



Appendix B
2008
Point, Area, On-Road Mobile and Off-Road Mobile
Emissions Inventory

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Appendix B-1 2008 Point and Area Source Emissions

The 2008 Emissions Inventory used to develop the 2008 point and area source emissions in this document was generated from the information that the Missouri Department of Natural Resources' Air Pollution Control Program submitted to EPA for use in the 2008 National Emissions Inventory (NEI) data. The 2008 NEI data is publicly available on EPA's website: <http://www.epa.gov/ttn/chief/net/2008inventory.html>. Tables B-1 and B-2 describe the 2008 annual emissions in tons per year for each county within the 1997 St. Louis PM_{2.5} nonattainment area for the point and area source categories, respectively. The full 2008 PM_{2.5} annual emissions inventory for the Missouri side of the 1997 St. Louis PM_{2.5} nonattainment area, which includes the point and area source emissions for the area, was placed on a 30 day public notice beginning July 13, 2011, and is Appendix E to this redesignation request and maintenance plan.

The information submitted by the Department to the EPA for the 2008 NEI data includes nonpoint emissions. These emissions were used as the area source emissions listed in Table B-2. However, due to the methods that are used to calculate the emissions for the marine and rail categories, the 2008 NEI data that was submitted to EPA included these emissions as nonpoint sources. Therefore, the nonpoint emissions for rail and marine were removed from the nonpoint emissions database in order to generate the area source emissions listed in Table B-2. The source classification codes (SCCs) that were removed from the area source analysis are listed in Table B-3, and the emissions from these categories are listed in Table B-36, to be included as off-road mobile source emissions.

Table B-1
2008 Annual Point Source Emissions by County in the St. Louis PM_{2.5} Nonattainment Area
(Missouri Counties Only)

County Name	CO	NH ₃	NO _x	PM ₁₀ -Pri	PM _{2.5} -Pri	SO ₂	VOC
Franklin County	2,496.24	2.82	9,178.19	2,380.91	1,448.96	57,944.69	685.48
Jefferson County	1,683.83	8.97	7,016.40	1,968.50	945.65	68,569.22	600.04
St. Charles County	900.69	8.04	7,649.32	377.96	316.21	48,595.24	936.97
St. Louis County	4,995.08	720.41	5,843.53	1,024.22	510.91	20,861.90	1,689.72
St. Louis City	1,319.86	568.40	1,415.83	721.95	271.66	5,729.67	1,155.67
Totals	11,395.70	1,308.64	31,103.27	6,473.54	3,493.39	201,700.72	5,067.88

Table B-2
2008 Annual Area Source Emissions by County in the St. Louis PM_{2.5} Nonattainment Area
(Missouri Counties Only)

County Name	CO	NH ₃	NO _x	PM ₁₀ -Pri	PM _{2.5} -Pri	SO ₂	VOC
Franklin County	2,025.42	1,299.59	295.22	17,974.75	2,109.54	992.76	1,534.94
Jefferson County	4,391.33	167.60	402.74	29,264.18	3,493.58	910.13	3,158.50
St. Charles County	2,694.02	887.07	463.77	14,262.61	1,734.42	899.09	5,686.72
St. Louis County	8,527.42	1,048.21	2,228.20	32,095.22	4,137.64	5,458.17	20,252.98
St. Louis City	3,146.33	133.45	1,036.38	8,747.03	1,220.31	3,277.89	7,682.83
Totals	20,784.53	3,535.93	4,426.31	102,343.80	12,695.50	11,538.04	38,315.97

Table B-3
SCC Codes and Descriptions not Included in the Analysis for Area Source Emissions

SCC	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2280002100	Mobile Sources	Diesel	Marine Vessels, Commercial	Port emissions
2280002200	Mobile Sources	Diesel	Marine Vessels, Commercial	Underway emissions
2285002006	Mobile Sources	Diesel	Railroad Equipment	Line Haul Locomotives: Class I Operations
2285002007	Mobile Sources	Diesel	Railroad Equipment	Line Haul Locomotives: Class II / III Operations

**Appendix B-2 - 2008 National Emissions Inventory
Inventory Documentation**

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1.0 INTRODUCTION

The Missouri Department of Natural Resources' Air Pollution Control Program has developed a comprehensive statewide emissions inventory for 2008 as required by the EPA's Consolidated Emissions Reporting Rule (CERR). The inventory covers point, nonpoint, onroad mobile, and nonroad mobile emissions as summarized in Table B-4 below. This document describes how the 2008 inventory is compiled and submitted to the EPA's National Emissions Inventory (NEI) through the new Emissions Inventory System (EIS).

Table B-4: Statewide 2008 Emissions in tons

Category	CO	NO_x	PM₁₀	PM_{2.5}	SO_x	VOC	NH₃
On Road	978,207	117,464	3,516	2,290	1,213	80,127	6,920
Point	92,239	129,953	18,318	8,997	367,370	17,432	1,655
Nonroad	364,153	47,317	4,611	4,412	873	51,572	48
Nonpoint	87,893	31,903	638,226	76,626	45,147	105,552	126,258
Total (tons)	1,522,531	326,642	664,687	92,324	414,604	254,661	134,881

2.0 POLLUTANTS

The 2008 inventory includes emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), coarse particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), ammonia (NH₃), lead, and grouped and speciated Hazardous Air Pollutant (HAP) emissions. PM₁₀ and PM_{2.5} emissions are broken into the filterable and condensable components for certain classifications in the nonpoint and mobile categories.

3.0 GEOGRAPHIC COVERAGE

The 2008 emissions inventory covers the entire state of Missouri. Point source emissions are prepared at the facility level with a geographic coordinate. Nonpoint, onroad, and nonroad mobile emissions are developed at the county level.

4.0 TEMPORAL COVERAGE

Annual and ozone summer day emissions are developed for point and nonpoint sources. For mobile sources, annual activity data is prepared, and seasonal information is compiled where available.

5.0 STAFF RESOURCES

The department's Air Pollution Control Program Emissions Inventory (EI) Unit, in partnership with the local air agencies in Kansas City, Springfield, St. Louis County, and St. Louis City, has

prepared the 2008 emissions inventory. The individuals making up the 2008 NEI preparation team along with their responsibilities are listed below.

Air Pollution Control Program EI Unit

- Wendy Vit, Environmental Engineer III: Oversight of point, nonpoint, and mobile source development and data submission
- Stacy Allen, Environmental Specialist III: Oversight of point source quality assurance; nonpoint source development, quality assurance, and data submission
- Jeanne Brown, Research Analyst II: Point source data entry, quality assurance, and data submission
- Nathan O'Neil, Environmental Specialist II: Point source quality assurance; nonpoint source development and quality assurance; mobile source development and quality assurance
- Mary Powell, Senior Office Support Assistant: Point source data entry and quality assurance
- Terry Stock, Environmental Specialist III: Point source quality assurance
- Brenda Wansing, Research Analyst II: Point source data entry, quality assurance, and data submission
- Dan Williams, Environmental Engineer II: Point source quality assurance
- Matt Arnold, Environmental Engineer I: Point and nonpoint source quality assurance

St. Louis County Department of Health, Air Pollution Control Section

- Sarah Medler, Air Emissions Specialist: Point source quality assurance

City of St. Louis Department of Health, Division of Air Pollution Control

- Andy Hilliker, Air Pollution Specialist II: Point source quality assurance

Kansas City Health Department, Air Quality Program

- Aveen Noori, Engineer: Point source quality assurance

Springfield-Greene County Health Department, Air Pollution Control Authority

- Ramona Clemens, Air Quality Control Specialist II: Point source quality assurance

6.0 POINT SOURCE INVENTORY

Data Collection

The point source portion of the 2008 NEI is based on information collected on Emissions Inventory Questionnaires (EIQs). Facilities with a construction or operating permit from the Air Pollution Control Program are required to submit an EIQ on an annual basis. The EIQ details the amount of air pollution emitted and other operational data for the previous calendar year.

EIQ submissions come in two formats: a Full EIQ and a reduced reporting EIQ. A full EIQ details the annual operating and emissions characteristics for a facility. A reduced reporting EIQ represents emissions from the last full EIQ. Permitted facilities are required to submit a full EIQ

annually or every three years or six years, depending on their permit type. Sources on a three- or six-year reporting cycle are given the option of filing a reduced reporting form in the interim years that reflects emissions submitted in their previous full EIQ. The reduced reporting option is not allowed if a facility calculates a facility wide chargeable emission change of 5 tons or more from the last full EIQ. Chargeable emissions are defined as pollutants SO_x, NO_x, PM₁₀, VOC, grouped HAPs (not CO, PM_{2.5}, or NH₃).

By Missouri rule, every facility for which the CERR stipulates that the Missouri Air Pollution Control Program must report their emissions to the NEI is required to submit a full EIQ to the department for that emission year. Smaller facilities, or facilities that don't meet the CERR reporting criteria for a given year, are generally not required to submit a full EIQ for that emission year. Rather, the Missouri Air Program allows them to submit a reduced EIQ, which is simply a statement that their emissions haven't changed significantly from the previous year.

For reporting year 2008, sources with Part 70 and Intermediate operating permits are required to submit a full EIQ, sources with a Basic operating permit or no operating permit with de minimis construction permit (NOP-DemPAL) with total chargeable emissions ≥ 10 tons are required to submit a full EIQ, and those with a Basic operating permit or NOP-DemPAL with total chargeable emissions < 10 tons are given the option of filing a reduced reporting form.

EIQ solicitations for calendar year 2008 emissions reporting were mailed to facilities in January 2009. A total of 2,245 EIQs were mailed statewide, of which 1,131 were full EIQs and 1,114 were reduced reporting form EIQs. Reminder postcards and emails were sent to facilities that had not submitted EIQs as of May 1, 2009. The due date for 2008 reporting was June 1, 2009

Data Handling Procedures

All point source emissions data for the State of Missouri is contained in a database called the Missouri Emissions Inventory System (MoEIS). Emission reports may be submitted either directly via the MoEIS web interface, a user-friendly, online portal linked directly to the MoEIS database, or they may be submitted on the hardcopy EIQ forms. Hardcopy EIQ submittals are then data entered into the MoEIS database by EI unit staff members. As a result, the MoEIS database is updated yearly with the most current emissions data for the State of Missouri.

Emissions data is summarized in the list of EIQ forms is provided in Table B-5. All hardcopy forms have an electronic counterpart in the MoEIS web interface system, and vice-versa. In general, Forms beginning with number one (1) provide general information about a facility. Forms beginning with a two (2) provide the detailed annual emission calculations, including activity or throughput, emission factors, emissions, and operational characteristics. More information on EIQ forms and instructions and MoEIS is available at <http://www.dnr.mo.gov/env/apcp/moeis/emissionsreporting.htm>

Table B-5. EIQ Forms

FORM NAME	FORM DESCRIPTION	FORM NUMBER
FORM 1.0 GENERAL PLANT INFORMATION	GENERAL PLANT INFORMATION, PLANT-WIDE EMISSIONS TOTALS, SIGNATURE SECTION CERTIFYING SUBMITTED INFORMATION IS ACCURATE AND COMPLETE	780-1431
FORM 1.1 PROCESS FLOW DIAGRAM	DIAGRAM IDENTIFYING AND LINKING ALL EMISSION UNITS, PROCESSES, AIR POLLUTION CONTROL DEVICES, AND EMISSION RELEASE POINTS FOR A FACILITY. SUBMIT ONLY IF THERE HAVE BEEN CHANGES.	780-1619
FORM 1.2 SUMMARY OF EMISSION UNITS AND RELATED PROCESSES	LIST OF ALL EMISSION UNITS AND ASSOCIATED PROCESSES AND THE STATUS OF EACH (ACTIVE, INSIGNIFICANT, DISMANTLED)	780-1620
FORM 2.0 EMISSION UNIT INFORMATION	MAIN EMISSIONS REPORTING FORM; SEPARATE FORM 2.0 REQUIRED FOR EACH PROCESS FOR WHICH EMISSIONS ARE BEING REPORTED (I.E., FORM 2.0 NOT REQUIRED FOR EMISSIONS BELOW REPORTING THRESHOLDS)	780-1621
FORM 2.0C CONTROL DEVICE INFORMATION	CONTROL DEVICE INFORMATION WHEN THERE IS A CONTROL DEVICE OPERATIVE AT AN EMISSION UNIT; SEPARATE FORM 2.0C REQUIRED FOR EACH CONTROL DEVICE	780-1434
FORM 2.0K CHARCOAL KILN INFORMATION	DETAILS THE OPERATIONS AND CHARACTERISTICS OF CHARCOAL KILNS	780-1530
FORM 2.0L LANDFILL INFORMATION	FORM FOR REPORTING EMISSIONS FROM LANDFILLS	780-1583
FORM 2.0P PORTABLE EQUIPMENT INFORMATION	DETAILS THE LOCATIONS AND OPERATIONS FOR PORTABLE EQUIPMENT OPERATIONS INCLUDING QUARRIES, ASPHALT PLANTS, AND CONCRETE BATCH PLANTS	780-1433
FORM 2.0S STACK/VENT INFORMATION	STACK INFORMATION FOR EMISSION UNITS WHERE EMISSIONS FROM A PROCESS ENTER THE AMBIENT AIR THROUGH ONE OR MORE STACKS/VENTS	780-1435
FORM 2.0Z OZONE SEASON INFORMATION FORM	CALCULATION OF OZONE SEASON DAY EMISSIONS OF VOC, NOX, OR CO; REQUIRED FROM FACILITIES LOCATED IN ST. LOUIS, ST. CHARLES, FRANKLIN AND JEFFERSON COUNTIES AND ST. LOUIS CITY WITH 10 TONS OR MORE OF VOC, NOX OR CO ANNUAL EMISSIONS.	780-1452
FORM 2.1 FUEL COMBUSTION WORKSHEET	INFORMATION RELATED TO COMBUSTION EQUIPMENT, FUEL USAGE, AND THE CALCULATIONS ASSOCIATED WITH COMBUSTION PROCESSES	780-1436

FORM 2.2 INCINERATOR WORKSHEET	INFORMATION RELATED TO THE INCINERATOR, WASTE MATERIAL(S) INCINERATED, AND THE ANNUAL WASTE MATERIAL THROUGHPUT	780-1438
FORM 2.3 VOC PROCESS MASS- BALANCE WORKSHEET	CALCULATES A VOC MASS BALANCE EMISSION FACTOR	780-1440
FORM 2.4 VOLATILE ORGANIC LIQUID LOADING WORKSHEET	CALCULATES AN EMISSION FACTOR FOR PETROLEUM LIQUID LOADING INTO TANK TRUCKS, RAIL CARS, AND BARGES BASED ON AP-42	780-1625
FORM 2.5L GENERAL LIQUID STORAGE TANK INFORMATION	INFORMATION ABOUT STORAGE TANKS	780-1444
FORM 2.7 HAUL ROAD FUGITIVE EMISSIONS WORKSHEET	CALCULATES AN EMISSION FACTOR FOR UNPAVED HAUL ROADS BASED ON AP-42 FORMULA	780-1445
FORM 2.8 STORAGE PILE WORKSHEET	CALCULATES EMISSION FACTORS FOR ACTIVITY AND WIND EROSION FROM STORAGE PILES BASED ON AP-42 FORMULAS	780-1446
FORM 2.9 STACK TEST/CONTINUOUS EMISSION MONITORING WORKSHEET	DOCUMENTATION FOR EMISSION FACTORS DERIVED FROM STACK TESTS OR CEM DEVICES	780-1447
FORM 2.T HAZARDOUS AIR POLLUTANT WORKSHEET	INFORMATION ON HAP CHEMICALS EMITTED AT THE PROCESS LEVEL; SEPARATES INDIVIDUAL HAPS FROM THOSE INCLUDED IN VOC/PM EMISSIONS	780-1448
FORM 3.0 EMISSION FEE CALCULATION	SUMMARY TABLE SHOWING EMISSIONS FROM ALL PROCESSES	780-1509
FORM 3.0CK EMISSION FEE CALCULATION FOR CHARCOAL KILNS	SUMMARY TABLE SHOWING EMISSIONS FROM CHARCOAL KILN OPERATIONS	780-1508
DRY CLEANER – NON- CHLORINATED AND PETROLEUM BASED SOLVENTS	EMISSIONS CALCULATIONS FOR DRY CLEANERS USING NON- CHLORINATED SOLVENT AND WITH COMBINED DRYER CAPACITY OF 84 POUNDS OR MORE	780-1954

FORM 4.0 FINANCIAL COST ESTIMATE	ESTIMATE THE COST OF COMPLYING WITH AIR POLLUTION REGULATION	780-1622
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The first EIQ handling step is referred to as tracking. Tracking involves checking the EIQ for completeness and entering the total plant emissions from the Form 1.0 General Plant Information sheet. The tracking step serves to get a relatively quick estimate of total payments received and emissions reported, and to document the initially reported emissions values prior to review and correction of any errors. The tracking step is completed for every EIQ, including full and reduced forms, hard copy and MoEIS submitted. Table B-6 summarizes what constitutes a complete EIQ for each type of EIQ.

