protection Agency, Emission Factor and Inventory Group, Emissions Monitoring and Analysis Division, Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina, September 2003.
 26. EPA, 2004a: Basic Format & Content Checker3.0 (Formerly known as the Quality Assurance/Quality Control Software 3.0) – March 2004; Extended Quality Control Tool – Updated May 18, 2004. Available at the following EPA website:
<http://www.epa.gov/ttn/chief/nif/index.html#nei>
 27. EPA, 2004b: NEI Quality Assurance and Data Augmentation for Point Sources, U.S. EPA, Emissions Monitoring and Analysis Division, Emission Factor and Inventory Group, May 26, 2004.
 28. EPA, 2004c: Factor Information and Retrieval (FIRE) Data System, Version 6.24, Located on the Technology Transfer Network Clearinghouse for Inventories & Emission Factors Website at <http://www.epa.gov.ttn/chief/software/fire/index.html>. March 2004.
 29. Pechan, 2003: Analysis of Utility Emissions Tracking System/Continuous Emissions Monitoring (ETS/CEM) Data, Final Report. Prepared by E.H. Pechan & Associates, Inc., (Pechan Report #03.07.003/9411.000) for the Lake Michigan Air Directors Consortium, July 2003.
 30. STI, 2003. Coe, D. and S. Reid, Sonoma Technology Inc., Research Development of

- Ammonia Emission Inventories for CENRAP, Final Report STI-902504-2241FR, October 30, 2003.
31. Thompson, 2002: Thompson, Rhonda L., A Demonstration of the Quality Assurance (QA) Software Specifically Developed for the National Emission Inventory (NEI), presented at the International Emission Inventory Conference “Emission Inventories – Partnering for the Future,” Atlanta, Ga, April 15-18, 2002, (<http://www.epa.gov/ttn/chief/conference/ei11/qa/thompson.pdf>).
 32. Chinkin L.R., Coe D.L., Funk T.H., Hafner H.R., Roberts P.T., Ryan P.A., and Lawson D.R. (2003) Weekday Versus Weekend Activity Patterns for Ozone Precursor Emissions in California’s South Coast Air Basin. *J. Air & Waste Manag. Assoc.* 53, 829-843 (STI-999679-2225).
 33. Coe D.L. Reid S.B., Stiefer P.S., Penfold B.M., Funk T.H., Chinkin L.R. (2004) Collection and Analysis of Weekend/Weekday Emissions Activity Data in the South Coast Air Basin. Final report prepared for the California Air resources Board, Sacramento, CA, STI-901140/901150-2477-FR; ARB Contract Nos. 00-305 and 00-313, May 2004.
 34. Coe D.L. and Reid S.B. (2003) Research and Development of Ammonia Emission Inventories for the Central States Air Resource Agencies and the Central Regional Air Planning Association, Oklahoma City, OK. Prepared by Sonoma Technology, Inc., Petaluma, Ca, STI-902501-2241-FR, October 2003.
 35. Croes B.E., Dolislager L.J., Larsen L.C., and Pitts J.N. (2003) The O₃ “Weekend Effect” and NO_x Control Strategies: Scientific and Public Health Findings and Their Regulatory Implications. *EM* July 27-35, 2003.
 36. Eastern Research Group & Starcrest Consulting Group LLC (2003) Improvements to the Commercial Marine Vessel Emission Inventory in the Vicinity of Houston, Texas. Prepared for the Houston Advanced Research Center, July 2003.
 37. Energy Information Administration (2003) Petroleum Marketing Annual 2002. Report prepared by the Energy Information Administration Office of Oil and Gas, U.S. Department of Energy, Washington, DC, DOE/EIA-0487(2002), August 2003.
 38. Flocchini R.G. and James T.A., et al., (2001) Sources and Sinks on PM₁₀ in the San Joaquin Valley, Interim Report. Prepared by the Air Quality Group, Crocker Nuclear Laboratory, University of California, Davis, CA, August 2001.
 39. Goodrich L.B., Parnell C.B., Mukhtar S., Lacey R.E., and Shaw B.W. (2002) Preliminary PM₁₀ Emission Factor for Freestall Dairies. Paper number 022148 presented to the 2002 *ASAE Annual International Meeting, July 2002*, by the department of Biological and Agricultural Engineering, Texas A&M University.
 40. Lawson D.R. (2003) The Weekend Ozone Effect – The Weekly Ambient Emissions Control Experiment. *EM* July 17-25, 2003.
 41. Pacific Environmental services (2001) Assessment of Emission Inventory Needs for Regional Haze Plans. Prepared for the Ozone Transport Commission and the Southeast States Air Atlantic Regional Air Management Association, March 2001.
 42. Reid S.B., Brown S.G., Sullivan D.C., Arkinson H.L., Funk T.H., and Stiefer P.S. (2004a) Research and Development of Planned Burning Emission Inventories for the Central States Regional Air Planning Association. Final report prepared for the Central States Air resources Agencies and the Central Regional Air Planning Association, Oklahoma City, OK by Sonoma Technology Inc. Petaluma, CA, STI-902514-2516-FR, July 2004.
 43. Reid S.B., Sullivan D.C., Funk T.H., Tamura T.M., Stiefer P.S., Penfold B.M., and Raffuse S.M. (2004b) Emissions Estimation Methods for Mobile Sources and Agricultural Dust Sources in the Central States. Methods Document Prepared for the Central States Air

