Appendix B-3

CenSARA Fuel Combustion Tool

CenSARA Area Combustion Emissions Inventory Enhancement Project

Final Report

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Prepared for:

Theresa Pella
Central States Air Resource Agencies (CenSARA)
P.O. Box 617
Oklahoma City, OK 73101

Prepared by:

Darcy Wilson, Marty Wolf, Stacie Enoch, and Bebhinn Do
Eastern Research Group, Inc.
1600 Perimeter Park Drive, Suite 200
Morrisville, NC 27560

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***Disclaimer**: The data in this final report and accompanying tool should be considered preliminary and under review by the states. For final 2011 NEI data, please contact the individual state.*

1.0 INTRODUCTION

State agencies must prepare and submit emissions inventories to the U.S. Environmental Protection Agency (EPA) as part of the national emissions inventory (NEI). Industrial, commercial/institutional, and residential fuel combustion are important contributors to area source emissions of criteria pollutants and hazardous air pollutants (HAPs). The goal of this project was to compile base year 2011 industrial, commercial/institutional (ICI), and residential fuel combustion activity data at the county level for each CenSARA state; develop a crosswalk between area and point source Source Classification Codes (SCCs) to facilitate point source adjustments; review and improve the available emission factors and calculation methods as needed; and provide support for point source adjustments.

The geographic coverage of the CenSARA area consists of the states of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas (Figure 1).

The air pollutants addressed in this project include criteria pollutants, HAPs, and a particulate matter (PM) precursor as follows:

- Criteria pollutants – Carbon monoxide (CO), nitrogen oxides (NO_x), directly emitted PM less than 10 micrometers (μm) in aerodynamic diameter and less than 2.5 μm in aerodynamic diameter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOC);
- HAPs – HAPs emitted from fuel combustion for which emissions factors are available, particularly several polycyclic organic matter (POM) species, metals (e.g., mercury, chromium, etc.), and dioxins/furans; and
- PM precursor – ammonia (NH_3).

Where necessary, the HAP metals were speciated to correspond with valid NEI pollutant codes.

This project covers emissions from fuel combustion at stationary area sources within the ICI and residential sectors. Fuel combustion emissions were estimated for the following fuel types:

- Coal,
- Distillate oil,
- Residual oil,
- Natural gas,
- Liquefied petroleum gas (LPG),
- Kerosene, and
- Wood (excluding residential).

Table 1 displays the area source SCCs associated with ICI and residential fuel combustion. There are additional types of materials that are consumed in the industrial sector, however, the additional fossil fuels are not actually combusted (oxidized) but are used as chemical feedstocks, construction materials, lubricants, solvents, or reducing agents. Therefore, there are no industrial sector combustion emissions from these fuel types.

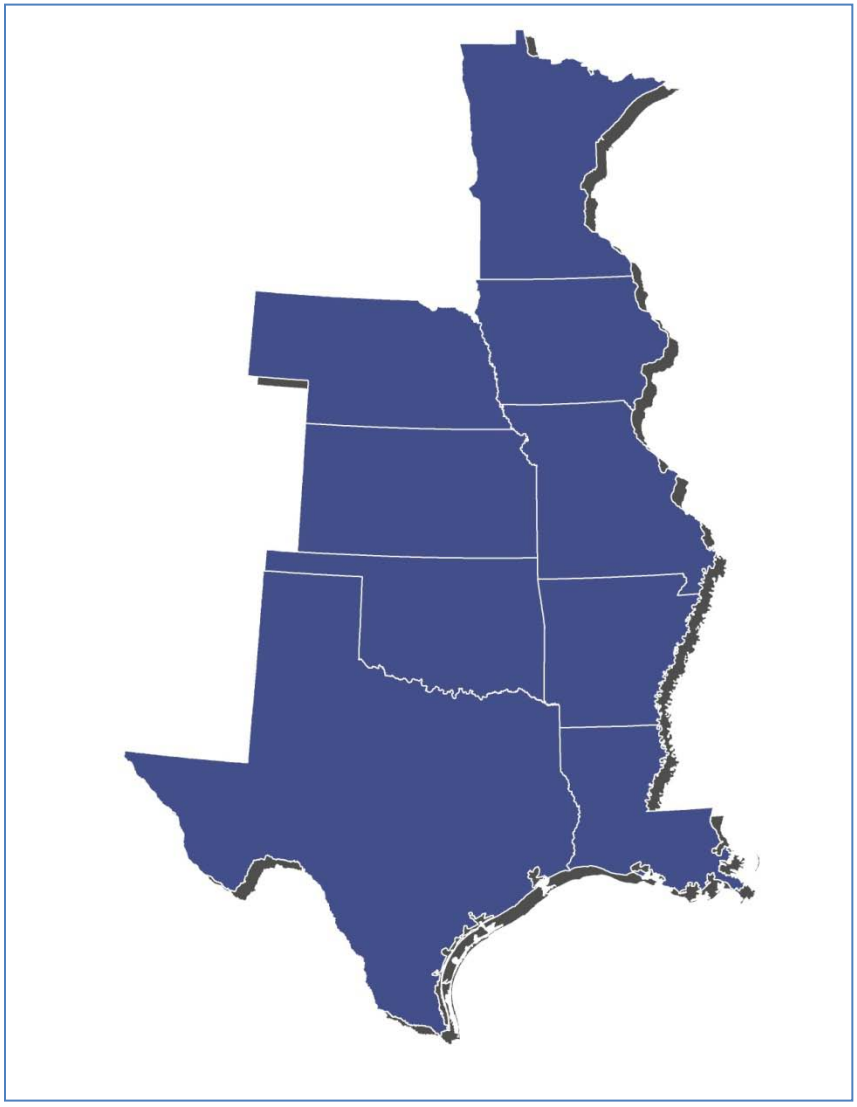

Figure 1. Map of the Nine-State CenSARA Area

Table 1. Area Source Fuel Combustion SCCs

SCC	Description
Industrial Fuel Combustion	
2102001000	Industrial Fuel Combustion; Anthracite Coal; Total: All Boiler Types
2102002000	Industrial Fuel Combustion; Bituminous/Subbituminous Coal; Total: All Boiler Types
2102004000	Industrial Fuel Combustion; Distillate Oil; Total: Boilers and IC Engines
2102004001	Industrial Fuel Combustion; Distillate Oil; Total: Boilers
2102004002	Industrial Fuel Combustion; Distillate Oil; Total: IC Engines
2102005000	Industrial Fuel Combustion; Residual Oil; Total: All Boiler Types
2102006000	Industrial Fuel Combustion; Industrial; Natural Gas; Total: Boilers and IC Engines
2102007000	Industrial Fuel Combustion; Liquid Petroleum Gas; Total: All Boiler Types
2102008000	Industrial Fuel Combustion; Wood; Total: All Boiler Types
2102011000	Industrial Fuel Combustion; Kerosene; Total: All Boiler Types
Commercial/Institutional Fuel Combustion	
2103001000	Commercial/Institutional Fuel Combustion; Anthracite Coal; Total: All Boiler Types
2103002000	Commercial/Institutional Fuel Combustion; Bituminous/Subbituminous Coal; Total: All Boiler Types
2103004000	Commercial/Institutional Fuel Combustion; Distillate Oil; Total: Boilers and IC Engines
2103004001	Commercial/Institutional Fuel Combustion; Distillate Oil; Total: Boilers
2103004002	Commercial/Institutional Fuel Combustion; Distillate Oil; Total: IC Engines
2103005000	Commercial/Institutional Fuel Combustion; Residual Oil; Total: All Boiler Types
2103006000	Commercial/Institutional Fuel Combustion; Natural Gas; Total: Boilers and IC Engines
2103007000	Commercial/Institutional Fuel Combustion; Liquid Petroleum Gas; Total: All Combustor Types
2103008000	Commercial/Institutional Fuel Combustion; Wood; Total: All Boiler Types
2103011000	Commercial/Institutional Fuel Combustion; Kerosene; Total: All Combustor Types
Residential Fuel Combustion	
2104001000	Residential Fuel Combustion; Anthracite Coal; Total: All Combustor Types
2104002000	Residential Fuel Combustion; Bituminous/Subbituminous Coal; Total: All Combustor Types
2104004000	Residential Fuel Combustion; Distillate Oil; Total: All Combustor Types
2104005000	Residential Fuel Combustion; Residual Oil; Total: All Combustor Types
2104006000	Residential Fuel Combustion; Natural Gas; Total: All Combustor Types
2104007000	Residential Fuel Combustion; Liquefied Petroleum Gas (LPG); Total: All Combustor Types
2104011000	Residential Fuel Combustion; Kerosene; Total: All Heater Types

2.0 CROSSWALK BETWEEN AREA AND POINT SOURCE SCCs

To avoid double counting between point and area sources, an accurate SCC crosswalk between area source SCCs and point source SCCs is needed. Double counting can occur when a facility is inventoried as a point source, but its fuel usage is also included as a part of the area source fuel usage estimates. If correctly assigned, point source SCCs specifically identify the combustor type, sector, and fuel type. The crosswalk must accurately map area source SCCs to point source SCCs so that the point source adjustments are made correctly. Tables A-1 and A-2 of

Appendix A present the ICI point and area source SCC crosswalks. The area sources are listed as subheadings in each table. Below each subheading is a list of point sources that map to the area source. There are typically no combustion point sources in the residential sector.