Table B-6. EIQ Completeness Matrix

TYPE OF EIQ	MINIMUM EIQ ELEMENTS REQUIRED FOR COMPLETENESS					
	SIGNED FORM 1.0 GENERAL PLANT INFORMATION	SIGNED REDUCED REPORTING FORM 1.0	INVOICE	EMISSIONS FEE PAYMENT	FORM 2.0 EMISSIONS WORKSHEETS	PRESS SUBMIT IN MOEIS
FULL EIQ– HARD COPY OR EXCEL	X		X	X	X	
FULL EIQ– MOEIS SUBMITTED	X		X	X		X
REDUCED REPORTING		X	X	X		

Other actions taken during the tracking step include entering the date the EIQ was received into MoEIS, updating any contact information, and entering the facility-wide total emissions from the summary Form 1.0.

The second EIQ handling step is data entry for all full EIQs submitted in hard copy format. During this step, the EI Unit data entry team enters the detailed process-level emissions and operational information into the MoEIS database. During data entry, potential problems are flagged for review by the technical team. Problems include, but are not limited to:

- Incorrect Source Classification Codes (SCCs)
- Emission unit numbering that differs from previous year history in the MoEIS database
- Calculation errors
- Missing or incomplete records
- Transposition errors.

If no errors are found during data entry, and the emissions reported on the hardcopy full EIQ match what is calculated by the MoEIS database, then the emission report is considered complete and data entered.

EIQs that have problems are assigned to a member of the technical review team. The technical review team will address the problems encountered during data entry by identifying the specific issue(s) and possible causes and contacting the facility to resolve those issues. Other issues may also be addressed during the review, including the appropriate use of emission estimation methods, documentation of source data, and consistency with permit emission calculations. Supplemental EIQ information may be collected by staff via telephone or email contact with the facility in question. Information collected in this manner will be recorded on the EIQ for reference, tracking and QA auditing. If the facility is requested to submit follow up verification or additional information in writing, a statement pertaining to this request will also be recorded

on the EIQ. The information recorded will include the date of the call or contact, staff person's name, contact person's name, and written documentation of the call.

After the submission deadline of June 1 has passed, a list of unsubmitted EIQs is generated and sent to the compliance and enforcement section of the Air Pollution Control Program. Once all hardcopy EIQs and web-submitted emission reports are contained in the MoEIS database, the data can be further quality assured.

Emission Estimation Methods

During the point source process, five emission estimation methods will be used for point source calculations: continuous emissions monitoring (CEM) data, stack test, material balance, emission factor, and engineering estimates, in order from greatest to least accuracy. The majority of the point source inventory will be accomplished using emission factors and methodologies listed in AP-42. Other emission factor source materials can be accepted with review and notation by EI unit staff members.

Quality Assurance Procedures

Prioritization

The EI Unit prioritizes review of those facilities that have the largest bulk emissions, specifically facilities with a Part 70 or Intermediate operating permit. While every data element collected helps to characterize the emission estimate, in evaluating the data, those fields most directly tied to the emissions calculation are given the highest priority. The MoEIS database system itself was quality assured to provide smooth data transfer from the state inventory to the NEI.

Methods

The EI Unit's general QA procedures utilize any and all of the techniques outlined in the EPA's Emission Inventory Improvement Program (EIIP) Technical Report Series Volume 6: Quality Assurance Procedures. The unit groups these techniques into two basic categories: Phase I, or Bottom-Up QA procedures, and Phase II, or Top-Down QA procedures. Top-Down Procedures analyze groups of emissions data that share a common trait and look for outliers, in keeping with the 'Reality Check' technique. Bottom-Up Procedures evaluate individual EIQs that are believed to be erroneous, whether due to a top-down analysis, errors found when entering the EIQ into the database, or inconsistencies brought to the attention of the EI Unit by a third party. These bottom-up procedures utilize the 'Peer Review', the 'Sample Calculations', or the 'Independent Audit' techniques. Note that any of these techniques could be found in either category; they have simply been mentioned in reference to the category in which they are most often found.

Computerized checks are facilitated through the use of the MoEIS automated system, exploiting its utility in ensuring that the necessary data is reported, and in providing an acceptable numeric

range for certain fields. It streamlines the process of ensuring that all data fields required for the EPA's EIS system are present, are compatible with, and meet the needs of the EPA system. For example, emission release point records that were missing fields were corrected with the input of emission modelers and facility staff. Outdated Source Classification Codes (SCC), units of measure, and control device codes were removed, and required data fields for stack emission release points were added.

Phase I reviews address individual EIQs to reconcile discrepancies with emission data. Phase I reviews are generally done only on hardcopy submitted EIQs, but may also be done based on priority. Examples of EIQ issues that were encountered include throughputs and emission factors with inconsistent units of measure, emission unit identifiers that are different from EIQs submitted previously, and MoEIS-calculated emissions that differ from the emissions on the hardcopy forms. Technical staff conducting these reviews worked with the companies to make corrections to their EIQs and place written documentation of all changes in the hardcopy EIQ files stored in the fileroom. In addition, all changes made to EIQs are tracked in an electronic log file.

Phase II reviews take a top-down look at the emissions data. This phase involves running Access queries to identify potential issues to investigate further. The Phase II QA queries included ensuring condensable particulate emissions were reported, ensuring correct application of sulfur/ash content in emission factors, and reviewing emission trends by facility and industry type to identify any anomalies. In addition, point source data from other databases incorporated by the EPA into the EIS, such as the Toxics Release Inventory (TRI) and the Clean Air Markets Division (CAMD), will be reviewed and compared to MoEIS data. Prioritization of the largest sources, largest changes, and largest anomalies is a top consideration, as is realizing a meaningful emission difference within a reasonable amount of time. Any changes made to EIQs during the Phase II QA process will be done with input from the companies, and written documentation of all changes will be placed in the EIQ files stored in the fileroom and in electronic files.

Results

CAMD Data Comparison: Several emission units in Missouri are subject the Acid Rain Program or the NO_x Budget Trading Program, and these units report SO_x and NO_x emissions directly to EPA's Clean Air Markets Division (CAMD). These units were reviewed to ensure the same emission quantities were reported to EPA and to the APCP in their annual emissions report. Over 70% of all EIQ-reported SO_x and NO_x emissions were quality assured with the help of the CAMD database. Since the naming of the units between the two databases is not always identical, and not all units reported to the APCP are required to report to CAMD in either individual or grouped format, some manual analysis was done to compare emissions reported to the two databases.

The largest difference noted between the two databases was an underreporting of almost 270 tons to MoEIS compared to CAMD. Contact with the facility showed that the cause was a transcription error, and the MoEIS data was corrected. Due to prioritization, the six other

facilities that showed reporting differences were not addressed, and their total difference was not more than the single NO_x correction that was completed.

Condensable PM Reporting: Missouri facilities were not required to report condensable emissions prior to emission year 2008, but they were reminded to report condensable starting with emission year 2008 in email or postcard form and in the EIQ packet. The inclusion of condensable PM data in the 2008 emission reporting year is important because it is an EPA triennial inventory year where data will be extensively quality assured for use in detailed air quality analyses and planning. Missouri is required to report condensable PM emissions in 2009 by EPA’s Air Emissions Reporting Rule (AERR), 40 CFR Part 51.15, and data collection systems for separate condensable and filterable PM reporting in 2009 are in place. Quality assurance of the 2008 emissions data began with Part 70 and Intermediate operating permit holders who use Source Classification Codes (SCCs) that have condensable emission factors in the webFIRE emission factor database.

Identifying facilities: There are many fuel combustion processes that produce condensable emissions. For the vast majority of fuel combustion processes, the condensable emissions are accounted for in the total PM₁₀ and PM_{2.5} emission factors already in use. This is especially true for natural gas, diesel, and fuel oil combustion sources. Coal combustion sources, on the other hand, required additional analysis to determine if condensable emissions were included in the report. Six facilities correctly included condensable in their initial emission report and were contacted to verify those emissions. Seven facilities were identified that may not have included condensable emissions, but the omission did not amount to over 10 ton underreporting. Seventeen facilities that did not report condensable emissions were the highest priority and were contacted from August to October 2009 to correct their emission reports.

Emission Results: Condensable PM emissions added to those seventeen facilities account for over 3,700 tons of PM₁₀ emissions statewide. The increased emission fees amounted to almost \$150,000. The addition of condensable emissions to PM₁₀ totals did not cause any facility to meet the 4,000 ton per pollutant cap or the 12,000 ton facility wide emission fee cap.

Table B-7: Selected Facility Condensable Additions

	Initial Inventory	Condensable Addition	17 Facility Inventory
17 facilities	3049 tons PM ₁₀	3746 Tons PM ₁₀	6795 Tons PM ₁₀
Estimated Fees	\$121,960	\$149,840	\$271,800

Ash/Sulfur Changes: The method of calculating emissions in MoEIS was changed from 2007 to the 2008 emission year. The previous equation used the throughput, emission factor, ash or sulfur content, and control efficiency to calculate emissions. The ash or sulfur term was added to the equation to assist facilities whose emission factor is an equation from AP-42 in the form [EF * A/S]. While the calculation method worked well for a limited number of facilities, it became a

source of confusion for the larger group, and misinterpretation of the emission factor term by Air Program users necessitated a change to the calculation to remove the ash or sulfur term from the calculation. Communication of the change to facilities was done via the EIQ mailout and notations in the MoEIS online system. A review of submitted EIQs to ensure all affected facilities had accounted for the new calculation method showed only one facility that did not adjust the emission factor to account for the change. They were contacted to make the correction and it resulted in an over 4,000 ton increase in SO_x emissions compared to their initial report.

Interannual Variability- Facilities that reported over 20 tons of chargeable emissions were examined to find sources with large interannual variability. A list of 20 facilities was generated where plantwide chargeable emissions changed by more than 20%, and each of these facilities were contacted to verify the source of the increase or decrease. Four facilities reported an emission change due to emission factor or control device changes, and the other 16 facilities reported throughput changes were the cause of the emission differences. Since the cause of the emission variability has been documented, there is no cause for changes to the emissions report for these twenty facilities.

Local Agency QA – Four facilities in St. Louis City were selected for a detailed audit based on their level of emissions and variation from past year reporting. At the four facilities, over 20 emission units were audited to confirm throughput, appropriate emission factor use, appropriate control efficiency application, permitted equipment limits, and number of pollutants. Six emission units were found to be incorrectly reported in the 2008 emission report, with one facility having overreported almost 10 tons of PM₁₀, and another underreported 40 tons facility-wide. Phase 1 quality assurance steps were used on 14 facilities in Springfield, 7 facilities in St. Louis County, and twenty facilities in Kansas City. Throughputs, emission factors, incorrect calculations, and HAP reporting were reviewed for these sites.

Stack Parameters – In preparation for point source data submission to the NEI, the required data elements for stack emission release points were queried to ensure the data submittal could occur without errors. Of the over 2,600 stack release points associated with point source emission reports that are submitted to the 2008 NEI, almost 50% required quality assurance before they could be submitted. Three main quality assurance steps were taken to correct the stack data: missing data elements were filled in as possible, data elements that were out of range were quality assured, and previously submitted NEI data elements were compared to current Missouri emission report data to identify discrepancies. Filling in missing data elements took the most time because it required review of modeling files, contact with local agency staff, or contact with the facility. Out of range data elements were a much smaller portion of the quality assurance, but these were also corrected via modeling files and contact with the facility. Discrepancies between the EIS and 2008 Missouri EIQ data were reconciled by accepting the Missouri data instead of EIS data.

HAP Quality Assurance – Quality assurance of the HAP inventory stemmed from the basic assumption that a facility may or may not have reported HAP data at all, much less correctly. All of the processes that were submitted to the NEI were matched up to standard industry emission factors from WebFIRE. Those whose emissions fell significantly outside the range predicted by WebFIRE, or had no emissions associated with a WebFIRE process were

investigated further. Of the 568 facilities submitted to the 2008 NEI, 438 could be associated with at least one HAP, and 342 of these had HAP emissions above reporting levels. This corresponded to about 3,000 units encompassing 3,500 processes. Those facilities with missing HAP emissions were contacted, and the TRI was also consulted, to ensure a complete inventory. Significant HAP emission amounts, particularly those that deviated from projected emissions by more than an order of magnitude, were investigated individually and corrected as needed.

Sources Included in 2008 NEI Point Source Inventory

As specified in the Consolidated Emissions Reporting Rule (CERR), the 2008 NEI is a three-year cycle inventory consisting of point source emissions from Type B sources at a minimum. Type B sources are defined as those with actual emissions $\geq 1,000$ tons/year CO; ≥ 100 tons/year of SO₂, NO_x, VOC, PM₁₀, PM_{2.5} or ammonia; or ≥ 5 tons/year lead. Because of the transition to the Air Emissions Reporting Rule (AERR) requirements for emission year 2009 and the new Emission Inventory System (EIS) available for 2008, it was decided to submit more than the minimum Type B CERR facilities as point sources for the NEI. Instead of using fluctuating actual emissions to determine a facilities status as a point source, the definition of Type B point source is adopted from the AERR based on potential emissions. Facilities with potential emissions over 100 tons per year of any pollutant have Part 70 operating permits, and facilities that have unconditioned potential emissions over 100 tons per year but have accepted limits to condition their potential to under 100 tons per year have Intermediate operating permits. Facilities with these two permit types are reported as point sources beginning in 2008 to create a stable number of sources to be submitted as point sources to the NEI.