- Resource Agencies and the Central Regional Air Planning Association, Oklahoma City, OK, by Sonoma Technology, Inc., Petaluma, Ca, STI-903574-2610-MD, September 2004.
44. Sullivan D.C. (2004) Mobile Source and Agricultural Dust Emission Inventory for the Central States. Final work plan/quality assurance project plan prepared for the Central States Air Resource Agencies and the Central Regional Air Planning Association, Oklahoma City, OK by Sonoma Technology Inc. Petaluma, CA, STI-903571-2460-FWP/QAPP, February 27, 2004.
 45. U.S. Environmental Protection Agency (2000) Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data. Prepared by the Office of Mobile Sources, Ann Arbor, MI, EPA420-R-00-002
 46. U.S. Environmental Protection Agency (2003a) National Emission Inventory (NEI) Air Pollutant Emission Trends, Criteria Pollutant Data, Current Emission Trends Summaries, Average Annual Emissions, All Criteria Pollutants, Years Including 1980, 1985, 1989-2001. Available on the Internet at <http://www.epa.gov/ttn/chief/trends/index.html>
 47. U.S. Environmental Protection Agency (2003b) Documentation for Aircraft, Commercial Marine Vessel, Locomotive, and Other Nonroad Components of the National Emissions Inventory. Prepared by the Emission Factor and Inventory Group, Research Triangle Park, NC, October 2003.
 48. U.S. Environmental Protection Agency (2004a) National Emission Inventory – Ammonia Emissions from Animal Husbandry Operations. Available on the Internet at <http://www.epa.gov/ttn/chief/net/2002inventory.html>
 49. U.S. Environmental Protection Agency (2004b) Emissions Inventory Improvement Program EIIP Document Series – Volume IX – Particulate Emissions – Fugitive Dust from Agricultural Tilling. Web site of the Technology transfer Network Clearinghouse for Inventories & Emission Factors. Available on the Internet at <http://www.epa.gov/ttn/chief/eiip/techreport/volume09/index.html>

Table 1.8: 2002 Emissions Summary for the Baton Rouge Area

CO Emissions Summary											
Parish	Point Sources		Nonpoint Sources		Nonroad Mobile Sources		Onroad Mobile Sources		Total		
	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	
Ascension	19.05	6953.20	14.10	5147.64	9.52	3476.11	48.25	17612.37	90.92	33189.32	
E. Baton Rouge	34.91	12742.93	5.98	2181.76	71.69	26167.24	173.17	63205.24	285.75	104297.17	
Iberville	16.48	6016.61	21.98	8023.73	4.32	1577.27	25.25	9218.00	68.03	24835.61	
Livingston	1.41	515.13	15.83	5777.46	8.83	3222.52	54.62	19935.10	80.69	29450.21	
W. Baton Rouge	4.26	1553.45	6.54	2385.56	27.20	9929.04	32.23	11763.89	70.23	25631.94	
Total	76.11	27781.32	64.43	23516.15	121.56	44372.18	333.52	121734.60	595.62	217404.25	

NOx Emissions Summary											
Parish	Point Sources		Nonpoint Sources		Nonroad Mobile Sources		Onroad Mobile Sources		Total		
	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	
Ascension	35.55	12976.00	0.78	285.72	7.61	2776.79	7.47	2726.83	51.41	18765.35	
E. Baton Rouge	34.88	12729.58	1.26	461.48	12.62	4604.77	18.61	6794.47	67.37	24590.28	
Iberville	43.08	14781.86	1.00	364.40	5.41	1973.34	4.48	1636.59	51.39	18756.20	
Livingston	0.58	212.15	0.50	182.33	1.24	452.24	8.76	3196.67	11.08	4043.39	
W. Baton Rouge	4.69	1713.44	0.36	131.80	7.13	2603.94	5.39	1969.07	17.58	6418.25	
Total	117.91	42413.03	3.90	1425.73	34.01	12411.08	44.72	16323.63	198.83	72573.47	

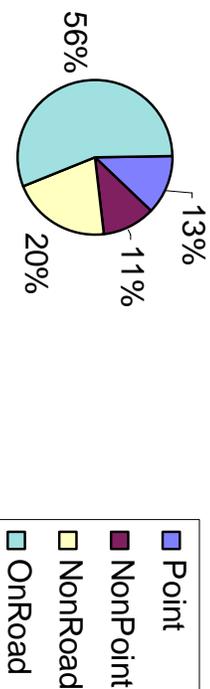
VOC Emissions Summary											
Parish	Point Sources		Nonpoint Sources		Nonroad Mobile Sources		Onroad Mobile Sources		Total		
	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	Daily (tons/day)	Annual (tons/year)	
Ascension	9.37	3421.40	4.14	1493.94	0.84	307.98	3.27	1195.36	17.62	6418.68	
E. Baton Rouge	19.58	7145.10	13.47	4770.02	5.14	1877.85	11.69	4265.07	49.88	18058.26	
Iberville	6.50	2372.06	3.96	1441.58	0.54	198.60	1.67	610.55	12.67	4622.79	
Livingston	1.24	451.38	5.16	1871.72	1.24	454.22	3.74	1363.70	11.38	4141.02	
W. Baton Rouge	3.48	1270.05	2.98	1084.29	7.23	2637.20	2.02	737.42	15.71	5728.96	
Total	40.17	14659.99	29.71	10661.73	14.99	5475.85	22.39	8172.10	107.26	38969.71	

Chart 1.8 Emission Contributions Per Source Category

2002 VOC Emissions by Source



2002 CO Emissions by Source



2002 NOx Emissions by Source