3.0 COMPILATION OF ICI AND RESIDENTIAL ACTIVITY DATA

The starting point for this project was the base year 2010 fuel consumption data available from the Energy Information Administration's State Energy Data System (SEDS) (EIA, 2012a; EIA, 2012b). [Base year 2011 data were not available.] The SEDS provides total state-level energy consumption estimates by state, sector, and fuel type.

The general approach used to calculate emissions for ICI and residential fuel combustion was to first compile state-level fuel consumption estimates, make adjustments to the EIA/SEDS data for mobile source fuel usage and non-combustion fuel usage, make the necessary point source adjustments, allocate the area source estimates to the county-level, and then multiply the fuel consumption estimates by appropriate emission factors.

Table 2 summarizes the area source activity data and units. It should be noted that physical unit SEDS data (i.e., tons, barrels, or cubic feet) were used for coal, residual oil, natural gas, LPG, and kerosene combustion, while Btu SEDS data were used for industrial and commercial and wood combustion.

Table 2. Nonpoint Source ICI and Residential Fuel Combustion Activity Data

Fuel and Combustor Type	Activity
Anthracite Coal; Total: All Boiler Types[a]	Thousand short tons of coal consumed
Bituminous/Subbituminous Coal; Total: All Boiler Types[a]	Thousand short tons of coal consumed
Distillate Oil; Total: Boilers	Thousand barrels of distillate oil consumed
Distillate Oil; Total: IC Engines	Thousand barrels of distillate oil consumed
Residual Oil; Total: All Boiler Types	Thousand barrels of residual oil consumed
Natural Gas; Total: Boilers and IC Engines	Million cubic feet of natural gas consumed
LPG; Total: All Boiler Types	Thousand barrels of LPG consumed
Wood; Total: All Boiler Types	Billion Btu of wood consumed
Kerosene; Total: All Boiler Types	Thousand barrels of kerosene consumed

[a] Residential coal reported in short tons of coal consumed.

3.1 Fuel-Specific Activity Data Adjustments

Coal – For coal combustion, it is necessary to compile data representing a subset of total sector coal consumption. Data representing non-coke plant consumption were compiled from EIA because coal consumed by coke plants is accounted for in the point source inventory. The SEDS data do not provide coal consumption estimates by type of coal (i.e., anthracite versus bituminous/subbituminous). Therefore, state-level ICI coal distribution data for 2010 from the EIA's *Annual Coal Distribution Report 2010* were used to allocate coal consumption between the two types of coal (EIA, 2011). The 2010 ratio of anthracite coal consumption to total coal consumption was used for this allocation procedure.

For the residential sector, 2006 state-level residential coal distribution data from the EIA's *Domestic Distribution of U.S. Coal by Destination State, Consumer, Origin and Method of Transportation* were used to allocate coal consumption between the two types of coal (EIA, 2008). [The 2006 version of this document was used because subsequent versions do not have residential anthracite and bituminous/subbituminous fractions.]

Table 3 presents the 2010 anthracite and bituminous/subbituminous coal ratios for each CenSARA state.

Table 3. Proportion of 2010 ICI and Residential Coal Consumption by Type of Coal

State	% Industrial Bituminous/ Subbituminous[a]	% Commercial/ Institutional Bituminous/ Subbituminous[a]	% Residential Anthracite	% Residential Bituminous/ Subbituminous
Arkansas	100.0	100.0	18.6	81.4
Iowa	N/A [b]	N/A	0.1	99.9
Kansas	N/A	N/A	0.0	0.0
Louisiana	100.0	100.0	0.0	100.0
Minnesota	99.8	100.0	0.3	99.7
Missouri	100.0	100.0	0.0	100.0
Nebraska	100.0	100.0	0.0	100.0
Oklahoma	100.0	100.0	8.3	91.7
Texas	100.0	100.0	18.6	81.4

[a] Anthracite ICI coal use was only reported for Minnesota (0.2%).
[b] N/A = Not applicable.

Distillate Oil and LPG – The SEDS ICI distillate oil and LPG consumption data include consumption estimates for equipment that are typically included in the nonroad sector inventory. In particular, SEDS considers the following nonroad source category activities to be part of the industrial sector: farming, logging, mining, and construction.

In order to avoid double-counting of distillate oil consumption between the nonpoint and nonroad sector emission inventories, the more detailed distillate oil consumption estimates reported in EIA's *Fuel Oil and Kerosene Sales* were combined with assumptions used in the regulatory impact analysis (RIA) for EPA's nonroad diesel emissions rulemaking (EIA, 2012c; EPA, 2003). Table 4 presents the assumptions that were applied to the state-level distillate oil consumption estimates to estimate total stationary source ICI consumption.

In order to avoid double-counting of LPG consumption, ERG used data from 2006 EPA National Mobile Inventory Model (NMIM) for 2006 and calculated the national volume of nonroad LPG consumption from agriculture, logging, mining, and construction source categories. This estimate was then divided into the SEDS total LPG consumption estimate to yield the proportion of total ICI LPG consumption attributable to the nonroad sector in that year (8.72% for industrial sources and 17.72% for commercial/institutional sources). It was assumed that these proportions were

appropriate for the 2011 inventory year. This estimate of the nonroad portion of LPG consumption was subtracted from each state's ICI LPG consumption estimate reported in SEDS.

Table 4. Assumptions Used to Estimate ICI Distillate Fuel Consumption

Sector	Distillate Fuel Type	% of Total Consumption from Stationary Sources
Industrial	No. 1 Distillate	60
	No. 2 Distillate (No. 2 Fuel Oil)	100
	No. 2 Distillate (Low Sulfur Diesel)	15[a]
	No. 2 Distillate (High Sulfur Diesel)	15[a]
	No. 4 Fuel Oil	100
Farm	Distillate Fuel Oil (Diesel)	0
	Distillate Fuel Oil (Other Distillate)	100
Off-Highway (Construction and Other)	Distillate Fuel Oil	5
Oil Company	Distillate Fuel Oil	50
Commercial/Institutional	No. 1 Distillate	80
	No. 2 Distillate (No. 2 Fuel Oil)	100
	No. 2 Distillate (Ultra-Low, Low, and High Sulfur Diesel)	0[b]
	No. 4 Fuel Oil	100

[a] This value differs from the 0% assumption adopted in EPA's nonroad diesel emissions rulemaking because it is known that some diesel fuel is used by stationary sources. A 15% value was selected for use as an approximate mid-point of a potential range of 8 to 24% stationary source use computed from a review of data from the EIA's *Manufacturing Energy Consumption Survey* and *Fuel Oil and Kerosene Sales*.
[b] A very small portion of total commercial/institutional diesel is consumed by point sources.

3.2 Non-Fuel Use Energy Adjustment

Some industrial sector energy is consumed for non-fuel purposes, such as natural gas that is used as a feedstock in chemical manufacturing plants and to make nitrogenous fertilizer, and LPG that is used to create intermediate products that are ultimately made into plastics. In order to estimate the volume of fuel that is associated with industrial combustion, it is necessary to subtract the volume of fuel consumption for non-energy uses from the volume of total fuel consumption.

The identification of feedstock usage was initially based upon the non-fuel use assumptions incorporated into the EIA's GHG emissions inventory for 2005 (EIA, 2007). The following fuels were assumed to be used entirely for non-fuel purposes: asphalt and road oil, feedstocks (naphtha <401 °F), feedstocks (other oils >401 °F), lubricants, miscellaneous petroleum products, pentanes plus, special naphthas, and waxes. In addition, it was also assumed that kerosene and motor gasoline were used entirely as fuel without any non-fuel purposes. The remaining fuels (i.e., coal [non-coke], distillate oil, LPG, natural gas, and residual oil) are used both for fuel and non-fuel purposes. The regional non-fuel fractions for distillate oil, LPG, natural gas, and residual oil were derived from non-fuel (feedstock) and total energy use statistics contained in EIA's *2006 Manufacturing Energy Consumption Survey (MECS)* (EIA, 2009); the 2010 MECS

has been conducted, but detailed data have not yet been released. This approach could not be used for non-coke coal because the 2006 MECS treats coal that is used to produce coke as a feedstock. Because of the limitations of the MECS data for non-coke coal, EIA previously provided a rough estimate of the percentage of non-coking coal that is used for non-fuel purposes (as well as treating "synthetic coal" as a fuel use). The estimate provided by EIA was that 5-10% of non-coke coal is used for non-fuel purposes (Lorenz, 2009); it was assumed that the midpoint of this range (i.e., 7.5%) is a reasonable estimate for the fraction of non-coke plant industrial sector coal consumption that is for non-fuel purposes.