This list of sources includes 568 facilities, with total criteria emissions summarized in Table B-8 and HAP emissions in Table B-9.

Table B-8 2008 NEI Point Source Emissions by Category

<i>Description</i>	<i>Number of Facilities</i>	<i>CO (tons)</i>	<i>NH₃ (tons)</i>	<i>NO_x (tons)</i>	<i>PM₁₀ (tons)</i>	<i>PM_{2.5} (tons)</i>	<i>SO_x (tons)</i>	<i>VOC (tons)</i>
Fossil Fuel Electric Power Generation	76	22,142	196	94,298	10,287	6,351	285,688	1,628
Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)	2	23	0	12	92	50	35,998	2
Cement Manufacturing	6	11,122	31	13,009	1,712	673	11,029	878
Steam and Air-Conditioning Supply	3	94	7	1,208	352	343	6,296	8
Petrochemical Manufacturing	2	121	16	946	149	20	5,586	174
Primary Aluminum Production	1	24,771	1	36	568	257	4,688	239
Pesticide and Other Agricultural Chemical Manufacturing	5	173	1	601	182	144	2,438	100
Lime Manufacturing	2	11,843	0	5,159	1,065	62	4,433	43
Pipeline Transportation of Natural Gas	10	1,350	2	8,551	115	115	2	328

Sewage Treatment Facilities	4	931	1,247	302	28	6	16	76
Nitrogenous Fertilizer Manufacturing	1		25	929	101	57		
Breweries	1	146	24	668	346	24	5,431	250
Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	1	13,391		64	27	19	2,519	2
Lead Ore and Zinc Ore Mining	2	0		0	92	4	0	4
Medicinal and Botanical Manufacturing	2	3	0	14	9	2	0	51
Automobile Manufacturing	2	159	3	342	72	42	448	1,851
Soybean Processing	4	34	0	40	145	71	0	1,009
Motor Vehicle Body Manufacturing	9	16	0	22	14	6	0	541
All Other Categories	435	5,959	102	3,757	2,976	750	2,798	10,225
Statewide Total	568	92,278	1,655	129,958	18,334	8,997	367,370	17,410

Table B-9 2008 HAP Point Source Emissions by category in tons

<i>Description</i>	<i>Number of Facilities</i>	<i>HCl</i>	<i>HF</i>	<i>Xylene Isomers</i>	<i>Hexane</i>	<i>Styrene</i>	<i>Organic HAPs</i>	<i>PM HAPs</i>	<i>Acid Gas HAPs</i>	<i>Dioxins/Furans</i>
Fossil Fuel Electric Power Generation	34	909	923	1	<1	<1	35	28	<1	
Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)	2							20		
Cement Manufacturing	5	441		18	2	11	178	1		1
Steam and Air-Conditioning Supply	1	61	8	<1	<1	<1	<1	6		
Petrochemical Manufacturing	2	15	8				3			
Primary Aluminum Production	1	<1	105				11	<1		
Pesticide and Other Agricultural Chemical Manufacturing	4	26	3	<1			25	<1	<1	
Lime Manufacturing	2	32					<1	<1		
Pipeline Transportation of Natural Gas	7			<1	<1	<1	71	<1		
Sewage Treatment Facilities	4	<1		<1		<1	20	1		
Breweries	1	85	11				2			
Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	1	10						<1	<1	
Medicinal and Botanical Manufacturing	2	1		<1	1		182	<1	<1	
Automobile Manufacturing	2	46	4	116	2	<1	97	3		
Soybean Processing	4	<1			382		4			
Motor Vehicle Body Manufacturing	8	<1		17	3	109	56	<1		
Metal Window and Door Manufacturing	3			83			147			
Unlaminated Plastics Profile Shape Manufacturing	8			2		202	13			
Boat Building	5			21	<1	68	36			
Heavy Duty Truck Manufacturing	1			5	1	<1	56	<1		
Solid Waste Landfill	12	7		6	3		43	<1		
Rubber and Plastics Hoses and Belting Manufacturing	5			2	<1	<1	52	<1		<1
Sawmills	4	<1		24		<1	30	<1	<1	
All Other Categories	220	41	8	128	28	19	462	14	3	<1

* All emissions in tons

** HAP Categories do not include HAP amounts that are listed individually

7.0 NONPOINT SOURCE INVENTORY

Emissions Development

The nonpoint source categories with published methods of estimation are too numerous and diverse to complete county-level inventories for all of them given current resources. The EPA will complete inventories for most nonpoint source categories using national defaults, but several categories are improved with state-level information or with point-source subtraction. Criteria pollutant emissions are submitted for these categories and HAP emissions are included for categories with speciation profiles.

Missouri prepared inventories for 18 categories that required point source subtraction or state-specific data. These categories are listed in the Missouri Category Summary section below. Categories that did not require point source subtraction that were calculated by EPA are listed in the EPA Category Summary section.

The 2008 Missouri statewide nonpoint criteria emissions are calculated in Table B-10.

Table B-10 Statewide 2008 Nonpoint emissions in tons

Category Description		CO (tons)	NH₃ (tons)	NO_x (tons)	PM₁₀ PRI (tons)	PM_{2.5} PRI (tons)	SO_x (tons)	VOC (tons)
Stationary Source Fuel Combustion	Residential	47,835	1,343	6,547	6,321	6,288	1,298	7,642
Stationary Source Fuel Combustion	Industrial and Commercial/Institutional	7,135	293	10,016	9,266	2,805	42,868	234
Mobile Sources	Commercial Marine Vessels	2,686	7	13,943	496	481	824	302
Solvent Utilization	Surface Coating							66,619
Storage and Transport	Gasoline Distribution: Stage I and Stage II							27,851
Mobile Sources	Paved and Unpaved Roads				570,447	54,551		
Industrial Processes	Construction Dust				42,888	4,289		
Industrial Processes	Commercial Cooking	562			1,515	1,401		214
Miscellaneous Area Sources	Agriculture Production - Crop and Livestock		124,592					
Waste Disposal, Treatment, and Recovery	Burning and Water Treatment	29,675	22	1,397	7,293	6,811	156	2,690
Statewide Total		87,893	126,258	31,903	638,226	76,626	45,147	105,552

Missouri Category Summary

Industrial and Commercial/Institutional Fuel Combustion

Because the Industrial and Commercial/Institutional (ICI) category appears in the top ten nonpoint source categories for multiple pollutants and fuel types, this category is critical to capturing a large segment of statewide emissions. A CENRAP project revised the 2002 nonpoint source ICI categories and produced a methodology and templates that incorporate region and state-specific information. Missouri used the CENRAP methodology to produce the inventory for both industrial and commercial/institutional combustion of coal, distillate oil, residual oil, natural gas, liquid petroleum gas, wood, and kerosene for criteria pollutant emissions.

Statewide emissions are calculated using the fuel activity and emission factors, then statewide point source emission contributions are subtracted, and finally the emissions are allocated to counties. The Energy Information Administration's (EIA's) State Energy Data System (SEDS) provides total energy consumption by sector, but the values have to be adjusted by energy not used for combustion and nonroad equipment use. EIA's *2002 Manufacturing Energy Consumption Survey* (MECS) was used to get regional sectoral energy consumption that is not used for combustion. A run of the NONROAD model for 2006 provided the diesel and LPG quantity to subtract for commercial sector nonroad equipment. Emission factors from Roy Huntley of the EPA, the Emission Inventory Improvement Plan (EIIP), and AP-42 cover the various fuel types for criteria pollutants. Emissions from coal combustion require the use of Missouri-specific coal sulfur content from the Energy Information Administration Quarterly Coal Report. Statewide point source emission contributions are subtracted by compiling the sector's CO emissions by Source Classification Code (SCC), which is fuel specific, back-calculating using AP-42 emission factors to a fuel throughput, and subtracting that fuel throughput from the statewide total. Before allocating the remaining nonpoint emissions to Missouri counties, an energy-intensity adjustment is done to account for the variation of energy used per employee for each industrial manufacturing NAICS code. *County Business Patterns* (CBP) published annually by the US Census Bureau outlines employment by NAICS codes and the energy-intensity per employee by NAICS code derived from EIA's 2002 Annual Energy Outlook. Emissions are then allocated to individual counties based on commercial/institutional employment by county and based on energy intensity and employment for the industrial sector.

Gasoline Distribution: Stage I and II

Gasoline distribution is a major nonpoint source contributor to VOC emissions. Both Stage I and II controls have been established in the St. Louis nonattainment areas and stage I controls have been established in Kansas City. EPA used national averages of fuel throughput to create VOC emissions for gasoline distribution and the counties with Stage I and II control measures are taken into account. Bulk plants and bulk terminals included in Missouri's point source emissions were subtracted from two of the four nonpoint categories. VOC and 8 speciated HAPs are included for these categories.

Industrial Surface Coating

Industrial solvent utilization was the fourth largest statewide nonpoint source of VOC emissions in 2004, and is a category of interest to Kansas City and St. Louis because of their ozone designation and control plans. EPA updated the per employee emission factors using 2007 solvent sales data from Freedonia, a market research firm. After applying those updated emission factors, point source subtraction was completed for Missouri counties by subtracting the number of employees at point sources for the applicable NAICS codes. The categories below had point source contribution subtracted:

Wood and Flat Stock (Factory Finished Wood)
Wood Furniture
Metal Furniture
Paper, Foil, and Film
Metal Cans
Metal Sheet, Strip, and Coil (Miscellaneous Metals)
Machinery and Equipment
Electronic and Other Special Coatings
Motor Vehicles
Aircraft
Railroads
Marine Coatings
Miscellaneous Manufacturing
Degreasing
Graphic Arts

EPA Category Summary

Residential Fuel Combustion

Residential fuel combustion appears in the top ten Missouri nonpoint source categories for SO_x, NO_x, VOC and PM₁₀. EPA estimated the residential fuel consumption and emissions for fuel types including coal, natural gas, LPG, diesel, and kerosene. EPA's new residential wood combustion Microsoft Access tool was used to remain consistent with the nation and reflect updates recommended by the task force that created the tool in 2007. Most data will be populated with data from national databases (US Census, US Forest Service) and updated SCCs and emission factors for current types of heating appliances.

Industrial Surface Coating

EPA's updated emission factors based on Freedonia data were applied to industrial employment, highway miles, or population to estimate emissions. Industrial categories that did not require point source subtraction are listed below:

Automobile Refinishing
Appliances
Dry Cleaning

Traffic Paints
Industrial Maintenance Coatings
Other Special Purpose Coatings
Architectural Coatings
Personal Care Products
Household Cleaning Products
Automotive Aftermarket
Coatings and Related Products
Adhesives and Sealants
FIFRA Regulated Products
Miscellaneous Products

Open Burning - Residential Waste Combustion Inventory

The 2002 NEI PM₁₀ emissions from household waste open burning ranked 8th largest in the State of Missouri. The EPA will provide a default emission inventory for this category based on national-default waste generation rates applied to rural population estimates from the US Census Bureau, and national default emission factors for VOC, NO_x, PM₁₀, and CO for both yard waste and municipal solid waste. The State of Missouri did not improve on the national defaults provided by the EPA due to resource limitations.

Open Burning – Wildfires, Agricultural, and Prescribed Burning Inventory

The 2002 NEI shows the importance of open burning to the state of Missouri inventory – grasses and wheat agricultural burning are among the top ten categories for SO_x emissions, and grasses also appear in the top ten for NO_x and PM₁₀. The EPA will provide a default inventory of fire emissions due to limited resources for collecting state-specific data. These values are not yet available through the EPA NEI website or the EIS.

Categories Not Developed

The following categories were not developed by EPA or Missouri due to time and resource constraints, or the emissions from these categories are deemed insignificant compared to the other components of the inventory.

Agricultural Tilling
Agricultural Pesticide Application
Cremation, Human and Animal
Chrome Plating
Cotton Ginning
Dental Preparation and Use
Drum and Barrel Reclamation
General Laboratory Activities
Grain Elevators
Hospital Sterilization
Fluorescent Lamp Recycling

Lamp Breakage
Landfills
Mining and Quarrying
Open Burning – Scrap Tires
Structure Fires
Swimming Pools

Quality Assurance Procedures

EI Unit staff has documented the following information for each nonpoint source category: source of data for activity, emission factors, allocation methodologies, nonpoint source SCCs covered, pollutants covered, and point source subtraction. Much of the documentation for EPA categories appears at the NEI website: <http://www.epa.gov/ttn/chief/net/2008inventory.html>

Emission inventory staff participated in the ERTAC workgroup that developed many of the updated emission factors and methodologies used for 2008 emission estimates, and the resulting emission factors were checked against those used in EPA templates for accuracy. All nonpoint source categories in the 2008 NEI will be reviewed, including those for which EPA is developing emissions estimates. The emission estimates were compared to the 2005 NEI to identify outlying or missing categories.

8.0 MOBILE SOURCE INVENTORY

Onroad Mobile Source Data Collection

The EPA will calculate onroad emissions by running the National Mobile Inventory Model (NMIM). The EI Unit provided updated activity data inputs for the NMIM National County Database (NCD). These updates more accurately reflect Missouri emissions than the default national averages. The EI Unit collected the following activity data for the 2008 NEI.

- Vehicle Miles Traveled (VMT): VMT by county and road type were provided by MoDOT for the State of Missouri and are summarized in Table B-11. Area-specific VMT by county and road type for the St. Louis and Kansas City regions were provided by East/West Gateway and Mid-America Regional Council.