Table 5 presents the regional non-fuel use percentages that were applied to estimate CenSARA states' industrial fuel combustion activity.

Table 5. Industrial Sector Non-Fuel Use Estimates

Fuel	Fraction Non-Fuel Use by Region	
	South	Midwest
Distillate Oil	0.1154	0.2778
LPG	0.9878	0.8538
Natural Gas	0.1056	0.0371
Non-Coke Coal	0.0750	0.0750
Residual Oil	0.2995	0.1778

3.3 Point Source Energy Adjustment

Because the point source inventory also includes ICI combustion categories, it is necessary to subtract point source inventory fuel use from the EIA/SEDS fuel consumption estimates. Appendix A contains the crosswalks between ICI fuel combustion nonpoint SCCs and associated point SCCs that were used in the subtraction procedure. If the point source activity adjustment for any county in within a state resulted in a negative number, the point source adjustment was then performed after summing the point source throughput estimates to the state-level.

4.0 COUNTY ALLOCATION OF STATE ACTIVITY DATA

County-level activity estimates for 2010 were developed by allocating the state-level activity resulting from the adjustments to the EIA data described above. Compiled 2010 estimates of manufacturing and commercial sector employment from the Bureau of Census' *County Business Patterns 2009* were used in this procedure (Census, 2012). Withheld *County Business Patterns* employment data were estimated based upon a technical memorandum previously developed for EPA (Divita, 2008). In addition, 2007 county-level estimates of institutional sector (NAICS code 92) employment were obtained from the 2007 *Census of Governments* (Census, 2009).[1] These were added to the county-level commercial sector employment to provide a combined estimate of county-level commercial and institutional employment.

[1] County-level federal and state government employment data are not available from the Bureau of the Census.

State-level ICI combustion estimates by fuel type were allocated to each county using the ratio of the number of employees in the industrial manufacturing sector (NAICS codes 31-33) and the commercial/institutional sector (NAICS codes 42-81, and 92) in each county to the total number of manufacturing and commercial/institutional sector employees in the state.

For the residential sector, state-level fuel consumption was allocated to each county using the U.S. Census Bureau's 2000 Census Detailed Housing Information (Census, 2000). These data include the number of housing units using a specific type of fuel for residential heating. State-level fuel consumption was allocated to each county using the ratio of the number of houses burning a particular fuel in each county to the total number of houses burning that fuel in the state.

5.0 EMISSION FACTORS

ERG compiled criteria and hazardous air pollutant emission factors for each nonpoint source fuel combustion category using EPA emission factors as the starting point. The criteria pollutant emission factors are presented in Appendix B. The majority of the emission factors are from the EPA/ERTAC2 database and EPA's *AP-42* report, Compilation of Air Pollutant Emission Factors (Huntley, 2009; EPA, 2010). The ammonia emission factors for wood combustion are from an Emission Inventory Improvement Program (EIIP) guidance document (EPA, 2004).

For coal combustion, the SO_2 emission factors are based on the sulfur content of the coal burned, and some of the PM emission factors for anthracite coal require information on the ash content of the coal. For the industrial and commercial/institutional sectors, state-specific coal sulfur contents for bituminous coal were obtained from the EIA's quarterly coal report (EIA, 2012d). For the residential sector, state-specific coal sulfur contents for bituminous coal were obtained from data compiled in preparing the 1999 residential coal combustion emissions estimates (EPA, 2002). Table 6 presents the bituminous coal sulfur content values used for each state. For anthracite coal, an ash content value of 13.38% and a sulfur content of 0.89% were applied to all states.

Table 6. State-Specific Sulfur Content for Bituminous Coal

State	% Industrial Sulfur Content	% Commercial/ Institutional Sulfur Content	% Residential Sulfur Content
Arkansas	1.59	1.23	1.20
Iowa	1.47	2.25	4.64
Kansas	2.77	1.23	5.83
Louisiana	0.88	1.23	0.86
Minnesota	0.37	1.94	0.97
Missouri	2.26	1.94	3.39
Nebraska	0.37	1.23	2.43
Oklahoma	0.53	1.23	3.08
Texas	0.82	1.23	1.14

HAP emission factors are from *AP-42* for the most part. Chromium was speciated as recommended by EPA for use in risk assessment studies; the toxicity of trivalent chromium is markedly lower than the toxicity of hexavalent chromium.

6.0 DEVELOPMENT OF AREA SOURCE EMISSION ESTIMATES

To develop the CenSARA states' ICI and residential fuel combustion emissions estimates for CAPs and HAPs, ERG developed the "CenSARA Fuel Combustion Activity Tool." The Tool was designed to assist agencies in compiling, allocating, and adjusting fuel combustion activity data, and developing county-level area source emission estimates for base year 2011 and future emission inventory cycles. Instructions for using the CenSARA Fuel Combustion Activity Tool are presented in Appendix C. The Tool is a state-specific Microsoft Access 2007 database that was designed to support different agency approaches for compiling, allocating, and adjusting area source fuel combustion activity data. To this end, the Tool is organized into State Level Activity and Allocation Tables, County Level Activity and Allocation Tables, and macros to be run after updates are made to the State and/or County Level Tables.

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Appendix A

SCC Point and Area Source Crosswalks

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
2102001000 - Stationary Source Fuel Combustion/Industrial/Anthracite Coal/Total: All Boiler Types				
10200101	External Combustion Boilers	Industrial	Anthracite Coal	Pulverized Coal
10200104	External Combustion Boilers	Industrial	Anthracite Coal	Traveling Grate (Overfeed) Stoker
10200107	External Combustion Boilers	Industrial	Anthracite Coal	Hand-fired
10200117	External Combustion Boilers	Industrial	Anthracite Coal	Fluidized Bed Boiler Burning Anthracite-Culm Fuel
39000189	Industrial Processes	In-process Fuel Use	Anthracite Coal	General
39000199	Industrial Processes	In-process Fuel Use	Anthracite Coal	General
2102002000 - Stationary Source Fuel Combustion/Industrial/Bituminous/Subbituminous Coal/ Total: All Boiler Types				
10200201	External Combustion Boilers	Industrial	Bituminous Coal	Pulverized Coal: Wet Bottom
10200202	External Combustion Boilers	Industrial	Bituminous Coal	Pulverized Coal: Dry Bottom
10200203	External Combustion Boilers	Industrial	Bituminous Coal	Cyclone Furnace
10200204	External Combustion Boilers	Industrial	Bituminous Coal	Spreader Stoker
10200205	External Combustion Boilers	Industrial	Bituminous Coal	Overfeed Stoker
10200206	External Combustion Boilers	Industrial	Bituminous Coal	Underfeed Stoker
10200210	External Combustion Boilers	Industrial	Bituminous Coal	Overfeed Stoker **
10200212	External Combustion Boilers	Industrial	Bituminous Coal	Pulverized Coal: Dry Bottom (Tangential)
10200213	External Combustion Boilers	Industrial	Bituminous Coal	Wet Slurry
10200217	External Combustion Boilers	Industrial	Bituminous Coal	Atmospheric Fluidized Bed Combustion: Bubbling Bed
10200218	External Combustion Boilers	Industrial	Bituminous Coal	Atmospheric Fluidized Bed Combustion: Circulating Bed
10200219	External Combustion Boilers	Industrial	Bituminous Coal	Cogeneration
10200221	External Combustion Boilers	Industrial	Subbituminous Coal	Pulverized Coal: Wet Bottom
10200222	External Combustion Boilers	Industrial	Subbituminous Coal	Pulverized Coal: Dry Bottom

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10200223	External Combustion Boilers	Industrial	Subbituminous Coal	Cyclone Furnace
10200224	External Combustion Boilers	Industrial	Subbituminous Coal	Spreader Stoker
10200225	External Combustion Boilers	Industrial	Subbituminous Coal	Traveling Grate (Overfeed) Stoker
10200226	External Combustion Boilers	Industrial	Subbituminous Coal	Pulverized Coal: Dry Bottom Tangential
10200229	External Combustion Boilers	Industrial	Subbituminous Coal	Cogeneration
10500102	External Combustion	Space Heaters	Industrial	Coal **
39000201	Industrial Processes	In-process Fuel Use	Bituminous Coal	Cement Kiln/Dryer (Bituminous Coal)
39000203	Industrial Processes	In-process Fuel Use	Bituminous Coal	Lime Kiln (Bituminous)
39000288	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Subbituminous)
39000289	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Bituminous)
39000299	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Bituminous)
50390002	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Coal
210200400* - Stationary Source Fuel Combustion/Industrial/Distillate Oil/Total: Boilers and IC Engines				
10200501	External Combustion Boilers	Industrial	Distillate Oil	Grades 1 and 2 Oil
10200502	External Combustion Boilers	Industrial	Distillate Oil	10-100 Million BTU/hr **
10200503	External Combustion Boilers	Industrial	Distillate Oil	< 10 Million BTU/hr **
10200504	External Combustion Boilers	Industrial	Distillate Oil	Grade 4 Oil
10200505	External Combustion Boilers	Industrial	Distillate Oil	Cogeneration
10201403	External Combustion Boilers	Industrial	CO Boiler	Distillate Oil
10500105	External Combustion	Space Heaters	Industrial	Distillate Oil
20200101	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine
20200102	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating
20200103	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Cogeneration
20200104	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Cogeneration
20200105	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Crankcase Blowby
20200106	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200107	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Exhaust
20200108	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
20200109	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Exhaust
20200401	Internal Combustion Engines	Industrial	Large Bore Engine	Diesel
20200405	Internal Combustion Engines	Industrial	Large Bore Engine	Crankcase Blowby
20200406	Internal Combustion Engines	Industrial	Large Bore Engine	Evaporative Losses (Fuel Storage and Delivery System)
20200407	Internal Combustion Engines	Industrial	Large Bore Engine	Exhaust
27000320	Internal Combustion Engines	Off-highway Diesel Engines	Industrial Equipment	Industrial Fork Lift: Diesel
30190001	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30190011	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30190021	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30290001	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30390001	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30390011	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30390021	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30400406	Industrial Processes	Secondary Metal Production	Lead	Pot Furnace Heater: Distillate Oil
30490001	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30490011	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30490021	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30490031	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Furnaces
30500208	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Distillate Oil
30505022	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Distillate Oil
30590001	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30590011	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30590021	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30600901	Industrial Processes	Petroleum Industry	Flares	Distillate Oil
30609901	Industrial Processes	Petroleum Industry	Incinerators	Distillate Oil (No. 2)
30790001	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30790011	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30790021	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30890001	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30890011	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30890021	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30990001	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30990011	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
31000401	Industrial Processes	Oil and Gas Production	Process Heaters	Distillate Oil (No. 2)
31000411	Industrial Processes	Oil and Gas Production	Process Heaters	Distillate Oil (No. 2): Steam Generators
31390001	Industrial Processes	Electrical Equipment	Process Heaters	Distillate Oil (No. 2)
39000501	Industrial Processes	In-process Fuel Use	Distillate Oil	Asphalt Dryer **
39000502	Industrial Processes	In-process Fuel Use	Distillate Oil	Cement Kiln/Dryer
39000503	Industrial Processes	In-process Fuel Use	Distillate Oil	Lime Kiln
39000589	Industrial Processes	In-process Fuel Use	Distillate Oil	General
39000598	Industrial Processes	In-process Fuel Use	Distillate Oil	Grade 4 Oil: General
39000599	Industrial Processes	In-process Fuel Use	Distillate Oil	General
39900501	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	Distillate Oil
39990001	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2): Process Heaters
39990011	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2): Incinerators
39990021	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2 Oil): Flares

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
40201002	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Distillate Oil
40290011	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Distillate Oil: Incinerator/Afterburner
49090011	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
49090021	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
50390005	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Distillate Oil
2102005000 - Stationary Source Fuel Combustion/Industrial/Residual Oil/Total: All Boiler Types				
10200401	External Combustion Boilers	Industrial	Residual Oil	Grade 6 Oil
10200402	External Combustion Boilers	Industrial	Residual Oil	10-100 Million BTU/hr **
10200403	External Combustion Boilers	Industrial	Residual Oil	< 10 Million BTU/hr **
10200404	External Combustion Boilers	Industrial	Residual Oil	Grade 5 Oil
10200405	External Combustion Boilers	Industrial	Residual Oil	Cogeneration
10201404	External Combustion Boilers	Industrial	CO Boiler	Residual Oil
20200501	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating
20200505	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Crankcase Blowby
20200506	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200507	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Exhaust
30190002	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Process Heaters
30190012	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Incinerators
30190022	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Flares
30290002	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Residual Oil: Process Heaters
30390002	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Process Heaters
30390012	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Incinerators
30390022	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Flares
30490002	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Process Heaters
30490012	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Incinerators

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30490022	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Flares
30490032	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Furnaces
30500207	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Residual Oil
30505021	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Residual Oil
30590002	Industrial Processes	Mineral Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30590012	Industrial Processes	Mineral Products	Fuel Fired Equipment	Residual Oil: Incinerators
30600111	Industrial Processes	Petroleum Industry	Process Heaters	Oil-fired (No. 6 Oil) > 100 Million Btu Capacity
30600902	Industrial Processes	Petroleum Industry	Flares	Residual Oil
30609902	Industrial Processes	Petroleum Industry	Incinerators	Residual Oil
30790002	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30790012	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Incinerators
30790022	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Flares
30890002	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30890012	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Incinerators
30890022	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Flares
30990002	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30990012	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Residual Oil: Incinerators
31000402	Industrial Processes	Oil and Gas Production	Process Heaters	Residual Oil
31000412	Industrial Processes	Oil and Gas Production	Process Heaters	Residual Oil: Steam Generators
31390002	Industrial Processes	Electrical Equipment	Process Heaters	Residual Oil
39000402	Industrial Processes	In-process Fuel Use	Residual Oil	Cement Kiln/Dryer
39000403	Industrial Processes	In-process Fuel Use	Residual Oil	Lime Kiln
39000489	Industrial Processes	In-process Fuel Use	Residual Oil	General
39000499	Industrial Processes	In-process Fuel Use	Residual Oil	General

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
39990002	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Process Heaters
39990012	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Incinerators
39990022	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Flares
40201003	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Residual Oil
40290012	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Residual Oil: Incinerator/Afterburner
49090012	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Residual Oil: Incinerators
49090022	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Residual Oil: Flares
2102006000 - Stationary Source Fuel Combustion/Industrial/Natural Gas/Total: Boilers and IC Engines				
10200601	External Combustion Boilers	Industrial	Natural Gas	> 100 Million BTU/hr
10200602	External Combustion Boilers	Industrial	Natural Gas	10-100 Million BTU/hr
10200603	External Combustion Boilers	Industrial	Natural Gas	< 10 Million BTU/hr
10200604	External Combustion Boilers	Industrial	Natural Gas	Cogeneration
10201401	External Combustion Boilers	Industrial	CO Boiler	Natural Gas
10500106	External Combustion	Space Heaters	Industrial	Natural Gas
20200201	Internal Combustion Engines	Industrial	Natural Gas	Turbine
20200202	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating
20200203	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Cogeneration
20200204	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Cogeneration
20200205	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Crankcase Blowby
20200206	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Evaporative Losses (Fuel Delivery System)
20200207	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Exhaust
20200208	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Evaporative Losses (Fuel Delivery System)
20200209	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Exhaust
20200251	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Rich Burn
20200252	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Lean Burn

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
20200253	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Rich Burn
20200254	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Lean Burn
20200255	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Clean Burn
20200256	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Clean Burn
30190003	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Process Heaters
30190013	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Incinerators
30190023	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Flares
30290003	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Natural Gas: Process Heaters
30291001	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Broiling Food: Natural Gas
30390003	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Process Heaters
30390013	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Incinerators
30390023	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Flares
30400407	Industrial Processes	Secondary Metal Production	Lead	Pot Furnace Heater: Natural Gas
30490003	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Process Heaters
30490013	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Incinerators
30490023	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Flares
30490033	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Furnaces
30500206	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Natural Gas
30505020	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Natural Gas
30590003	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30590013	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Incinerators
30590023	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Flares
30600105	Industrial Processes	Petroleum Industry	Process Heaters	Natural Gas
30600903	Industrial Processes	Petroleum Industry	Flares	Natural Gas
30602401	Industrial Processes	Petroleum Industry	Reciprocating Engine Compressors	Natural Gas Fired
30609903	Industrial Processes	Petroleum Industry	Incinerators	Natural Gas

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30790003	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30790013	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Incinerators
30790023	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Flares
30890003	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30890013	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Incinerators
30890023	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Flares
30990003	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30990013	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Incinerators
30990023	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Flares
31000404	Industrial Processes	Oil and Gas Production	Process Heaters	Natural Gas
31000414	Industrial Processes	Oil and Gas Production	Process Heaters	Natural Gas: Steam Generators
31390003	Industrial Processes	Electrical Equipment	Process Heaters	Natural Gas
39000602	Industrial Processes	In-process Fuel Use	Natural Gas	Cement Kiln/Dryer
39000603	Industrial Processes	In-process Fuel Use	Natural Gas	Lime Kiln
39000605	Industrial Processes	In-process Fuel Use	Natural Gas	Metal Melting **
39000689	Industrial Processes	In-process Fuel Use	Natural Gas	General
39000699	Industrial Processes	In-process Fuel Use	Natural Gas	General
39900601	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	Natural Gas
39990003	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Natural Gas: Process Heaters
39990013	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Natural Gas: Incinerators