Table B-11: 2008 Vehicle Miles Traveled by County

County FIPS	County_Name	VMT* in Million Miles	County FIPS	County_Name	VMT* in Million Miles
1	Adair County	159.4784	121	Macon County	242.8909
3	Andrew County	319.5966	123	Madison County	138.1476
5	Atchison County	196.4741	125	Maries County	122.7927
7	Audrain County	240.2153	127	Marion County	354.5883
9	Barry County	356.2431	129	Mercer County	52.8821
11	Barton County	228.2903	131	Miller County	348.3599
13	Bates County	276.5227	133	Mississippi County	241.8438
15	Benton County	213.8250	135	Moniteau County	141.0637
17	Bollinger County	117.7653	137	Monroe County	91.6368
19	Boone County	1,484.7484	139	Montgomery County	381.1052
21	Buchanan County	751.9344	141	Morgan County	221.8110
23	Butler County	488.9247	143	New Madrid County	483.9027
25	Caldwell County	154.1807	145	Newton County	791.7511
27	Callaway County	913.0340	147	Nodaway County	188.0544
29	Camden County	491.0100	149	Oregon County	151.1144
31	Cape Girardeau County	722.6664	151	Osage County	176.1925
33	Carroll County	96.9629	153	Ozark County	115.5051
35	Carter County	122.2928	155	Pemiscot County	491.2463
37	Cass County	947.9729	157	Perry County	299.3293
39	Cedar County	113.8193	159	Pettis County	406.5007
41	Chariton County	85.0137	161	Phelps County	711.2055
43	Christian County	721.9733	163	Pike County	276.9507
45	Clark County	139.0347	165	Platte County	1,363.4685
47	Clay County	2,256.7113	167	Polk County	355.0242
49	Clinton County	320.3453	169	Pulaski County	537.7921
51	Cole County	618.3292	171	Putnam County	52.0246
53	Cooper County	479.2263	173	Ralls County	202.9427
55	Crawford County	491.5010	175	Randolph County	289.3356
57	Dade County	77.8041	177	Ray County	190.6346
59	Dallas County	193.3356	179	Reynolds County	88.8169
61	Daviess County	267.3748	181	Ripley County	110.1861
63	DeKalb County	199.1815	183	St. Charles County	2,727.9563
65	Dent County	149.0151	185	St. Clair County	182.8044
67	Douglas County	127.5733	186	Ste. Genevieve County	398.6384
69	Dunklin County	317.1931	187	St. Francois County	548.1491
71	Franklin County	1,636.7261	189	St. Louis County	11,925.1835
73	Gasconade County	156.4525	195	Saline County	463.6895
75	Gentry County	58.3613	197	Schuyler County	62.0992
77	Greene County	2,404.9309	199	Scotland County	51.6444
79	Grundy County	80.0101	201	Scott County	471.9991
81	Harrison County	274.5483	203	Shannon County	119.4785
83	Henry County	310.2750	205	Shelby County	99.2628
85	Hickory County	97.5059	207	Stoddard County	363.2309
87	Holt County	259.7343	209	Stone County	312.0035
89	Howard County	99.7101	211	Sullivan County	65.6205

91	Howell County	470.7985
93	Iron County	126.2972
95	Jackson County	6,713.6034
97	Jasper County	1,067.1157
99	Jefferson County	1,884.7099
101	Johnson County	499.5025
103	Knox County	57.7446
105	Laclede County	652.5356
107	Lafayette County	692.2315
109	Lawrence County	656.1909
111	Lewis County	166.5792
113	Lincoln County	495.2502
115	Linn County	153.6966
117	Livingston County	170.1267
119	McDonald County	330.7242

213	Taney County	642.9550
215	Texas County	322.3266
217	Vernon County	345.9822
219	Warren County	524.8759
221	Washington County	220.3597
223	Wayne County	183.2741
225	Webster County	662.7641
227	Worth County	18.6762
229	Wright County	278.1377
510	St. Louis City	3,450.4882

*From MoDOT except for Cass, Clay, Jackson, and Platte (MARC) and Franklin, Jefferson, St. Charles, St. Louis, and St. Louis City (East-West Gateway)

- **Vehicle Age Distribution:** An age distribution for light duty vehicles was created from a list of Vehicle Identification Numbers (VINs), by county, provided by the Department of Revenue. The VINs were decoded into model year and MOBILE6 vehicle classes by ESP Data Solutions, Inc, a private contractor. Specific age distributions were created for all current and potential non-attainment areas, as well as a single distribution created for the remaining counties of the state. This data updated the BaseYearVMT Table and the CountyYear Table.
- **St. Louis IM Program Specifications:** IM data was provided by the St. Louis Regional Office's IM Program. This will be to update the CountyYear Table.
- **St. Louis Stage 2 Program Specifications:** Stage 2 information was updated in the County Table.
- **Fuel Parameters:** Reid Vapor Pressure (RVP) specifications for Kansas City and Reformulated Gasoline (RFG) specifications for St. Louis were used to update the CountyYear Table.

Table B-12 Onroad Emissions by Category

<i>Category</i>	<i>CO</i>	<i>NH₃</i>	<i>NO_x</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>SO₂</i>	<i>VOC</i>
Light Duty Gasoline	919,867	6,631	59,772	1,669	782	899	72,584
Heavy Duty Gasoline	33,938	112	7,071	182	131	71	2,911
Motorcycles	6,994	6	814	21	11	3	1,118
Light Duty Diesel	162	1	140	17	14	2	86
Heavy Duty Diesel	16,628	164	47,527	1,526	1,260	228	3,301
Diesel Buses	619	5	2,141	102	91	10	128
Total	978,207	6,920	117,464	3,516	2,290	1,213	80,127

Nonroad Mobile Source Emissions

The EPA will be using NMIM to estimate the majority of nonroad emissions. The EI Unit did not generate nonroad emissions estimates because surveys for equipment population and usage would be required to improve upon national activity inputs. The initial emission estimates are included in Table B-13.

Table B-13 Nonroad Emissions by Category

<i>Category</i>	<i>CO</i>	<i>NO_x</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>SO₂</i>	<i>VOC</i>
Agricultural Equipment	20,188	20,685	1,938	1,880	415	2,446
Commercial Equipment	62,825	2,703	215	206	39	3,360
Construction and Mining Equipment	13,070	11,789	996	965	276	1,690
Pleasure Craft	56,068	3,037	336	310	34	19,424
Railroad Equipment	272	133	16	16	2	30
Industrial Equipment	25,238	6,131	220	214	69	1,336
Lawn and Garden Equipment	148,830	2,223	477	441	26	11,065
Logging Equipment	1,252	245	28	26	7	129
Recreational Equipment	36,409	371	384	354	5	12,093
Statewide Total	364,153	47,317	4,611	4,412	873	51,572

Rail Inventory

The Eastern Regional Technical Advisory Committee (ERTAC) methodology for rail inventories produces a bottom up inventory using proprietary railroad activity data to assign emissions to individual rail lines and rail yards. Class I, the 7 largest freight rail carriers that account for 85% of rail cars hauled in 2008, are inventoried for criteria pollutants. Their line-haul and railyard emissions are estimated from activity data, fleet-specific Fuel Consumption Index, in GTM per gallon of fuel used, to generate fuel use values at the link-level. Fleet-specific emission factors, determined by the mix of engine types and ages, will be used to calculate emissions. The calculation will be performed by the ERTAC to maintain the security of proprietary data elements, and the final emissions will be aggregated to the county level. Railyard operations such as generators, loading equipment, maintenance, and repair are included in the NMIM nonroad emissions. Smaller Class II Regional and III Shortline railroad emissions will be estimated using top-down allocation of national activity and emissions due to limited data availability.

The rail inventory emissions have not been loaded into the EIS as of June 1st. Their emissions are not included in this report, but will be added when they are available.

Aviation Inventory

The EPA has developed the 2008 NEI for aircraft emissions using national datasets from the Bureau of Transportation Statistics (BTS), the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) and Form 5010. The compiled information on locations of airports and their activity is quality checked to eliminate duplication and double-counting of landing and takeoff activity (LTO), and this information was input to the FAA's Emission and Dispersion Modeling System (EDMS) where emissions were generated. These emissions are now found in the point source inventory since emissions are associated with each airports specific latitude and longitude. Only aircraft landing and take-off activity is accounted for in this portion of the inventory; ground support equipment and other maintenance emissions are included in the nonroad portion of the inventory. Both criteria and hazardous air pollutant emissions are included in the estimates, but only criteria pollutants are displayed in Table B-14.

Table B-14 2008 NEI Missouri Airport LTO Emissions (tons)

CH ₄	CO	NO _x	PM ₁₀ -PRI	PM _{2.5} -PRI	SO ₂	VOC
1.98	13,692.52	1,919.95	243.79	182.43	207.21	1,202.74

9.0 BIOGENIC SOURCE INVENTORY

EPA will provide a biogenic source inventory and will not accept biogenic emissions from states. These estimates are not yet available as of June 1, 2010 on the EPA NEI website or the EIS.

10.0 EIS DATA SUBMISSION TIMELINE AND PROCEDURES

The timeline and milestones for collecting and quality assuring the 2008 NEI data and submitting to the EIS is below.

Pre-Submission – Through June 30, 2009:

- Access the EIS Gateway website to view and edit point source facility information one-at-a-time
- Download a snapshot of the entire facility inventory for off-line and bulk edits
- Update MoEIS code tables to match EIS code tables to reduce errors
- Download the staging tables that will be used for batch submissions to the Gateway via the CDX Node
- Collect onroad mobile source activity data
- Review nonpoint source methodologies and collect activity data

Submission - July 1, 2009 through June 1, 2010:

- Completed all entry of EIQs into MoEIS by August 15, 2009.
- August-November: Complete Phase I and Phase II QA of point source data.
- July-Nov 2009: Manipulate onroad mobile activity data to create inputs for the NCD. Run NMIM with the updated NCD tables and QA results.

- Submitting emission and activity data:
 - October 2009 to April 2010– Submit updates to the facility inventory using batch uploads and editing one-by-one through the EIS
 - April 2010-May 2010 – Submit point, nonpoint, and mobile source emissions
- Submitted and accepted data are viewable in the EIS Gateway webpage one business day after they are submitted, review the data for complete uploads
- Feedback is provided through the EIS Gateway page for the following:
 - File received by the CDX Node
 - Schema validation issues
 - File received by the EIS and is being processed
 - QA feedback is ready for viewing

Post-Submission – After June 2, 2010:

- EPA closes submission window via CDX Node for first analysis June 4th, 2010 through July 16th (6 weeks), specifically looking at:
 - Organizations that submitted, data categories submitted, sectors submitted, pollutants submitted, and unresolved warning messages
 - Comparisons to other data sets, comparison to previous year inventories, compare point to non-point, compare geographically, identifying duplicate wildfires if state submitted
 - No data will be rejected during this analysis, but resubmission is encouraged to resolve EPA-identified issues
 - EPA encourages states to continue developing and refining emissions for submittal during the second open window period
- EPA re-opens the window for revised submissions based on first analysis from July 19th to Oct 30th, 2010.
 - During this time, EPA will release a preliminary General Purpose Release (what the initial public release would look like, but it's just for submitter review)
 - States review an EPA-generated feedback report and make corrections as needed through the EIS Gateway and data uploads
- EPA closes submission window again and does the same analysis again from Nov 2nd to Dec 31st, 2010
 - Final General Purpose Release due Dec 31, 2010 (2 years after emission year) for public consumption

Appendix B-3 2008 On-Road Mobile Source Emissions Using Mobile 6.2 via NMIM

The 2008 on-road mobile emissions shown in Section 4 of this redesignation request and maintenance plan were created using Mobile6.2 via the NMIM for the St. Louis nonattainment area for the purpose of submitting state wide emissions data for EPA’s 2008 NEI. The NMIM NCD was updated with Missouri specific data. The fuel and meteorological data in the NCD for 2008 was used and all months for 2008 were selected to create an annual emissions profile. Table B-15 summarizes the emissions by county that were generated using NMIM.

**Table B-15
2008 Annual On-Road Mobile Source Emissions by County in the St. Louis PM_{2.5}
Nonattainment Area Calculated using Mobile 6.2 and NMIM (Tons/Year)
(Missouri Counties Only)**

County Name	CO	NH₃	NO_x	PM₁₀-Pri	PM_{2.5}-Pri	SO₂	VOC
Franklin County	20,184.97	166.80	2,730.77	80.24	51.07	27.09	1,448.33
Jefferson County	23,738.65	192.14	3,209.18	92.12	58.59	31.13	1,706.45
St. Charles County	34,807.47	278.22	4,726.01	132.91	84.48	44.93	2,566.36
St. Louis County	150,937.91	1,216.43	20,726.08	580.39	368.85	196.22	11,351.33
St. Louis City	43,131.08	351.94	6,004.28	168.11	106.90	56.78	3,350.19
Totals	272,800.09	2,205.53	37,396.31	1,053.77	669.88	356.15	20,422.66

The VMT Data used in conjunction with NMIM to estimate the emissions in Table B-15 is listed below in Table B-16. The county level VMT was broken down to SCC using the default distribution in NMIM. A vehicle distribution was created from registration data from Missouri’s Department of Revenue.

**Table B-16 - 2008 Annual VMT Data by County
(Missouri Counties Only)**

County	2008 Annual VMT
Franklin	1,636,760,381
Jefferson	1,884,745,023
St. Charles	2,728,058,895
St. Louis	11,924,864,323
St. Louis City	3,450,450,085
Total	21,624,878,706

The vehicle registration data used to in conjunction with NMIM to estimate the emissions in Table B-15 is listed below in Table B-17. The same registration distribution was used for all five counties in the nonattainment area.

Table B-17. St. Louis Nonattainment Area Registration Distribution (NMIM Inputs for 2008 On-Road Mobile Source Emissions)

Vehicle Class	Vehicle Model Year Population Percentage Per Vehicle Classification												
	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
LDV	0.0248	0.0564	0.0666	0.0649	0.0653	0.0632	0.0633	0.0679	0.0675	0.0652	0.0604	0.0501	0.0488
LDT1	0.0130	0.0345	0.0103	0.0666	0.0759	0.0255	0.0713	0.0780	0.0859	0.0487	0.0474	0.0398	0.0379
LDT2	0.0179	0.0593	0.0700	0.0750	0.0840	0.0759	0.0728	0.0808	0.0671	0.0640	0.0563	0.0522	0.0427
LDT3	0.0161	0.0734	0.0630	0.0760	0.0785	0.0842	0.0838	0.0728	0.0624	0.0539	0.0561	0.0365	0.0328
LDT4	0.0153	0.0843	0.1358	0.0771	0.0953	0.1119	0.0736	0.0461	0.0564	0.0549	0.0715	0.0395	0.0342
HDV2b	0.0078	0.0468	0.0483	0.0729	0.0660	0.0808	0.0871	0.0713	0.0773	0.0671	0.0642	0.0310	0.0519
HDV3	0.0066	0.0628	0.0602	0.0961	0.0876	0.0681	0.0715	0.0613	0.0774	0.0669	0.0734	0.0272	0.0331
HDV4	0.0040	0.0200	0.0638	0.0404	0.0338	0.0366	0.0385	0.0413	0.0653	0.0781	0.0821	0.0383	0.0630
HDV5	0.0187	0.1207	0.0664	0.0804	0.0535	0.0639	0.0560	0.0450	0.0578	0.0951	0.0899	0.0465	0.0572
HDV6	0.0311	0.0355	0.1005	0.0865	0.0529	0.0268	0.0212	0.0199	0.0840	0.0765	0.0685	0.0572	0.0591
HDV7	0.0182	0.0324	0.1250	0.1080	0.1033	0.0772	0.0847	0.0669	0.0285	0.0427	0.0285	0.0253	0.0281
HDV8a	0.0136	0.0110	0.0524	0.0497	0.0565	0.0513	0.0420	0.0301	0.0426	0.0791	0.0570	0.0386	0.0354
HDV8b	0.0189	0.0726	0.2263	0.0348	0.0639	0.0957	0.0899	0.0552	0.0522	0.1363	0.0697	0.0305	0.0203
HDBS	0.0343	0.0556	0.0925	0.0556	0.1004	0.0587	0.0623	0.0351	0.0489	0.0657	0.0669	0.0678	0.0426
HDBT	0.0060	0.0045	0.0132	0.0144	0.0138	0.0291	0.0378	0.0258	0.0249	0.0390	0.0351	0.0309	0.0351
MC	0.0190	0.0646	0.1035	0.1096	0.1172	0.0874	0.0922	0.0713	0.0610	0.0435	0.0360	0.0255	0.0208
	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	
LDV	0.0390	0.0420	0.0313	0.0274	0.0213	0.0184	0.0138	0.0121	0.0083	0.0065	0.0049	0.0106	
LDT1	0.0443	0.0211	0.0168	0.0210	0.0189	0.0193	0.0184	0.0363	0.0582	0.0433	0.0250	0.0426	
LDT2	0.0292	0.0287	0.0266	0.0215	0.0157	0.0149	0.0096	0.0096	0.0076	0.0054	0.0042	0.0090	
LDT3	0.0322	0.0423	0.0338	0.0207	0.0181	0.0106	0.0112	0.0104	0.0070	0.0067	0.0058	0.0117	
LDT4	0.0201	0.0158	0.0145	0.0101	0.0074	0.0055	0.0052	0.0063	0.0074	0.0045	0.0014	0.0059	
HDV2b	0.0350	0.0393	0.0244	0.0196	0.0151	0.0122	0.0124	0.0154	0.0097	0.0062	0.0102	0.0280	
HDV3	0.0266	0.0340	0.0223	0.0165	0.0122	0.0126	0.0134	0.0118	0.0126	0.0096	0.0098	0.0264	
HDV4	0.0504	0.0723	0.0647	0.0308	0.0247	0.0243	0.0238	0.0270	0.0198	0.0121	0.0128	0.0321	
HDV5	0.0517	0.0217	0.0147	0.0083	0.0067	0.0110	0.0113	0.0125	0.0080	0.0012	0.0000	0.0018	
HDV6	0.0557	0.0389	0.0134	0.0152	0.0093	0.0162	0.0292	0.0196	0.0184	0.0240	0.0062	0.0342	
HDV7	0.0253	0.0321	0.0174	0.0202	0.0158	0.0166	0.0139	0.0226	0.0162	0.0178	0.0103	0.0230	
HDV8a	0.0333	0.0786	0.0447	0.0381	0.0239	0.0228	0.0291	0.0360	0.0277	0.0261	0.0163	0.0641	
HDV8b	0.0087	0.0015	0.0015	0.0029	0.0044	0.0044	0.0029	0.0044	0.0000	0.0000	0.0015	0.0015	
HDBS	0.0489	0.0327	0.0185	0.0146	0.0106	0.0095	0.0114	0.0173	0.0024	0.0035	0.0032	0.0410	
HDBT	0.0830	0.0836	0.0492	0.0441	0.0267	0.0399	0.0609	0.0333	0.0558	0.0540	0.0351	0.1248	
MC	0.0189	0.0171	0.0122	0.0119	0.0073	0.0063	0.0063	0.0064	0.0054	0.0068	0.0097	0.0401	

The following I/M Program File was used in NMIM in order to generate the 2008 on-road mobile emissions listed in Table B-15.

> IM Programs for MO
* Added IM240 beginning 2000, OBD beginning 2005
* New programs include Evap GC

> Exhaust I/M program 1
* Original Idle program through 1999
I/M PROGRAM : 1 1984 1999 1 TRC IDLE
I/M MODEL YEARS : 1 1971 1995
I/M VEHICLES : 1 22222 11111111 1
I/M STRINGENCY : 1 20
I/M COMPLIANCE : 1 96
I/M WAIVER RATES : 1 3 3
NO I/M TTC CREDITS : 1

> Exhaust I/M program 2
* IM240
I/M PROGRAM : 2 2000 2050 1 TRC IDLE
I/M MODEL YEARS : 2 1971 1995
I/M VEHICLES : 2 22222 11111111 1
I/M STRINGENCY : 2 20
I/M COMPLIANCE : 2 96
I/M WAIVER RATES : 2 3 3
I/M CUTPOINTS : 2 08152.CP1
NO I/M TTC CREDITS : 2

> Exhaust I/M program 3
* Cover OBD vehicles before 2005 OBD program
I/M PROGRAM : 3 1996 2004 1 TRC IDLE
I/M MODEL YEARS : 3 1996 2004
I/M VEHICLES : 3 22222 11111111 1
I/M STRINGENCY : 3 20
I/M COMPLIANCE : 3 96
I/M WAIVER RATES : 3 3 3
NO I/M TTC CREDITS : 3

Anti-tampering Program File:

* ATP data for 29071 from atp29071.txt
ANTI-TAMP PROG :
84 71 50 22222 11111111 1 11 096. 22212222

Appendix B-4 2008 On-Road Mobile Source Emissions Using MOVES 2010A

EPA released the Mobile Vehicle Emission System (MOVES) in December of 2010, and MOVES is now the official model to use for mobile emissions modeling. 2008 mobile emissions were initially created using Mobile6.2 via NMIM for the St. Louis nonattainment area for the purpose of submitting state wide emissions data for EPA's 2008 National Emissions Inventory (NEI). The NMIM NCD was updated with Missouri specific data. Local VMT data, vehicle registration distributions, and meteorology data from the updated NCD were converted to MOVES formatting using EPA provided conversion workbooks. The full 2008 PM_{2.5} annual emissions inventory for the Missouri side of the 1997 St. Louis PM_{2.5} nonattainment area was placed on a 30 day public notice beginning July 12, 2011, and is included as Appendix E to this redesignation request and maintenance plan. This inventory included the detailed on-road mobile emission inventory numbers generated using MOVES 2010a that are described in this section.

The local VMT data was gathered from East-West Gateway at the county level. This data is listed in Table B-16 above. The road type distribution in the baseyearvmt table from the NCD was used to distribute the county level VMT to road type. EPA's VMT converter workbook was then used to produce MOVES input tables. A vehicle registration distribution was originally created for NMIM using registration data from Missouri's Department of Revenue. The vehicle distribution was converted to MOVES age distribution table using EPA's VMT converter workbook. The registration data was also used to create the MOVES vehicle population input tables. Vehicle counts were converted from Mobile 6.2 vehicle classes to MOVES source types using the source type fractions from the Source Type Pop Fractions table in EPA's VMT converter workbook. MOVES base data was used for all other inputs, after reviewing the data to ensure accuracy. The base fuel supply tables in MOVES were used for the runs, as they already took into account the reformulated gasoline used in the St. Louis nonattainment area. A separate input database was created for each county, using county specific data where possible. All of the MOVES input tables, other than templates where EPA default data was used, which were used to create the 2008 on-road mobile emissions inventory referred to in Section 5 of this document can be found in this Appendix.

The MOVES model runs were set up selecting all available gasoline and diesel fuel vehicle type combinations, all months, days, hours, and all road types. A separate run was set-up for each pollutant. The emissions were post-aggregated to the year level using MOVES.

MOVES is a completely redesigned model, not just an updated version of the previous Mobile model. The way MOVES calculates emissions has changed to reflect EPA's more current understanding of the emissions produced by vehicles and the various factors that affect the emissions. NO_x emissions were found to be higher because of the larger portion extended idling of heavy duty vehicles contributes to the emissions total. PM_{2.5} emissions were also higher because of a better understanding of the effect of stop and go traffic, which has a significant impact on emissions in highly urban areas, such as the St. Louis nonattainment area. As a result of these changes to the model, MOVES produced higher emissions estimates for both 2008 and 2022 than were originally created with NMIM.

Table B-18 summarizes the 2008 annual on-road emissions by county as calculated using MOVES 2010A for the Missouri counties located in the St. Louis PM_{2.5} nonattainment area. Tables B-19 through B-34 provide all of the MOVES inputs that were used to create the 2008 on-road mobile emissions inventory that is summarized in Table B-18, and also referred to in Section 5 of this document., except for templates where EPA default data was used.

Table B-18
2008 Annual On-Road Mobile Source Emissions by County in the St. Louis PM_{2.5}
Nonattainment Area Calculated using MOVES 2010A
(Missouri Counties Only)

County Name	CO	NH₃	NO_x	PM₁₀-Pri	PM_{2.5}-Pri	SO₂	VOC
Franklin County	15,676.63	77.75	4,165.14	137.51	131.56	30.12	1,499.34
Jefferson County	23,286.70	90.68	5,284.46	177.63	169.62	36.32	2,424.59
St. Charles County	33,662.39	133.29	7,745.99	272.43	260.16	54.30	3,476.51
St. Louis County	125,682.25	585.26	32,193.73	1,156.41	1,105.71	237.05	12,419.57
St. Louis City	32,605.02	169.20	9,119.82	334.16	319.94	68.87	3,132.81
Totals	230,912.99	1,056.17	58,509.15	2,078.14	1,986.99	426.65	22,952.81

Table B-19 – 2008 Source Type Population (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

YearID	SourceTypeName	SourceTypeID	Source Type Population by County				
			Franklin	Jefferson	St Charles	St Louis County	St Louis City
2008	Motorcycle	11	6,067	13,018	11,151	19,243	3104
2008	Passenger Car	21	46,568	98,009	144,441	527,148	125,776
2008	Passenger Truck	31	45,890.24	82,509.19	110,385.78	303,295.72	59,405.61
2008	Light Commercial Truck	32	16,768.76	28,420.81	35,913.22	97,845.28	20,194.39
2008	Refuse Truck	41	8.25	41	35.5	93.5	69.5
2008	Single Unit Short-haul Truck	42	24.75	123	106.5	280.5	208.5
2008	Single Unit Long-haul Truck	43	302.08	541.2	549.04	2,709.24	661
2008	Motor Home	51	21.53	19.34	19.44	50.14	16.25
2008	School Bus	52	813.93	900.99	1,019.79	3,623.55	1,249.2
2008	Transit Bus	53	61.05	66.99	76.07	270.27	92.6
2008	Intercity Bus	54	44.26	71.09	82.23	378.69	143.45
2008	Combination Short-haul Truck	61	370.31	324.37	327.86	791.19	247.5
2008	Combination Long-haul Truck	62	306.84	257.02	257.57	544.92	160

Table B-20 – 2008 Annual VMT by HPMS Vehicle Type, County, and Year (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

HPMSVtypeID	HPMSVtypeName	YearID	HPMSBaseYearVMT by County				
			Franklin	Jefferson	St. Charles	St. Louis	St. Louis City
10	Motorcycles	2008	11,619,323	13,841,651	20,770,584	91,989,970	26,665,063
20	Passenger Cars	2008	707,169,172	811,173,607	1,171,243,667	5,115,865,231	1,477,495,621
30	Other 2 axle-4 tire vehicles	2008	799,130,600	924,394,839	1,342,595,411	5,875,722,138	1,702,465,533
40	Buses	2008	4,781,820	5,578,789	8,183,119	35,928,481	10,469,862
50	Single Unit Trucks	2008	29,351,955	33,386,793	47,634,481	207,228,073	59,856,119
60	Combination Trucks	2008	84,673,330	96,333,716	137,528,782	598,448,609	173,536,046

Table B-21 – Age Distribution by Source Type (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

AgeID	Source Type ID												
	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.019	0.0248	0.016038	0.015215	0.006	0.006	0.03372	0.019407	0.022549	0.022677	0.024421	0.018826	0.017834
1	0.0646	0.0564	0.059034	0.058508	0.0045	0.0045	0.054157	0.048521	0.039325	0.03937	0.032671	0.049995	0.052613
2	0.1035	0.0666	0.063189	0.062229	0.0132	0.0132	0.092687	0.158149	0.129508	0.130555	0.106219	0.16227	0.169835
3	0.1096	0.0649	0.073971	0.073529	0.0144	0.0144	0.057163	0.057986	0.082002	0.084645	0.091592	0.052692	0.04403
4	0.1172	0.0653	0.081725	0.079405	0.0138	0.0138	0.098055	0.068814	0.07432	0.076743	0.07138	0.066656	0.063479
5	0.0874	0.0632	0.072225	0.07206	0.0291	0.0291	0.05743	0.075516	0.060754	0.062113	0.04642	0.077218	0.080584
6	0.0922	0.0633	0.075227	0.075017	0.0378	0.0378	0.060728	0.071294	0.059753	0.061551	0.046468	0.072242	0.074392
7	0.0713	0.0679	0.075731	0.074101	0.0258	0.0258	0.034794	0.048222	0.045101	0.04668	0.038418	0.04791	0.047775
8	0.061	0.0675	0.069095	0.069315	0.0249	0.0249	0.049567	0.050551	0.053801	0.053336	0.05744	0.050259	0.049622
9	0.0435	0.0652	0.059343	0.060606	0.039	0.039	0.065329	0.101607	0.075238	0.074281	0.059218	0.106403	0.114631
10	0.036	0.0604	0.056546	0.058019	0.0351	0.0351	0.065952	0.060365	0.052757	0.052173	0.04901	0.061907	0.064481
11	0.0255	0.0501	0.045379	0.044021	0.0309	0.0309	0.066337	0.035034	0.038694	0.038608	0.041544	0.03448	0.033479
12	0.0208	0.0488	0.040069	0.041299	0.0351	0.0351	0.042714	0.030037	0.038252	0.038379	0.043733	0.028628	0.026173
13	0.0189	0.039	0.031719	0.032547	0.083	0.083	0.048635	0.022609	0.033622	0.033505	0.041779	0.020871	0.017769
14	0.0171	0.042	0.029341	0.030746	0.0836	0.0836	0.033323	0.026945	0.032499	0.031744	0.038573	0.026434	0.025331
15	0.0122	0.0313	0.025132	0.025766	0.0492	0.0492	0.018302	0.014853	0.01522	0.015277	0.015313	0.014766	0.014626
16	0.0119	0.0274	0.020261	0.020238	0.0441	0.0441	0.01489	0.014543	0.016624	0.016485	0.018482	0.014281	0.013778
17	0.0073	0.0213	0.01591	0.015912	0.0267	0.0267	0.010657	0.011093	0.012019	0.01218	0.012215	0.010861	0.010491
18	0.0063	0.0184	0.014002	0.013972	0.0399	0.0399	0.009968	0.011696	0.014667	0.014636	0.016859	0.011229	0.010394
19	0.0063	0.0138	0.011117	0.011398	0.0609	0.0609	0.012691	0.012448	0.018417	0.017168	0.026192	0.012123	0.011221
20	0.0064	0.0121	0.014109	0.014268	0.0333	0.0333	0.018084	0.014903	0.019136	0.018141	0.024946	0.014734	0.014172
21	0.0054	0.0083	0.015761	0.015219	0.0558	0.0558	0.00363	0.01022	0.014831	0.014247	0.019752	0.009773	0.008829
22	0.0068	0.0065	0.011686	0.011205	0.054	0.054	0.00501	0.010636	0.017272	0.016478	0.024234	0.009966	0.008574
23	0.0097	0.0049	0.00791	0.008124	0.0351	0.0351	0.003627	0.006385	0.007661	0.00744	0.00919	0.006293	0.006072
24	0.013837	0.003694	0.00582	0.006825	0.022815	0.022815	0.003017	0.003218	0.003631	0.003569	0.004095	0.003185	0.003108
25	0.019738	0.002785	0.004029	0.004856	0.01483	0.01483	0.002668	0.001864	0.001955	0.001889	0.002204	0.001885	0.001903
26	0.006525	0.002099	0.002201	0.002308	0.009639	0.009639	0.002379	0.001137	0.001109	0.001082	0.001162	0.001156	0.001183
27	0	0.001582	0.001069	0.001073	0.006266	0.006266	0.00214	0.00071	0.000645	0.000647	0.000595	0.000721	0.000739
28	0	0.00044	0.000253	0.000245	0.004073	0.004073	0.001953	0.000417	0.000378	0.000362	0.000398	0.000432	0.000454
29	0	0	0.000147	0.000139	0.002647	0.002647	0.001784	0.00024	0.000223	0.000197	0.000282	0.000256	0.000278
30	0	0	0.001957	0.001836	0.064531	0.064531	0.028609	0.010581	0.018036	0.013841	0.035194	0.011546	0.012147