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
39990023	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Natural Gas: Flares
40201001	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Natural Gas
40290013	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Natural Gas: Incinerator/Afterburner
40290023	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Natural Gas: Flares
49090013	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Natural Gas: Incinerators
49090023	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Natural Gas: Flares
50390006	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Natural Gas
2102007000 - Stationary Source Fuel Combustion/Industrial/Liquified Petroleum Gas (LPG)/Total: All Boiler Types				
10201001	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Butane
10201002	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Propane
10201003	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Butane/Propane Mixture: Specify Percent Butane in Comments
10500110	External Combustion	Space Heaters	Industrial	Liquified Petroleum Gas (LPG)
20201001	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Propane: Reciprocating
20201002	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Butane: Reciprocating
20201005	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Crankcase Blowby
20201006	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20201007	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Exhaust
20201008	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20201009	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Exhaust
20201011	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine
20201012	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating Engine
20201013	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Cogeneration
20201014	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating Engine: Cogeneration
27300320	Internal Combustion Engines	Off-highway LPG-fueled Engines	Industrial Equipment	Industrial Fork Lift: Liquified Petroleum Gas (LPG)
30290005	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30490035	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Propane: Furnaces
30500209	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: LPG
30505023	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: LP Gas
30590005	Industrial Processes	Mineral Products	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters
30600107	Industrial Processes	Petroleum Industry	Process Heaters	LPG-fired
30600905	Industrial Processes	Petroleum Industry	Flares	Liquified Petroleum Gas
30609905	Industrial Processes	Petroleum Industry	Incinerators	Liquified Petroleum Gas
30890004	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters
31000406	Industrial Processes	Oil and Gas Production	Process Heaters	Propane/Butane
39001089	Industrial Processes	In-process Fuel Use	Liquified Petroleum Gas	General
39001099	Industrial Processes	In-process Fuel Use	Liquified Petroleum Gas	General
39901001	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	LPG
40201004	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Liquified Petroleum Gas (LPG)
50390010	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
2102008000 - Stationary Source Fuel Combustion/Industrial/Wood/Total: All Boiler Types				
10200901	External Combustion Boilers	Industrial	Wood/Bark Waste	Bark-fired Boiler
10200902	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood/Bark-fired Boiler
10200903	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler - Wet Wood (>=20% moisture)
10200904	External Combustion Boilers	Industrial	Wood/Bark Waste	Bark-fired Boiler (< 50,000 Lb Steam) **
10200905	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood/Bark-fired Boiler (< 50,000 Lb Steam) **
10200906	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler (< 50,000 Lb Steam) **
10200907	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood Cogeneration
10200908	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler - Dry Wood (<20% moisture)
10200910	External Combustion Boilers	Industrial	Wood/Bark Waste	Fuel cell/Dutch oven boilers **
10200911	External Combustion Boilers	Industrial	Wood/Bark Waste	Stoker boilers **
10200912	External Combustion Boilers	Industrial	Wood/Bark Waste	Fluidized bed combustion boiler
39000989	Industrial Processes	In-process Fuel Use	Wood	General

Table A-1. Industrial Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
39000999	Industrial Processes	In-process Fuel Use	Wood	General: Wood
2102011000 - Stationary Source Fuel Combustion/Industrial/Kerosene/Total: All Boiler Types				
20200901	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine
20200902	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating
20200905	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Crankcase Blowby
20200906	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200907	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Exhaust
20200908	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20200909	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust
20400110	Internal Combustion Engines	Engine Testing	Aircraft Engine Testing	Jet A Fuel
20400111	Internal Combustion Engines	Engine Testing	Aircraft Engine Testing	JP-5 Fuel
20400112	Internal Combustion Engines	Engine Testing	Aircraft Engine Testing	JP-4 Fuel
20400406	Internal Combustion Engines	Engine Testing	Reciprocating Engine	Kerosene/Naphtha (Jet Fuel)

Table A-2. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
2103001000 - Stationary Source Fuel Combustion/Commercial/Institutional/Anthracite Coal/Total: All Boiler Types				
10300101	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Pulverized Coal
10300102	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Traveling Grate (Overfeed) Stoker
10300103	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Hand-fired
2103002000 - Stationary Source Fuel Combustion/Commercial/Institutional/Bituminous/Subbituminous Coal/Total: All Boiler Types				
10300203	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Cyclone Furnace
10300205	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Pulverized Coal: Wet Bottom
10300206	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Pulverized Coal: Dry Bottom
10300207	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Overfeed Stoker
10300208	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Underfeed Stoker
10300209	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Spreader Stoker
10300211	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Overfeed Stoker **
10300214	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Hand-fired
10300216	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Pulverized Coal: Dry Bottom (Tangential)
10300217	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Atmospheric Fluidized Bed Combustion: Bubbling Bed
10300218	External Combustion Boilers	Commercial/Institutional	Bituminous Coal	Atmospheric Fluidized Bed Combustion: Circulating Bed
10300221	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Pulverized Coal: Wet Bottom
10300222	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Pulverized Coal: Dry Bottom
10300223	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Cyclone Furnace
10300224	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Spreader Stoker
10300225	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Traveling Grate (Overfeed) Stoker
10300226	External Combustion Boilers	Commercial/Institutional	Subbituminous Coal	Pulverized Coal: Dry Bottom Tangential

Table A-2. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10500202	External Combustion	Space Heaters	Commercial/Institutional	Coal **
50190002	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Coal
50290002	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Coal
210300400* - Stationary Source Fuel Combustion/Commercial/Institutional/Distillate Oil/Total: Boilers and IC Engines				
10300501	External Combustion Boilers	Commercial/Institutional	Distillate Oil	Grades 1 and 2 Oil
10300502	External Combustion Boilers	Commercial/Institutional	Distillate Oil	10-100 Million BTU/hr **
10300503	External Combustion Boilers	Commercial/Institutional	Distillate Oil	< 10 Million BTU/hr **
10300504	External Combustion Boilers	Commercial/Institutional	Distillate Oil	Grade 4 Oil
10500205	External Combustion	Space Heaters	Commercial/Institutional	Distillate Oil
20300101	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating
20300102	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine
20300105	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Crankcase Blowby
20300106	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20300107	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Exhaust
20300108	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20300109	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine: Exhaust
50100602	Waste Disposal	Solid Waste Disposal - Government	Fire Fighting	Structure: Distillate Oil
50190005	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Distillate Oil
50290005	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Distillate Oil
2103005000 - Stationary Source Fuel Combustion/Commercial/Institutional/Residual Oil/Total: All Boiler Types				
10300401	External Combustion Boilers	Commercial/Institutional	Residual Oil	Grade 6 Oil
10300402	External Combustion Boilers	Commercial/Institutional	Residual Oil	10-100 Million BTU/hr **

Table A-2. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10300403	External Combustion Boilers	Commercial/Institutional	Residual Oil	< 10 Million BTU/hr **
10300404	External Combustion Boilers	Commercial/Institutional	Residual Oil	Grade 5 Oil
2103006000 - Stationary Source Fuel Combustion/Commercial/Institutional/Natural Gas/Total: Boilers and IC Engines				
10300601	External Combustion Boilers	Commercial/Institutional	Natural Gas	> 100 Million BTU/hr
10300602	External Combustion Boilers	Commercial/Institutional	Natural Gas	10-100 Million BTU/hr
10300603	External Combustion Boilers	Commercial/Institutional	Natural Gas	< 10 Million BTU/hr
10500206	External Combustion	Space Heaters	Commercial/Institutional	Natural Gas
20300201	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating
20300202	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine
20300203	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Cogeneration
20300204	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Cogeneration
20300205	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Crankcase Blowby
20300206	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Evaporative Losses (Fuel Delivery System)
20300207	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Exhaust
20300208	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Evaporative Losses (Fuel Delivery System)
20300209	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Exhaust
50190006	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Natural Gas
50290006	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Natural Gas
2103007000 - Stationary Source Fuel Combustion/Commercial/Institutional/Liquified Petroleum Gas (LPG)/Total: All Combustor Types				
10301001	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane
10301002	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Propane

Table A-2. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10301003	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane/Propane Mixture: Specify Percent Butane in Comments
10500210	External Combustion	Space Heaters	Commercial/Institutional	Liquified Petroleum Gas (LPG)
20301001	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Propane: Reciprocating
20301002	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane: Reciprocating
20301005	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Crankcase Blowby
20301006	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20301007	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Exhaust
50190010	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
50290010	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
2103008000 - Stationary Source Fuel Combustion/Commercial/Institutional/Wood/Total: All Boiler Types				
10300901	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Bark-fired Boiler
10300902	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood/Bark-fired Boiler
10300903	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood-fired Boiler - Wet Wood (>=20% moisture)
10300908	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood-fired Boiler - Dry Wood (<20% moisture)
10300910	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Fuel cell/Dutch oven boilers **
10300911	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Stoker boilers **
10300912	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Fluidized bed combustion boilers
10500209	External Combustion	Space Heaters	Commercial/Institutional	Wood
2103011000 - Stationary Source Fuel Combustion/Commercial/Institutional/Kerosene/Total: All Combustor Types				
20300901	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: JP-4
20300908	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)

Table A-2. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions (Cont.)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
20300909	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust
50100603	Waste Disposal	Solid Waste Disposal - Government	Fire Fighting	Structure: Kerosene

Appendix B

Criteria Pollutant Emission Factors for ICI and Residential Combustion Area Source Categories

Table B-1. Criteria Pollutant Emission Factors for ICI and Residential Combustion Area Source Categories

SCC	Description	Emission Factor Units[1]	VOC	NO_x	CO	SO_2	$PM_{2.5}$-FIL	PM_{10}-FIL	PM-CON	NH_3
2102001000	Industrial Anthracite Coal	lb/ton	0.3	9	0.6	39 * S%	0.48 * A%	1.1 * A%	0.08 * A%	0.03
2102002000	Industrial Bitum/Subbitum Coal	lb/ton	0.05	11	5	38 * S%	1.4	12	1.04	0.03
2102004001	Industrial Distillate Oil: Boilers	lb/1000 gal	0.2	20	5	142 * S%	0.25	1.0	1.3	0.08
2102004002	Industrial Distillate Oil: IC Engines	lb/1000 gal	0.2[2]	604	130	39.8	42.5	42.5	1.0	0.8[2]
2102005000	Industrial Residual Oil	lb/1000 gal	0.28	55	5	157 * S%	4.67 * (1.12 * S% + 0.37)	7.17 * (1.12 * S% + 0.37)	1.5	0.8
2102006000	Industrial Natural Gas	lb/MMcf	5.5	100	84	0.6	0.11	0.2	0.32	0.49[7]
2102007000	Industrial LPG[3]	lb/1000 bbl	0.52	14.23	7.97	0.06	0.01	0.02	0.03	0.05
2102008000	Industrial Wood[4]	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.007[5]
2102011000	Industrial Kerosene	lb/1000 gal	0.19	19.29	4.82	142 * S%	0.24	0.96	1.25	0.771
2103001000	Comm/Inst Anthracite Coal	lb/ton	0.3	9	0.6	39 * S%	0.48 * A%	1.1 * A%	0.08 * A%	0.03
2103002000	Comm/Inst Bitum/Subbitum Coal	lb/ton	0.05	11	5	38 * S%	1.4	12	1.04	0.03
2103004001	Comm/Inst Distillate Oil: Boilers	lb/1000 gal	0.34	20	5	142 * S%	0.83	1.08	1.3	0.8
2103004002	Comm/Inst Distillate Oil: IC Engines	lb/1000 gal	0.34[2]	604	130	39.8	42.5	42.5	1.0	0.8[2]
2103005000	Comm/Inst Residual Oil	lb/1000 gal	1.13	55	5	157 * S%	1.92 * (1.12 * S% + 0.37)	5.17 * (1.12 * S% + 0.37)	1.5	0.8
2103006000	Comm/Inst Natural Gas	lb/MMcf	5.5	100	84	0.6	0.11	0.2	0.32	0.49
2103007000	Comm/Inst LPG	lb/1000 bbl	0.52	14.23	7.97	0.06	0.01	0.02	0.03	0.05
2103008000	Comm/Inst Wood[4]	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.005[5]
2103011000	Comm/Inst Kerosene	lb/1000 gal	0.33	19.29	4.82	142 * S%	0.8	1.04	1.25	0.771
2104001000	Residential Anthracite Coal	lb/ton	10	3	275	39 * S%	0.6 * A%	10	0.08 * A%	2
2104002000	Residential Bitum/Subbitum Coal	lb/ton	10	9.1	275	31 * S%	3.8	6.2	1.04	2
2104004000	Residential Distillate Oil	lb/1000 gal	0.7	18	5	142 * S%	0.83	1.08	1.3	1
2104005000	Residential Residual Oil[6]	lb/1000 gal	0.7	18	5	142 * S%	0.83	1.08	1.3	1
2104006000	Residential Natural Gas	lb/MMcf	5.5	94	40	0.6	0.11	0.2	0.32	20
2104007000	Residential LPG	lb/1000 bbl	21.91	562.8	159.6	2.39	0.4382	0.7968	1.275	1.952
2104011000	Residential Kerosene	lb/1000 bbl	28.35	729	202.5	1,725.3	33.615	43.74	52.65	40.5

Source: Unless otherwise noted, 2008 nonpoint source NEI (Huntley, 2009).

Notes: [1] lb = pound; ton = short ton; gal = gallon; MMcf = million cubic feet; MMBtu = million British thermal units; bbl = barrels; S = sulfur content; A = ash Content

[2] Emission factor from SCC 2102004000 or 21002005000.

[3] Emission factors from commercial/institutional LPG.

[4] Emission factors from *AP-42*, Section 1.6, Wood Residue Combustion in Boilers (EPA, 2003).

[5] Emission factor from Pechan, 2004 (converted from lb/ton using 0.08 ton/MMBtu for industrial sector and 0.0625 ton/MMBtu for commercial sector).

[6] Emission factors from *AP-42*, Section 1.3, Fuel Oil Combustion, and from Residential Distillate Oil.

[7] ERG believes that there is an error in the EPA ERTAC emission factor workbook (Huntley, 2009) for this emission factor (EF). The change log in the ERTAC workbook conflicts with the emission factors spreadsheet.

Appendix C

User's Guide for the CenSARA Fuel Combustion Activity Tool

Instructions for Using the CenSARA Fuel Combustion Activity Tool

1.0 Introduction

CenSARA tasked Eastern Research Group (ERG) to develop a tool that state, local, and tribal agencies could use to develop an area source emission inventory for industrial, commercial/institutional (ICI), and residential fuel combustion. To this end, ERG prepared the CenSARA Fuel Combustion Activity Tool to assist agencies in compiling, allocating, and adjusting fuel combustion activity data, and developing county-level area source emission estimates.

The CenSARA Fuel Combustion Activity Tool is a state-specific Microsoft Access 2007 file. Because different approaches can be implemented to compile, allocate, and adjust area source fuel combustion activity data, the tables, queries, and macros in the Tool are organized into 5 "Groups:" Master Table, Group 1 State Level Activity and Allocation Tables, Group 2 County Level Activity and Allocation Tables, Reference Tables, and a Group of three macros to be run after updates are made to the Group 1 and Group 2 Tables.

In order to view and edit tables or run the macros in the Groups listed above, expand the window for that Group by clicking the Group name. For example, if you want to expand Group 2 in order to review and edit the county level activity data, click the Group 2 name "Group 2 County Level Activity Tables and Emission Factors" as shown in Figure 1.

2.0 Description of Tables

1. **CenSARA_ICI_Res_Master Table** – The Master Table contains the state, county, SCC, default activity, point source activity, area source activity, emissions factors and estimates, and EIS-ready fields. The fields included in the Master Table are shown in Table 1, along with a description of what each field contains. The Master Table is populated with the data that can be reviewed and used to populate the EIS staging tables. Revisions made to the Group 1 and Group 2 Tables are incorporated into the Master Table after the associated state level and/or county level Macros are run. Any revisions or updates needed should be made in the Group 1 and Group 2 Tables, not the Master Table.

2. **Group 1 <u>State Level</u> Activity and Allocation Tables** – The Group 1 State Level Tables contain the raw EIA/SEDS default state level input, input fields for non-fuel use adjustments, and input fields for county-level allocations.

    a. **Group1a ICI State Level Activity and Allocation Tables ICI** – These tables contain the raw EIA/SEDs state level activity data, fields for making state level adjustments for non-fuel use, and fields for allocating the ICI state level data to the county level. A list of the tables in Group 1a is shown in Table 2.

    b. **Group 1b Residential State Level Activity and Allocation** – These tables contain the raw EIA/SEDs state level activity data, and fields for allocating the residential data to the county level. A list of the tables in Group 1b is shown in Table 3.

    c. **Group 1c Intermediate Tables** – These tables can be used to review the updates made to the Group 1a and 1b Tables. A list of the tables in Group 1a is shown in Table 4.

3. **Group 2 County Level Activity Tables and Emission Factors** – The Group 2 County Level Tables contain the county level activity data developed from the Group 1 Tables. The county level activity is used to estimate emissions. This group also includes a table of emission factors and a table for entering point source activity at the county level. A list of the tables in Group 1 is shown in Table 5.