Table B-22 – Inspection and Maintenance Data for 2008 (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

Pol ProcessID	stateID	yearID	Source typeID	Fuel TypeID	IM ProgramID	Inspect Freq	Test StandardsID	Beg Model YearID	End Model YearID	Use IMyn	Compliance Factor
101	29	2008	21	1	1	1	11	1971	1995	Y	93.12
101	29	2008	21	1	10	1	51	1996	2006	Y	93.12
101	29	2008	31	1	1	1	11	1971	1995	Y	93.12
101	29	2008	31	1	10	1	51	1996	2006	Y	93.12
101	29	2008	32	1	1	1	11	1971	1995	Y	93.12
101	29	2008	32	1	10	1	51	1996	2006	Y	93.12
102	29	2008	21	1	1	1	11	1971	1995	Y	93.12
102	29	2008	21	1	10	1	51	1996	2006	Y	93.12
102	29	2008	31	1	1	1	11	1971	1995	Y	93.12
102	29	2008	31	1	10	1	51	1996	2006	Y	93.12
102	29	2008	32	1	1	1	11	1971	1995	Y	93.12
102	29	2008	32	1	10	1	51	1996	2006	Y	93.12
112	29	2008	21	1	7	1	41	1971	1995	Y	93.12
112	29	2008	21	1	8	1	43	1996	2006	Y	93.12
112	29	2008	31	1	7	1	41	1971	1995	Y	93.12
112	29	2008	31	1	8	1	43	1996	2006	Y	93.12
112	29	2008	32	1	7	1	41	1971	1995	Y	93.12
112	29	2008	32	1	8	1	43	1996	2006	Y	93.12
113	29	2008	21	1	7	1	41	1971	1995	Y	93.12
113	29	2008	21	1	8	1	43	1996	2006	Y	93.12
113	29	2008	31	1	7	1	41	1971	1995	Y	93.12
113	29	2008	31	1	8	1	43	1996	2006	Y	93.12
113	29	2008	32	1	7	1	41	1971	1995	Y	93.12
113	29	2008	32	1	8	1	43	1996	2006	Y	93.12
201	29	2008	21	1	1	1	11	1971	1995	Y	93.12
201	29	2008	21	1	10	1	51	1996	2006	Y	93.12
201	29	2008	31	1	1	1	11	1971	1995	Y	93.12
201	29	2008	31	1	10	1	51	1996	2006	Y	93.12
201	29	2008	32	1	1	1	11	1971	1995	Y	93.12

201	29	2008	32	1	10	1	51	1996	2006	Y	93.12
202	29	2008	21	1	1	1	11	1971	1995	Y	93.12
202	29	2008	21	1	10	1	51	1996	2006	Y	93.12
202	29	2008	31	1	1	1	11	1971	1995	Y	93.12
202	29	2008	31	1	10	1	51	1996	2006	Y	93.12
202	29	2008	32	1	1	1	11	1971	1995	Y	93.12
202	29	2008	32	1	10	1	51	1996	2006	Y	93.12
301	29	2008	21	1	10	1	51	1996	2006	Y	93.12
301	29	2008	31	1	10	1	51	1996	2006	Y	93.12
301	29	2008	32	1	10	1	51	1996	2006	Y	93.12
302	29	2008	21	1	10	1	51	1996	2006	Y	93.12
302	29	2008	31	1	10	1	51	1996	2006	Y	93.12
302	29	2008	32	1	10	1	51	1996	2006	Y	93.12

Table B-23 – Fuel Formulation for 2008 (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content
2302	12	Gasohol (E10)	11.2917	43.0622	10	0	0	0	20.2606	8.39154
2303	12	Gasohol (E10)	8.75115	46.6452	10	0	0	0	18.9623	8.14345
2304	12	Gasohol (E10)	6.84571	49.3325	10	0	0	0	17.9886	7.95739
2305	12	Gasohol (E10)	13.1972	40.375	10	0	0	0	21.2343	8.57759
20043	20	Conventional Diesel	0	43	0	0	0	0	0	0

Fuel FormulationID	Fuel SubtypeID	fuelSubtypeDesc	Benzene Content	e200	e300	biodiesel EsterVolume	cetaneIndex	PAHContent
2302	12	Gasohol (E10)	0.848747	56.4983	84.16	0	0	0
2303	12	Gasohol (E10)	0.763743	53.3414	85.1429	0	0	0
2304	12	Gasohol (E10)	0.69999	50.9738	85.88	0	0	0
2305	12	Gasohol (E10)	0.9125	58.8659	83.4229	0	0	0
20043	20	Conventional Diesel	0	0	0	0	0	0

Table B-24 – 2008 Fuel Supply (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

FuelYearID	Month GroupID	Fuel FormulationID	Market Share	Market ShareCV
2008	1	2305	1	0.5
2008	1	20043	1	0.5
2008	2	20043	1	0.5
2008	2	2302	1	0.5
2008	3	2302	1	0.5
2008	3	20043	1	0.5
2008	4	20043	1	0.5
2008	4	2303	1	0.5
2008	5	2303	1	0.5
2008	5	20043	1	0.5
2008	6	20043	1	0.5
2008	6	2304	1	0.5
2008	7	2304	1	0.5
2008	7	20043	1	0.5
2008	8	20043	1	0.5
2008	8	2304	1	0.5
2008	9	2304	1	0.5
2008	9	20043	1	0.5
2008	10	20043	1	0.5
2008	10	2303	1	0.5
2008	11	2302	1	0.5
2008	11	20043	1	0.5
2008	12	20043	1	0.5
2008	12	2302	1	0.5

Table B-25 – Average Monthly Temperatures by Hour of the Day for Franklin County in Fahrenheit (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

	MonthID											
HourID	1	2	3	4	5	6	7	8	9	10	11	12
1	25.8	29	39.1	48.4	55.9	68.2	70.9	67.1	60.6	49	38.4	24.7
2	24.8	27.4	37	46.4	54.7	67.1	69.6	66.2	60.8	47.9	38.4	24.7
3	23.8	26.3	35.8	45	53.6	66	68.8	65.4	60	47.1	37.5	24
4	22.8	25.3	34.5	44.1	52.6	65	68.1	64.8	59.1	46.5	36.8	23.5
5	22	24.9	33.5	43.2	51.7	64.1	67.5	63.9	58.6	45.7	36	23
6	21.4	24.2	32.6	42.7	51.1	63.5	66.8	63.4	58.2	45.1	35.3	22.5
7	21.2	23.8	32.1	42.7	52.6	65.7	68.2	63.9	57.9	44.6	34.7	22.8
8	21	23.4	32.4	45.3	56.2	69.3	71.4	67.6	60	45.9	34.2	22.3
9	22.2	24.9	36.4	48.9	59.6	72.9	75.2	71.7	63.8	50.9	37.1	23.8
10	26.6	27.8	40.5	52.5	63.2	76.2	78.5	75.7	67.8	56	41.5	27.4
11	31.2	31.1	44.7	55.7	66.4	79	81.3	78.9	71.4	60.5	45.6	31.7
12	36	34.3	48.5	58.5	68.8	81.3	83.6	81.2	74.4	63.9	49.3	36.1
13	39.6	37.2	51.7	61.5	70.6	83	85.6	82.9	76.5	66.1	51.9	39.7
14	42.4	39.5	53.9	63.3	72.1	84.3	87	84.1	77.9	67.5	54	42.2
15	44	41	55.6	64.9	73.6	85.1	88	84.9	78.7	68.4	55.1	43.9
16	44.4	41.6	56.3	65.8	74.3	85.5	88.1	85.1	78.7	68.5	55.1	44.1
17	43.2	41.4	56.1	65.6	74.3	85.2	87.7	84.7	77.9	67.4	53.7	42.2
18	39.4	39.9	54.8	64.6	73.3	84.1	86.7	83.3	75.8	64.2	50.1	37.8
19	35.2	37	51.7	62.1	71.3	82.3	84.6	80.4	71.3	58.9	46.8	34.4
20	32.8	34.9	47.9	58.2	67.3	79	81	75.9	67	55.9	44.8	32
21	31	33.6	45.7	55.6	63.2	74.6	76.9	72.5	65.1	54.1	43.1	30.1
22	29.6	32.2	43.9	53.4	60.7	72.2	75	70.6	63.8	52.7	41.9	28.4
23	28.2	30.9	42.3	51.5	58.9	70.7	73.4	69.2	62.5	51.3	40.7	27.1
24	27.2	29.9	40.5	50	57.2	69.3	72.1	68.1	61.4	50.2	39.5	25.7

Table B-26 – Average Monthly Percent Relative Humidity by Hour of the Day for Franklin County (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	68.3	76	71.8	70.6	77	78.3	83.9	86.1	88.2	77	68.9	69.9
2	69	77.2	72.8	72.9	77.2	80.2	84.4	86.9	88.5	78.7	70.3	71.8
3	70.1	78	73.9	74.5	78.2	81.6	85.3	87.5	89.2	79.8	71.7	72.9
4	70.9	78.3	75.3	75.3	79.3	82.4	86.1	88.1	90.1	80.4	72.8	73.8
5	71.8	78.3	76.8	76.1	80.5	83.8	86.4	89.3	90.4	81.6	73.9	75.1
6	72.3	78.9	77.6	77	81.1	84.4	87.3	89.6	90.4	82.5	75	75.7
7	72	78.8	78.2	77.6	80.3	83	85.8	89	90.4	83.4	75.9	76.1
8	72	78.8	78.3	74.5	76.2	77.9	81.4	84.9	89.5	83.2	76.5	76
9	71.2	77.6	74.8	69.8	71.5	72.4	74.9	77.5	84.7	76.8	74.3	75.2
10	66.9	74.3	69.7	64.8	65.8	66.9	69.3	70.2	77.2	67.7	68.4	72.4
11	62	70.4	63.5	61.1	61.1	62.1	64.5	64.2	70.5	59.4	62.1	68.4
12	56.8	67	58.7	58.2	58.1	58.2	60.9	60	64.6	53.3	56.5	64.8
13	53	63.8	54.8	55	56.3	55.4	57.9	57.2	60.9	49.9	52.7	62.1
14	50.2	61.5	52.6	53	55.1	53.7	55.8	55.4	58.3	47.7	49.4	60.2
15	48.4	60	51	51.1	53.1	52.2	54.6	54.2	56.8	46.3	47.6	58.7
16	47.3	59.4	50.7	49.7	52.5	51.5	54.4	54	56.6	46	47.1	58
17	47.9	59.8	50.7	49.1	51.7	51.5	55.1	54.9	58.1	47.2	48.4	59.2
18	51.2	61.6	52.5	49.9	52.1	52.8	56.7	57.6	62.8	52.3	52.9	62.9
19	55.5	65.4	56.2	52.8	54.6	55.5	61.1	63.5	72.5	61.5	57.2	65.6
20	58.3	68.2	61	57.5	60.3	61.6	68.4	72.7	80.5	66.9	60	67
21	60.6	70.1	63.9	60.8	66.3	68.8	75.3	78.4	83.9	69.6	62.5	67.6
22	62.8	72	66.3	63.9	70.3	72.8	78.3	81.9	85.3	71.9	64.4	68.3
23	64.5	73.7	68.2	66.4	73.1	75	80.7	83.8	86.4	73.7	65.9	68.7
24	66.1	75.1	70.3	68.3	75.4	77	82.3	85.2	87.6	75.6	67.6	69.1

Table B-27 – Average Monthly Temperatures by Hour of the Day for Jefferson County in Fahrenheit (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	25.6	28.3	38.5	47.4	55	68.3	70.1	67	60.2	48.6	37.5	24.2
2	24.7	26.8	36.3	45.5	53.8	67.3	68.8	66.1	60.4	47.7	37.3	24.2
3	23.7	25.7	35.2	44.3	52.8	66.3	68.1	65.3	59.5	46.9	36.4	23.2
4	22.5	24.8	34.2	43.3	51.8	65.2	67.5	64.6	58.9	46.3	35.8	22.8
5	22	24.2	33.3	42.6	50.9	64.5	66.8	63.9	58.2	45.4	35	22.3
6	21.2	23.5	32.3	42.3	50.5	63.8	66.2	63.4	57.9	44.8	34.3	21.8
7	20.8	23.1	31.8	42.3	52.1	66	67.6	63.9	57.6	44.3	33.7	22.1
8	20.8	22.9	32	44.9	55.7	69.6	70.8	67.6	59.9	45.6	33.5	21.6
9	22	24.2	35.7	48.4	58.9	73	74.5	71.6	63.7	50.7	36.6	23.2
10	26.2	27	39.5	51.7	62.4	76.3	77.6	75.6	67.6	55.8	41	27
11	30.7	30	43.6	54.7	65.5	78.9	80.3	78.7	71.3	60.2	45	31
12	35	33.2	47.1	57.1	67.7	81.1	82.5	80.8	74.2	63.7	48.6	35.2
13	38.3	35.7	50.1	59.7	69.3	82.8	84.3	82.5	76.4	65.8	51.1	38.8
14	41.2	37.9	52.3	61.6	70.4	83.9	85.6	83.7	77.7	67.2	53.2	41.1
15	42.9	39.2	53.7	62.9	71.7	84.6	86.6	84.4	78.5	68.1	54.3	42.8
16	43.3	40	54.5	63.8	72.6	84.9	86.9	84.4	78.6	68.1	54.3	43
17	42.1	39.8	54.3	63.5	72.6	84.6	86.5	84.2	77.8	67.1	52.9	41.1
18	38.5	38.3	53	62.6	71.6	83.6	85.4	82.7	75.6	63.9	49.1	36.9
19	34.4	35.7	50	60.1	69.7	81.8	83.4	79.9	71	58.7	45.7	33.8
20	32	33.6	46.8	56.8	65.8	78.6	79.9	75.6	66.7	55.6	43.7	31.5
21	30.3	32.1	44.6	54.1	62	74.4	76.1	72.3	64.7	53.7	41.9	29.8
22	29.1	31.2	42.7	52.2	59.7	72.2	74.1	70.4	63.3	52.3	40.7	27.9
23	28	29.9	41.4	50.3	57.6	70.7	72.6	69	62.1	50.9	39.5	26.8
24	27	29.1	39.7	48.9	56.2	69.4	71.3	68.1	61.1	49.7	38.4	25.1

Table B-28 – Average Monthly Percent Relative Humidity by Hour of the Day for Jefferson County (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	67.9	75.6	72.4	70.8	76.6	76.7	83	85.5	87.6	77.2	68.8	69.6
2	69	77.1	73	73.1	76.8	78.3	83.8	86.6	87.6	78.3	70.2	71.1
3	70.1	78	74.1	74.4	77.6	79.9	84.6	86.9	88.5	80.1	71.3	72.5
4	71.2	78.2	75.2	75.5	78.7	81.2	85.2	87.8	88.8	80.7	72.1	73.1
5	71.8	78.2	76.1	76.1	79.5	82.3	85.8	88.4	89.4	81.9	73.2	74.4
6	72.3	78.8	77.6	76.9	80.1	83.2	86.3	88.7	89.4	82.8	74.3	75
7	72.6	78.8	78.2	77.3	79.3	81.3	85.2	88.4	89.4	83.4	75.2	75.3
8	72.3	78.4	78.5	73.9	75	76	80.5	84	88.2	83.2	75.5	75.6
9	71.1	77.2	75.4	69	70.7	70.4	73.8	76.7	83.2	77.1	73.4	74.8
10	67.1	74.2	70.2	64.4	65	64.8	68.5	69.4	76.1	67.5	67.5	71.7
11	62.2	70.5	64.4	60.9	60.3	60.1	63.7	63.8	69.5	58.9	61.3	68
12	57.2	67.1	59.9	58.5	57.6	56.1	60	59.5	63.9	52.9	56.2	64.6
13	53.7	64.7	56.4	55.6	56.1	53	57.4	56.9	60	49.3	52.6	62
14	50.9	62.1	54.1	53.4	54.8	51.8	55	55.1	57.9	46.8	49.5	59.8
15	48.8	60.8	53	51.6	53.4	50.2	53.7	54.1	56.4	45.5	47.7	58.3
16	47.7	59.9	52.5	50.1	52.4	49.5	53.5	54.1	56	45.4	47	57.9
17	48.1	60.1	52.7	49.7	52	49.5	53.9	54.8	57.5	46.4	48.3	59
18	51.3	61.6	54.4	50.7	52.1	50.5	55.6	57.6	62.3	51.7	52.9	62.7
19	55.6	65.2	58.2	54	54.5	53.5	59.7	63.5	71.7	61	57.3	65.3
20	58.2	68.3	62.5	58.4	60.3	59.2	67.1	71.6	79.3	66.7	59.9	66.6
21	60.5	70.2	65.3	61.8	66.2	66.5	73.7	77.6	82.9	69.6	62.9	67.3
22	62.5	71.9	67.5	64.5	70	70.6	77.2	81	84.6	71.8	64.5	68.2
23	64.2	73.6	69.5	67.3	73.2	72.7	79.5	83.2	85.8	73.7	66.3	68.4
24	65.8	74.7	71.3	68.7	75.3	74.9	81.1	84.3	86.7	75.8	67.8	69.1

Table B-29 – Average Monthly Temperatures by Hour of the Day for St. Charles County in Fahrenheit (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	24.3	26.9	37.9	47.5	54.9	68.8	70.2	67.6	60.6	49.2	37.6	23.3
2	23.3	25.3	36.1	45.7	53.7	67.8	69	66.8	60.7	48.1	37.5	23.5
3	22.2	24.1	34.9	44.4	52.6	66.7	68.3	65.9	59.9	47.6	36.6	22.8
4	21.2	23.2	33.8	43.5	51.5	65.7	67.9	65.1	59.2	46.8	35.9	22
5	20.7	22.9	32.8	42.7	50.8	64.8	67.2	64.5	58.6	46	35	21.5
6	20.3	22.4	31.7	42.4	50.2	64.3	66.7	63.9	58.1	45.4	34.2	21.3
7	20.1	21.8	31.2	42.4	51.9	66.4	68	64.5	58	44.8	33.8	21
8	20.1	21.5	31.5	45	55.3	69.8	71	68	60.1	46.1	33.5	20.5
9	21.4	23.1	35.2	48.4	58.2	73	74.4	71.9	63.7	50.8	36.5	22.3
10	25.8	25.6	38.9	51.4	61.8	75.9	77.5	75.7	67.6	55.4	40.5	26
11	30.3	28.6	42.7	54.3	64.7	78.4	79.9	78.7	71.3	59.7	44.2	30.3
12	34.4	31.7	46.2	56.7	66.7	80.8	82.2	80.7	74.1	63.1	47.9	34.8
13	38	34.1	48.9	59.3	68	82.3	84.1	82.2	76.2	65	50.5	38.3
14	40.7	36.2	51	61.1	69.4	83.3	85.4	83.5	77.6	66.4	52.6	40.3
15	42	37.6	52.4	62.5	70.8	84	86.4	84.1	78.3	67.3	53.8	41.8
16	42	38.1	52.9	63.4	71.7	84.4	86.5	84.3	78.4	67.4	53.8	42.1
17	41.1	37.8	52.7	63.3	71.8	84.3	86	84	77.8	66.3	52.5	40.6
18	37.5	36.4	51.6	62.4	71	83.3	85	82.7	75.7	63.3	48.9	36.3
19	33.3	33.6	48.8	60.1	69.1	81.8	83	79.8	71	58.4	45.8	33.3
20	30.9	31.9	45.4	56.5	65.3	78.6	79.7	75.8	66.8	55.4	43.9	31
21	29	30.5	43.5	54	61.5	74.6	76	72.5	65	53.9	42.5	29.3
22	27.8	29.5	41.9	52.3	59.1	72.5	74	70.7	63.4	52.6	41.4	27.3
23	26.5	28.2	40.8	50.5	57.4	71.1	72.7	69.4	62.4	51.4	40	25.8
24	25.4	27.7	39	49.1	56	69.8	71.3	68.5	61.2	50.3	38.8	24.3

Table B-30 – Average Monthly Percent Relative Humidity by Hour of the Day for St. Charles County (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	67.5	75.8	71.7	70.5	76.6	77.3	83.3	85.5	87.9	76.1	68.8	69.8
2	68.2	77	72.1	72.8	76.5	78.9	84.1	86.4	88.2	77.8	70.2	71.3
3	69.6	77.5	73.5	74.4	77.9	80.5	84.9	86.9	88.8	78.9	71.6	72.5
4	70.7	78.1	74.9	75.3	79.3	82.1	85.2	88.1	89.4	79.5	72.4	73.4
5	71.6	78.1	76.4	75.8	79.8	82.9	86.4	88.4	90.1	81	73.8	74.9
6	71.9	78	77.5	76.3	81	84.1	86.7	89	90.4	81.9	75.3	75.6
7	71.6	78.7	78.2	77	79.9	81.9	85.2	88.1	90	83.1	76.2	76.5
8	71.6	78.3	78.2	73	75.5	76.3	80.2	84	88.8	82.6	76.4	76.2
9	70.5	76.7	74.7	67.9	71.4	70.6	73.8	76.5	83.8	76.8	73.9	75
10	66.2	73.8	69.8	63.9	64.7	65.5	68.2	69	76.3	67.9	68.3	72.2
11	61.3	70.1	63.8	60.2	59.8	60.5	63.5	62.9	69.2	59.8	62.4	68.5
12	56.4	66.7	58.8	57.5	57	55.9	59.5	58.5	63.9	53.4	56.9	65.4
13	52.5	64	55.1	54.7	55.9	53.1	56.6	55.9	59.8	49.9	53.2	62.7
14	49.9	61.3	53	52.7	54.3	51.7	54.4	54	57.3	47.6	49.8	61.2
15	48.1	59.5	51.6	50.9	52.7	50.1	53.1	52.9	56	46.3	47.8	59.6
16	47.1	58.9	51.4	49.5	51.7	49.2	52.9	53	55.6	46	47.1	59.2
17	47.3	59.5	51.8	49.1	50.8	49.2	53.8	53.9	57.1	47	48.6	60.2
18	50.9	61.1	53.5	50.3	50.7	50.3	55.5	56.4	61.6	52.2	53.3	64
19	55.7	65.2	57.5	53.3	53.1	53.2	60	62.4	71.9	61	57.6	66.6
20	58.6	68.1	62.3	58.2	59	59.3	66.8	71.2	80.5	66.9	60.4	67.7
21	61.1	70.6	64.9	61.5	65.4	66.9	74	77.6	83.5	69.3	62.2	67.8
22	62.6	72.3	67.1	63.7	70.2	71.1	77.4	81.3	85.6	71.1	63.9	68.1
23	64	73.7	68.6	66.6	72.9	73.5	79.2	83.3	86.1	72.9	65.5	68.5
24	65.6	74.9	70.7	68.2	75	76	81.1	84.7	87.6	74.7	67.3	69.3

Table B-31 – Average Monthly Temperatures by Hour of the Day for St. Louis County in Fahrenheit (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	25.5	28.1	39	48.2	56.2	70.2	71.8	68.8	62.4	50.7	38.8	24.4
2	24.5	26.6	37.3	46.2	55	69.1	70.6	68.1	62.5	49.8	38.6	24.6
3	23.6	25.2	36.1	45.1	53.8	68	69.9	67.2	61.6	49.1	37.8	23.9
4	22.7	24.5	35.1	44.3	52.8	67	69.6	66.5	60.9	48.4	37	23.2
5	21.9	23.9	34.2	43.6	52.1	66.1	68.9	65.9	60.4	47.6	36.3	22.5
6	21.4	23.4	33.1	43.3	51.6	65.6	68.4	65.3	59.9	47.1	35.6	22.5
7	21.2	23.1	32.6	43.3	53.2	67.7	69.7	65.8	59.8	46.6	35	22.5
8	21.2	22.7	32.9	45.7	56.5	70.9	72.5	69.4	61.9	47.9	34.9	22
9	22.5	24.1	36.4	48.9	59.4	73.9	75.7	72.8	65.2	52.2	37.8	23.9
10	26.6	26.7	39.8	51.8	62.5	76.8	78.5	76.6	68.7	56.7	41.5	27.2
11	30.8	29.5	43.3	54.6	65.2	79.3	81	79.5	72.2	60.7	45.1	31.1
12	34.9	32.5	46.7	56.8	67.1	81.6	83.1	81.4	74.8	63.9	48.4	35.1
13	38.2	35	49.4	59.3	68.4	83.1	84.8	83	76.8	65.8	50.9	38.7
14	41	37.1	51.3	61	69.4	84	86.2	84.1	78.3	67.2	52.8	40.8
15	42.5	38.5	52.7	62.4	70.8	84.8	87.2	84.8	79	67.9	54	42
16	42.5	39	53	63.2	71.6	85	87.3	84.9	79	68.1	54.1	42.5
17	41.6	38.6	53	63.1	71.9	84.9	86.8	84.6	78.4	67	52.8	40.8
18	38.1	37.2	51.7	62.4	70.9	84	85.9	83.2	76.3	64.2	49.5	37
19	34.2	34.6	49.1	60.1	69.3	82.5	83.9	80.5	72.3	59.9	46.6	34.4
20	31.8	32.9	46.3	56.8	65.6	79.5	80.7	76.8	68.5	57.1	44.8	32.3
21	30.1	31.6	44.4	54.4	62.5	76	77.4	73.9	66.6	55.5	43.4	30.6
22	29.2	30.8	42.6	52.8	60.2	73.9	75.8	72.1	65.2	54.1	42.2	28.4
23	27.9	29.5	41.7	51	58.4	72.4	74.4	70.8	64.1	52.9	41.1	27
24	26.8	28.8	40	49.6	57.2	71.2	73	69.8	63.1	51.7	39.9	25.3

Table B-32 – Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis County (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	67.3	75.9	71.8	70	75.9	75.8	82.3	85	87.4	75.9	68.9	70.2
2	68.1	77.1	72.2	72.6	76	78.1	83.3	85.8	87.7	77.6	70.3	71.8
3	69.5	78.3	73.3	74.2	77.4	80	84.2	86.7	88.6	79.1	71.7	72.9
4	70.3	78.5	74.4	74.7	78.5	81.3	84.7	87	89.5	79.6	72.5	73.8
5	71.5	78.5	75.9	75.6	79.3	82.4	85.9	87.9	89.8	81.1	73.6	75.7
6	72	78.8	77.7	76.1	80.5	83.3	86.2	88.4	90.1	82	75.4	76.4
7	71.7	79.1	78	76.4	79.4	81.1	84.7	88.2	90.1	82.9	76.3	76.7
8	71.4	78.4	78.6	72.5	75	75.6	79.8	83.2	88.6	82.4	76.6	76.6
9	70.3	77.2	74.8	67.9	71	70	73.4	76.3	83.3	76.7	74.1	75.2
10	66	74.2	69.9	63.7	65	64.7	67.9	68.6	76.2	67.6	68.2	72.7
11	61.4	70.5	64.6	60.2	60	60	63.2	62.8	69.1	59.4	62.3	68.9
12	56.7	67.1	59.6	57.8	57.5	55.2	59.2	58.4	63.5	53.1	57.5	66
13	52.8	64.6	56	54.9	56.4	52.3	56.3	55.8	59.6	49.5	53.4	63.2
14	49.8	62	53.9	53.1	55.1	51.3	54.2	53.9	57	47.2	50.4	61.2
15	47.8	59.9	52.4	51.3	53.5	49.5	52.5	52.9	55.5	45.9	48.4	59.9
16	46.8	59	52.7	49.9	52.7	48.6	52.5	52.9	55.3	45.5	47.5	59.2
17	47.2	59.7	52.9	49.6	51.4	48.6	53.2	53.9	56.8	46.6	48.8	60.5
18	50.6	61.2	54.8	50.5	51.4	49.7	54.7	56.4	61.5	51.4	53.2	64.1
19	55.1	65.1	58.5	54	53.5	52.4	58.9	62	70.6	59.1	57.2	66.5
20	58.2	68.2	62.5	58.2	59	57.9	65.8	69.8	78.6	65.1	60	67.9
21	60.2	70.4	65.3	61.4	64.5	64.3	72.3	76.1	82.2	68.2	62.1	68.3
22	61.9	72.1	67.7	63.6	69.2	69	75.5	80	84.2	70.4	64	68.6
23	63.7	73.8	69.3	66.6	72.5	71.6	77.7	82.2	85.3	72.5	65.7	69
24	65.2	75	71.1	68.3	74.6	74.3	80.1	83.9	86.5	74.6	67.4	69.7

Table B-33 – Average Monthly Temperatures by Hour of the Day for St. Louis City in Fahrenheit (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	25.9	28.9	40.2	48.1	56	70.1	72.4	69.2	62.7	51.5	39.4	25.9
2	25	27.5	38.4	46.2	54.9	69.1	71.2	68.5	62.9	50.7	39.2	25.9
3	24	26.3	37.4	45.3	53.8	68	70.6	67.7	62.2	49.9	38.3	25
4	22.9	25.4	36.3	44.3	52.9	67	70.1	67	61.5	49.4	37.8	24.6
5	22.4	24.9	35.6	43.7	52.2	66.2	69.6	66.3	61	48.6	37.1	23.9
6	21.7	24.4	34.5	43.4	51.8	65.6	69.1	65.9	60.6	47.9	36.4	23.9
7	21.5	23.8	33.9	43.7	53.6	67.9	70.6	66.5	60.5	47.5	35.8	23.9
8	21.3	23.5	34.2	46	57	71.2	73.5	70.2	62.6	48.8	35.8	23.2
9	22.8	24.9	37.7	49.2	59.8	74.4	76.5	73.7	66	53.3	38.7	25.2
10	27	27.5	41	52.1	62.9	77.4	79.2	77.5	69.5	57.8	42.5	28.4
11	31	30.3	44.3	54.8	65.6	79.9	81.6	80.3	72.9	61.8	45.9	32
12	35	33	47.4	57	67.7	82.1	83.6	82.3	75.4	64.8	49.3	35.9
13	38.1	35.5	50.1	59.3	68.7	83.8	85.2	83.7	77.3	66.8	51.7	39.3
14	41.1	37.4	51.8	61	69.7	84.5	86.7	84.9	78.7	68.1	53.5	41.5
15	42.7	38.8	53.3	62.4	71.1	85.3	87.6	85.5	79.4	68.8	54.6	42.9
16	42.5	39.3	53.6	63.2	71.7	85.4	87.8	85.5	79.5	68.8	54.6	42.9
17	41.6	39.1	53.4	62.9	72	85.4	87.5	85.3	78.7	67.9	53.3	41.5
18	38.1	37.7	52.2	62.1	71.2	84.4	86.4	83.8	76.8	65.1	50	37.7
19	34.3	35.1	49.5	60.1	69.4	82.9	84.5	81.2	72.5	60.7	47.2	35
20	32.1	33.4	47	56.7	65.8	79.8	81.4	77.2	68.5	57.8	45.2	33.4
21	30.4	32.2	45	54.5	62.5	76	77.9	74.3	66.8	56.2	43.8	31.6
22	29.5	31.3	43.5	52.8	60.2	73.6	76.2	72.3	65.5	54.9	42.7	29.8
23	28.3	30.1	42.6	51	58.3	72.2	74.8	71.2	64.3	53.6	41.6	28.4
24	27.2	29.6	41.1	49.5	57.1	71	73.6	70.3	63.4	52.4	40.6	26.8