4. **Macros** – This Group contains 3 Macros (shown in Table 6) to run after changes are made to Group 1 State Level tables (Macro 01), the Group 2 County Level tables (Macro 02), and to make point source adjustments and calculate emissions (Macro 03).

5. **Reference Tables** – This Group contains four tables provided as a reference for states. The lookups include a conversion table, pollutant type lookup, SCC lookup, and SCC crosswalk for point and area source SCCs. This group also contains a run log that indicates when the macros were last run.

6. **Unassigned Objects** – This group contains the queries and background tables needed in order to run the macros. Users should not need to make updates to tables or queries in this group.

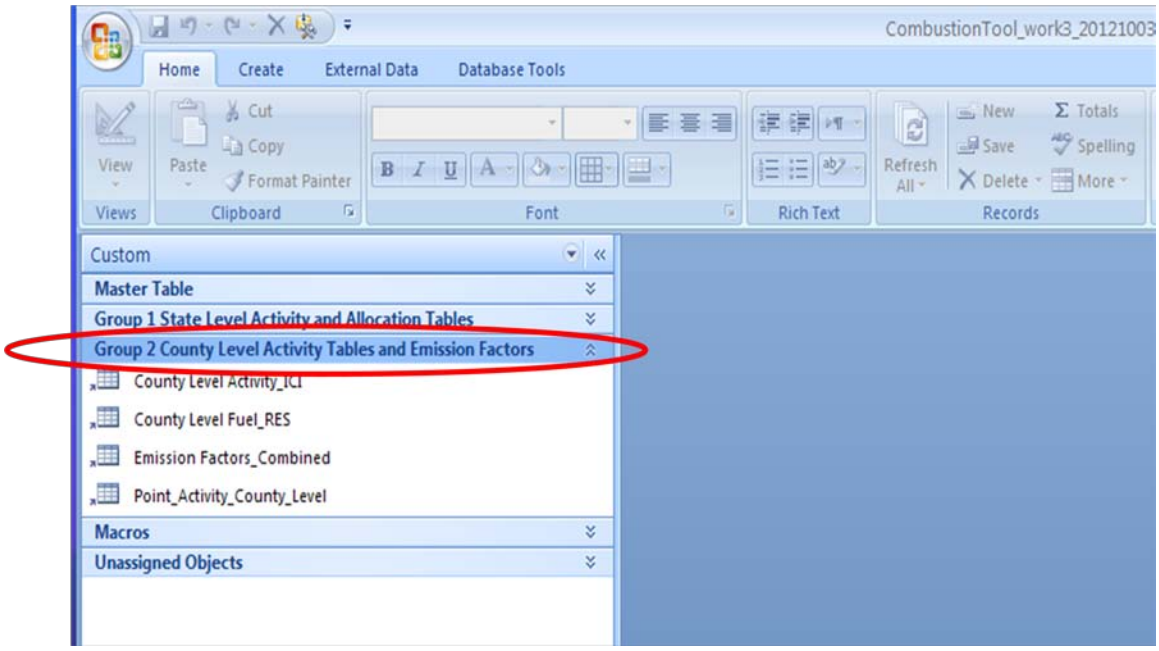

Figure 1. Click to Expand the Group 2 County Level Activity Tables and Emission Factors.

Section 3.0 Instructions for Making Revisions

If you are revising tables in more than one Group, it is important to follow the order of the steps below. As you make changes in one Group and run the corresponding macro, changes are made to the other Group. If you revise the Master table and then revise tables in Group 1 or Group 2 and run the macros, your changes to the Master table will be overwritten.

1. Revise the Group 1 State Level tables as needed. The types of updates that could be made here include updating raw EIA/SEDS data for future years, updating county business patterns to use in allocations, changing the nonroad adjustment percentages for ICI for future years, providing state total point source activity, etc.

2. If you did not revise Group 1, go to step 3 below. If revisions were made in Group 1, run the macro called "01 Use State Level Activity to Update County Level Activity." This macro will recreate the Group 2 county level activity tables using your revised data from Group 1. To run the macro, double click the name of the macro. When the macro is finished, you will see a pop up message letting you know it is complete.

3. Review and revise Group 2 as needed. The types of updates that could be made here include revising the county level activity data, revising emission factors, and providing point source activity at the county level. Note that if you revise the ash or sulfur content for coal, distillate oil, or residual oil, you will need to manually re-calculate the PM and/or SO_2 emission factors (using equations provided in the Final Report). Also note that lead is currently flagged as a HAP; EPA's EIS flags it as a CAP.

4. If you did not revise Group 1 or Group 2 above, go to step 5 below. If you made revisions in Group 1 or Group 2 above, run Macro 02 to incorporate revisions into the Master Table. To run the macro, double click the name of the macro. When the macro is finished, you will see a pop up message letting you know it is complete.

5. Review the emission factors, default activity, or point source activity in the Master Table as needed.

6. If you did not make changes to Group 1, Group 2, or the Master table, you do not need to run any of the Macros. If you made changes, run Macro 03 to recalculate emissions. ***Note that Macro 03 repopulates the Area Activity field. If you want to use your own county level combustion activity data instead of the EPA defaults, you should enter the activity in the corresponding tables in Group 2 instead of entering it in the Master Table.*

Table 1. Fields Included in the CenSARA_ICI_Res_Master_Table

Field Names	Description
StateAndCountyFIPSCode	Combined state and county FIPs codes
FIPS State Code	State FIPS code
Postal State Code	State abbreviation
StateName	State name
FIPS County Code	County FIPS code
CountyName	County name
TribalCode	Tribal code
TribalName	Tribal name
SourceClassificationCode	SCC
Source Classification Code Description	SCC short description
PollutantCode	EIS pollutant code
Pollutant Code Description	Pollutant name
Type	Pollutant type (e.g., CAP, HAP, GHG)[a]
Default Activity	Default activity (based on adjusted EIA/SEDS data)
Default Activity Units	Default activity units (e.g., ton, thousand gallons, thousand barrels, million cubic feet)
State-Level Point Activity Provided	Populated with "Y" if state level point source activity were entered the Group 1a Table
Point Activity	User-supplied (or calculated) point source county-level activity data as calculated based on Group 1a allocated data, or entered in Group 2 table
Point Activity Units	Point source activity units
Area Activity	User-supplied (or calculated) area source county-level activity data
Area Activity Units	Area source activity units
EmissionFactor	Emission factor
EmissionFactorNumeratorUnitofMeasureCode	Emission factor numerator
EmissionFactorDenominatorUnitofMeasureCode	Emission factor denominator
TotalEmissions	Estimated, adjusted, county-level emissions
EmissionsUnitofMeasureCode	Emission estimate units
CalculationParameterValue	EIS activity data field
CalculationParameterUnitofMeasure	EIS field for activity units
CalculationParameterTypeCode	EIS code for basis of estimate (e.g., I = (Fuel Input)
CalculationMaterialCode	EIS code for fuel type
CalculationDataYear	Base year (e.g., 2011)
ReportingPeriodTypeCode	Type of estimate (e.g., A= Annual)
EmissionCalcMethodCode	Numerical flag to indicate the emission factor source.

[a] Lead is flagged as a HAP in the CenSARA Tool.

Table 2. Group 1a ICI State Level Activity and Allocation Tables ICI

Table Name	Description
Coal_Types	Used for ICI type of coal adjustment (e.g., % anthracite, bituminous/subbituminous)
Commercial_Allocations	Used for C/I allocation to county based on employment
Commercial_Boiler_Engine_Split[a]	Used to split distillate usage between boilers and engines
County Information	County lookup reference table
Distillate_Nonroad	Calculates the percent of nonroad distillate usage for adjustment
Industrial_Allocations	Used for industrial allocation to county based on employment
Industrial_Boiler_Engine_Split[a]	Used to split distillate usage between boilers and engines
LPG_Nonroad_Percent	Percent of nonroad LPG for adjustment
MECS_FuelUse_AllPurposes	Activity data used for non-fuel use adjustment
MECS_NonFuelUse_Feedstock	Activity data used for non-fuel use adjustment
Point_Activity_State_Level	User-supplied state level point source activity
SEDS_Activity_Raw	Raw EIA/SEDS activity data
State_to_Region_Crosswalk	Used for non-fuel use adjustment to region (e.g., South, Midwest)

[a] Be sure to allocate point source activity between these two SCCs.