Table B-34 – Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis City (MOVES Inputs for 2008 and 2022 On-Road Mobile Source Emissions)

HourID	MonthID											
	1	2	3	4	5	6	7	8	9	10	11	12
1	68	76.6	72.6	71.4	77	76.6	83.4	85.9	87.7	76.9	69.3	69.8
2	69	78.1	73.2	73.8	76.9	78.7	84.2	86.5	87.7	78	71	71.3
3	69.8	79	74	74.8	78	80.8	85.4	87	88	79.7	72.1	72.7
4	70.9	79	75.2	75.9	79.1	81.9	85.6	87.6	88.9	80.3	72.3	73.6
5	72.1	78.9	76.3	76.5	79.9	82.7	86.5	88.5	89.5	81.5	73.4	75.2
6	72.4	79.2	78.4	77.4	80.5	83.9	86.8	88.5	89.8	82.7	75.2	75.8
7	72.7	79.5	79	77.1	79.4	81.7	85.1	88.2	89.5	83.3	76.3	76.2
8	72.3	79.1	79.4	73.4	75.1	75.9	80.1	83.3	88.3	83.1	76.3	76.4
9	70.9	77.9	75.6	68.3	71	70	74	76.4	83	77	73.6	75
10	66.7	74.9	70.6	64.2	64.8	64.5	68.4	68.9	75.7	67.4	68	72.5
11	61.9	71.5	65.5	60.7	60.1	59.6	63.7	63.1	68.9	59.1	62.4	69
12	57.4	68.3	60.7	58.5	57.1	55.3	59.7	58.7	63.6	52.8	57.2	66.1
13	53.7	65.5	57	55.7	56.4	52	57.1	56.3	59.7	48.9	53.8	63.1
14	50.6	63.3	55.1	53.7	55.1	51.2	54.6	54.2	57	46.4	50.7	61.1
15	48.4	61.4	53.4	51.7	53.7	49.5	53.1	53.5	55.5	45.5	48.5	59.5
16	47.8	60.3	53.4	50.4	52.9	48.9	52.7	53.5	55.1	45.3	47.8	59.1
17	48	60.7	53.8	50.2	51.8	48.9	53.4	54.2	56.8	46.4	48.9	60.1
18	51.2	62.1	55.8	51.4	51.4	49.9	55.2	57.1	61.6	51.3	53.3	63.6
19	55.9	66	59.7	54.8	53.9	52.4	59.2	62.6	71.1	59.4	57.3	66.2
20	58.7	69.2	63.6	59.6	59.7	58.2	66.3	71.1	79.7	65.7	60.6	67.5
21	60.8	71.1	66.4	62.1	65.5	65	73.6	77.5	83.4	68.8	62.6	68.4
22	62.5	73.1	68.7	64.8	70	70.2	76.8	81.4	84.8	71	64.5	68.7
23	64.3	74.8	70.2	67.7	73.6	72.8	79.1	83.1	86.2	73.1	66.3	68.9
24	66.1	75.7	71.8	69.4	75.7	75.3	81	84.8	87.1	75.5	67.8	69.6

Appendix B-5 2008 Off-Road Mobile Source Emissions

At the request of the Department, EPA Region 7 calculated off-road mobile emissions for the Missouri counties in the St. Louis PM_{2.5} nonattainment area. Using the fuel and meteorological data from the NCD, EPA ran the non-road model and created annual emissions for 2008 and 2022. The modeling protocol submitted by EPA Region 7 to the Department, for the development of the 2008 and 2022 off-road mobile emissions can be found in Appendix B-6 of this document. The data generated by EPA for the 2008 off-road mobile source emissions for the Missouri counties in the St. Louis PM_{2.5} nonattainment area are summarized in B-35. The full 2008 PM_{2.5} annual emissions inventory for the Missouri side of the 1997 St. Louis PM_{2.5} nonattainment area, which includes the 2008 off-road emissions inventory for the area, was placed on a 30 day public notice beginning July 13, 2011, and is included as Appendix E to this redesignation request and maintenance plan.

As stated in Appendix B-1, EPA generates emissions data for marine and rail sources using a method similar to the way emissions are generated for non-point sources. Therefore, 2008 NEI data for marine and rail emissions, which are listed as nonpoint emissions in the NEI data, need to be added to the off-road mobile source category. The 2008 emissions for rail and marine sources are summarized by county in Table B-36. The total off-road mobile source emissions by county are listed in Table B-37.

Table B-35
EPA Generated 2008 Annual Off-Road Mobile Source Emissions by County in the
St. Louis PM_{2.5} Nonattainment Area (Excludes Marine and Rail Emissions)
(Missouri Counties Only)

County Name	NO_x	PM₁₀-Pri	PM_{2.5}-Pri	SO₂	VOC
Franklin County	665.82	67.91	64.73	11.77	945.16
Jefferson County	726.68	77.19	73.60	14.61	929.83
St. Charles County	1,893.56	179.78	171.98	37.05	1,948.52
St. Louis County	5,354.35	558.11	530.64	99.31	6,470.16
St. Louis City	794.90	55.98	53.25	9.74	1,066.00
Totals	9,435.31	938.97	894.20	172.48	11,359.67

Table B-36
2008 Annual Marine and Rail Emissions by County in the St. Louis PM_{2.5} Nonattainment
Area
(Missouri Counties Only)

County Name	NO_x	PM₁₀-Pri	PM_{2.5}-Pri	SO₂	VOC
Franklin County	1,185.21	40.37	37.15	12.39	59.94
Jefferson County	376.05	12.92	12.17	11.56	14.31
St. Charles County	1,051.65	37.58	35.65	40.52	37.13
St. Louis County	1,149.43	39.56	36.68	19.77	53.86
St. Louis City	8,258.16	293.25	283.73	467.38	191.26
Totals	12,020.50	423.69	405.37	551.61	356.50

Table B-37
Total 2008 Annual Off-Road Mobile Source Emissions by County in the St. Louis PM_{2.5}
Nonattainment Area
(Missouri Counties Only)

County Name	NO_x	PM₁₀-Pri	PM_{2.5}-Pri	SO₂	VOC
Franklin County	1,851.03	108.28	101.88	24.16	1,005.10
Jefferson County	1,102.73	90.11	85.77	26.17	944.14
St. Charles County	2,945.21	217.36	207.63	77.57	1,985.65
St. Louis County	6,503.78	597.67	567.32	119.08	6,524.02
St. Louis City	9,053.06	349.23	336.98	477.12	1,257.26
Totals	21,455.81	1,362.66	1,299.57	724.09	11,716.17



Appendix B-6

EPA Region 7 Off-Road Emissions Modeling Protocol for 2008, 2017, and 2022 for the St. Louis, Missouri-Five County Nonattainment Area

**Ozone and PM2.5 Maintenance Plan Work Share
St. Louis, Missouri-Five County Area
Nonroad modeling for inventory development**

For this modeling exercise, the EPA Region 7 utilized the NONROAD2008a model to calculate an ozone and PM2.5 nonroad inventory in five counties in the St. Louis nonattainment area for the 1997 PM2.5 annual and 1997 Ozone NAAQS. The NONROAD2008a model provides the emissions for all nonroad source categories except aircraft, commercial marine vessel, and railroad locomotive.

In running the NONROAD model, the user must specify a modeling scenario by the inventory year, geographic area (nation, state, county), period (annual, seasonal, monthly, daily), and the equipment categories. For all other required variables, the NONROAD model provides default input values. For the following modeling exercises, fuel parameters (Reid Vapor Pressure (RVP), oxygen weight, sulfur content, ethanol volume and market percentage) and temperatures for each geographical area were provided by MDNR in lieu of the modeling default settings for more accurate results (see attachment).

Ozone Precursor Emissions

Ozone Methodology/Input Data

Nonroad mobile source emissions for the years of 2008 and 2022 are calculated using the EPA approved model, NONROAD2008a, and included Franklin County, Jefferson County, St. Charles County, St. Louis County and St. Louis City in St. Louis, Missouri.

For modeling ozone precursor pollutants, temperatures and fuel characteristics representative of each county during an ozone summer weekday, were entered into NONROAD2a and modeled to calculate an ozone season weekday emissions for nonroad sources. Minimum, maximum, and average temperatures for a typical summer season were provided by MDNR (see attachment). Modeling input parameters are as follows:

Table B-38 NONROAD Model Temperature & Fuel Characteristic Input Values by County

County	Oxygen Weight %	RVP psi	Gasoline Sulfur %	Diesel Sulfur	Marine Diesel Sulfur %	CNG / LPG Sulfur %	Temperatures		
							Min.	Max.	Avg.
Franklin	0.35	7	0.0049	0.0355	0.0402	0.003	61.8	90	75.96
Jefferson	0.35	7	0.0049	0.0355	0.0402	0.003	61	88.6	75.16
St. Charles	0.35	7	0.0049	0.0355	0.0402	0.003	62.2	89.2	76.15
St. Louis	0.35	7	0.0049	0.0355	0.0402	0.003	64.1	89.5	77.1
St. Louis City	0.35	7	0.0049	0.0355	0.0402	0.003	65.1	89.8	77.72

Direct PM2.5 / PM2.5 Precursor Emissions

Methodology/Input Data

Nonroad mobile source emissions for the years of 2008 and 2022 were calculated using the EPA approved model, NONROAD2008a, and included Franklin County, Jefferson County, St. Charles County, St. Louis County and St. Louis City in St. Louis, Missouri.

For modeling PM2.5 and PM2.5 precursor pollutants, temperatures and fuel characteristics representative of each county for each of the four seasons (winter, spring, summer, and fall) were entered into the NONROAD2008a model as input parameters. The highest temperature and lowest temperature from each three month period (December-February, March-May, June-August, and September-November) were averaged to create a seasonal average temperature. Those seasonal average temperatures, seasonal minimum and seasonal maximum temperatures were then utilized in the model, including the fuel parameters, to calculate the total emissions for each county and season. Summing the emissions of all four seasons for each county gave the total annual emissions. The temperatures and fuel characteristics representative of each county were provided by MDNR. Modeling input parameters are as follows:

Table B-39 NONROAD Model Temperature & Fuel Characteristic Input Values by County & Season

County	Season	Oxygen Weight %	RVP psi	Gasoline Sulfur %	Diesel Sulfur	Marine Diesel Sulfur %	CNG / LPG Sulfur %	Temperatures		
								Min.	Max.	Avg.
Franklin	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	19.7	47	33.4
Franklin	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	33.5	76.9	55.2
Franklin	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	61.8	90	75.9
Franklin	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	34.3	80.9	57.6
Jefferson	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	18.6	45.6	32.1
Jefferson	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	32.4	75.8	54.1
Jefferson	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	61	88.6	74.8
Jefferson	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	33.6	79.8	56.7
St. Charles	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	18.7	43.9	31.3
St. Charles	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	32.3	75.8	54.1
St. Charles	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	62.2	89.2	75.7
St. Charles	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	34.8	80.3	57.6
St. Louis	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	19.8	44.2	32
St. Louis	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	34.5	76.1	55.3
St. Louis	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	64.1	89.5	76.8
St. Louis	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	35.5	80.2	57.9
St. Louis City	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	20.7	45.5	32.6
St. Louis City	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	35.7	76.4	56
St. Louis City	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	65.1	89.8	77.5
St. Louis City	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	36.6	80.4	58.5

QA/QC

Quality control and quality assurance were conducted throughout this nonroad modeling process. Data collected from various data sources were verified and correctly entered or transcribed into the model. In some instances, input values, i.e., temperatures and fuel values were double and/or triple checked for accuracy to insure they corresponded to the data supplied by MDNR. In addition, a spot-checking of the modeling results, including rerunning the model for those results in question, was performed to insure reliability.

County	NO _x		VOC		CO	
	2008	2022	2008	2022	2008	2022
Franklin	2.93	1.81	3.59	1.55	23.56	19.76
Jefferson	2.89	1.27	3.64	2.06	38.72	34.77
St. Charles	7.61	3.33	7.49	3.95	85.2	73.93
St. Louis CO	20.55	9.08	27.22	17.85	424.3	388.64
St. Louis City	2.86	1.19	3.97	2.2	65.9	56.28
Total	36.84	16.68	45.91	27.61	637.7	573.38

Table B-41 Direct PM_{2.5} and PM_{2.5} Precursor Pollutant County Totals (Tons per Year)

County	PM _{2.5}				PM ₁₀				SO ₂				NO _x				VOC			
	2008	2014	2017	2022	2008	2014	2017	2022	2008	2014	2017	2022	2008	2014	2017	2022	2008	2014	2017	2022
Franklin	64.73	53.52	46.39	39.04	67.91	56.7	48.65	34.72	11.77	12.38	12.28	10.75	665.82	455.98	368.45	233.1	945.2	716	593.2	386.3
Jefferson	73.6	64.76	58.76	52.26	77.19	68.02	61.77	55.05	14.61	15.3	15.14	15.33	726.68	521.13	420.37	319.4	929.8	689	600.5	544.7
St. Charles	172	149.19	135.73	120.74	179.78	156.1	142.2	126.75	37.05	38.81	38.44	39.01	1893.56	1352.36	1093.4	828	1949	1326	1189	1032
St. Louis	530.6	497.27	470.54	444.84	558.11	524.39	497.1	471.26	99.31	105.2	104.65	106.99	5354.35	3690.4	2981.5	2323	6470	4772	4452	4457
St. Louis City	53.25	49.82	47.14	46.35	55.98	52.48	49.76	49.02	9.74	10.5	10.49	10.93	794.9	473.11	390.58	341.3	1066	731	632	628.6

Modeling File Naming Convention

Ozone: pollutant-county-year

PM2.5: pollutant-county-year-season

OZONE Modeling Files Example: 03Frnk08 = (Ozone Franklin County 2008)

O3 = Ozone

08 = 2008

22 = 2022

Frnk = Franklin County

Jeff = Jefferson County

StCh = St. Charles County

StLC = St. Louis County

StCi = St. Louis City

PM2.5 Modeling Files Example: PMFr22wi = (PM2.5 Franklin County 2022 winter)

PM = PM2.5

08 = 2008

wi = winter

sp = spring

su = summer

au = autumn

Fr = Franklin County

Je = Jefferson County

Ch = St. Charles County

SL = St. Louis County

SC = St. Louis City