Table 3. Group 1b Residential State Level Activity and Allocation

Table Name	Description
Housing Units - 2000 Census	Used for residential allocation to county based on housing fuel usage
Res_Coal	State level activity data for coal
Res_Distillate	State level activity data for distillate
Res_Kerosene	State level activity data for kerosene
Res_LPG	State level activity data for LPG
Res_NaturalGas	State level activity data for natural gas
SCC	Lookup used for residential queries

Table 4. Group 1C Intermediate Tables

Table Name	Description
Res_all	Summary of state level residential fuel combustion activity
SEDS_Activity_Adjusted	Summary of adjusted state level ICI fuel combustion activity

Table 5. Group 2 County Level Tables

Table Name	Type	Description
County Level Activity_ICI	ICI	Adjusted EIA/SEDS ICI activity data at the county level
County Level Fuel_RES	Residential	Residential fuel use at the county level
Emission Factors_Combined	Both	Emission factors by SCC, pollutant, and state
Point_Activity_County_Level	ICI	User-supplied or calculated county level point source activity

Table 6. Macros

Macro Name	Description
01 Use State Level Activity to Update County Level Activity	Uses the Group 1 State Level Tables to create the County Level Activity ICI and County Level Fuel RES Tables in Group 2
02 Update Master Table with Activity and Emission Factors	Uses the Group 2 County Level Tables to update the CenSARA Master Table
03 Make Point Source Adjustment and Calculate Emissions	Adjusts the default activity based on point activity to calculate final area activity and emissions

Missouri used the CenSARA Fuel Combustion Activity Tool to provide emission estimates for Industrial, Commercial/Institutional (ICI), and Residential fuel combustion categories. Residential wood combustion is not calculated by this methodology and is included as a separate nonpoint category. The following discussion covers Missouri's state-specific work with CenSARA's tool to arrive at a final nonpoint combustion emission estimate. Following Missouri's state-specific discussion is the contractor provided documentation of the tool, including data resources used, emission factors, and point-nonpoint SCC crosswalks.

Missouri's analysis covers the 25 SCC codes in this category:

SCC	Source Classification Code Description
2102001000	Stationary Fuel Comb /Industrial /Anthracite Coal /Total: All Boiler Types
2102002000	Stationary Fuel Comb /Industrial /Bituminous/Subbituminous Coal /Total: All Boiler Types
2102004001	Stationary Fuel Comb /Industrial /Distillate Oil /Boilers
2102004002	Stationary Fuel Comb /Industrial /Distillate Oil /IC Engines
2102005000	Stationary Fuel Comb /Industrial /Residual Oil /Total: All Boiler Types
2102006000	Stationary Fuel Comb /Industrial /Natural Gas /Total: Boilers and IC Engines
2102007000	Stationary Fuel Comb /Industrial /Liquified Petroleum Gas /Total: All Boiler Types
2102008000	Stationary Fuel Comb /Industrial /Wood /Total: All Boiler Types
2102011000	Stationary Fuel Comb /Industrial /Kerosene /Total: All Boiler Types
2103001000	Stationary Fuel Comb /Commercial/Institutional /Anthracite Coal /Total: All Boiler Types
2103002000	Stationary Fuel Comb /Commercial/Institutional /Bituminous/Subbituminous Coal /Total: All Boiler Types
2103004001	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /Boilers
2103004002	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /IC Engines
2103005000	Stationary Fuel Comb /Commercial/Institutional /Residual Oil /Total: All Boiler Types
2103006000	Stationary Fuel Comb /Commercial/Institutional /Natural Gas /Total: Boilers and IC Engines
2103007000	Stationary Fuel Comb /Commercial/Institutional /Liquified Petroleum Gas /Total: All Combustor Types
2103008000	Stationary Fuel Comb /Commercial/Institutional /Wood /Total: All Boiler Types
2103011000	Stationary Fuel Comb /Commercial/Institutional /Kerosene /Total: All Combustor Types
2104001000	Stationary Fuel Comb /Residential /Anthracite Coal /Total: All Combustor Types
2104002000	Stationary Fuel Comb /Residential /Bituminous/Subbituminous Coal /Total: All Combustor Types
2104004000	Stationary Fuel Comb /Residential /Distillate Oil /Total: All Combustor Types
2104006000	Stationary Fuel Comb /Residential /Natural Gas /Total: All Combustor Types
2104007000	Stationary Fuel Comb /Residential /Liquified Petroleum Gas /Total: All Combustor Types
2104011000	Stationary Fuel Comb /Residential /Kerosene /Total: All Heater Types

The method provides estimates for CAP, HAP, and GHG emissions. Missouri submitted the 91 HAPs and GHG pollutants voluntarily to the NEI.

Checks of the CenSARA Tool:

Missouri and the other CenSARA states reviewed the data within the tool (activity, nonpoint fuel use, allocation method, emission factors) and found the following issues:

1. EIS does not accept pollutant code 40 because the emissions are also calculated for each individual species of PAH. The emissions for this pollutant code are removed from the data file submitted to EPA.

2. There are duplicate EFs in the EF table:
    - Lead emission factors have duplicates for 2013004001 and 2104004001. EF citations are from webFIRE or AP-42 Section 1.3. Since the webFIRE factor could not be found, the AP-42 factor is used. The factor is also corrected from 1.25 E-03 to 1.51E-03 to match AP-42.
    - Methane (CH4) has a duplicate for 2102004001.

3. The duplicates above created duplicates in the Master table which must also be deleted – meaning that fixing the EF table does not fix this because the way ERG set up the queries the Master table is never emptied or overwritten, only edited.
    - Also, there were duplicate Fluoranthene records for 2103004001 or 2103004002.

4. There are missing emission factors for several GHG pollutants (CO_2 2102004001, 2103004001, 21040*; CH_4 2102004002, 2103004002, 2104004000 through 210401100; N2O 2102004002, 2103004001 and 2103004002, 2104001000, 2104005000 through 2104011000). These omissions are not corrected as GHG emissions are voluntary.

5. For SCC 2102004002 and 2103004002 the emission factor table has emission factors for $PM_{2.5}$-PRI, PM_{10}-PRI, PM CON, NH_3, SO_2 and VOC, but the tool does not calculate all the emissions as listed in yellow below

SCC	SCC Description	CO	NH_3	NO_X	PM_{10}-FIL	PM_{10}-PRI	$PM_{2.5}$-FIL	$PM_{2.5}$-PRI	PM-CON	SO_2	VOC
2102004002	Stationary Fuel Comb /Industrial /Distillate Oil /IC Engines	192.81		895.82	63.03	64.52	59.03	60.51	1.48		
2103004002	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /IC Engines	35.25		163.79	11.52		11.52				

To correct this, the tools final master table was edited to add the missing pollutant/SCC/county records with throughput and emissions factor using a query. Then the rows were updated with a query to calculate the emission value.

Emission Factors:

The tool estimates CAP, HAP and GHG emissions using emission factors that are based on fuel usage.

Statewide Fuel Usage Estimates:

The Energy Information Administration (EIA) estimates total statewide fuel usage, and that number provides a starting point for nonpoint category activity. From the latest available 2010 EIA data, the initial estimate of total statewide fuel usage by SCC is below:

SCC	Source Classification Code Description	State Consumption	Unit
2102001000	Stationary Fuel Comb /Industrial /Anthracite Coal /Total: All Boiler Types	0	TON
2102002000	Stationary Fuel Comb /Industrial /Bituminous/Subbituminous Coal /Total: All Boiler Types	710,400	TON
2102004001	Stationary Fuel Comb /Industrial /Distillate Oil /Boilers	3,698.80	E3GAL
2102004002	Stationary Fuel Comb /Industrial /Distillate Oil /IC Engines	3,698.80	E3GAL
2102005000	Stationary Fuel Comb /Industrial /Residual Oil /Total: All Boiler Types	966.93	E3GAL
2102006000	Stationary Fuel Comb /Industrial /Natural Gas /Total: Boilers and IC Engines	63,120.16	E6FT3
2102007000	Stationary Fuel Comb /Industrial /Liquified Petroleum Gas /Total: All Boiler Types	15,772.40	E3GAL
2102008000	Stationary Fuel Comb /Industrial /Wood /Total: All Boiler Types	3,424,000	E6BTU
2102011000	Stationary Fuel Comb /Industrial /Kerosene /Total: All Boiler Types	294	E3GAL
2103001000	Stationary Fuel Comb /Commercial/Institutional /Anthracite Coal /Total: All Boiler Types	0	TON
2103002000	Stationary Fuel Comb /Commercial/Institutional /Bituminous/Subbituminous Coal /Total: All Boiler Types	134,125	TON
2103004001	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /Boilers	674.84	E3GAL
2103004002	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /IC Engines	674.84	E3GAL
2103005000	Stationary Fuel Comb /Commercial/Institutional /Residual Oil /Total: All Boiler Types	172.66	E3GAL
2103006000	Stationary Fuel Comb /Commercial/Institutional /Natural Gas /Total: Boilers and IC Engines	58922.03	E6FT3
2103007000	Stationary Fuel Comb /Commercial/Institutional /Liquified	4788.18	E3GAL

SCC	Source Classification Code Description	State Consumption	Unit
	Petroleum Gas /Total: All Combustor Types		
2103008000	Stationary Fuel Comb /Commercial/Institutional /Wood /Total: All Boiler Types	3,028,000	E6BTU
2103011000	Stationary Fuel Comb /Commercial/Institutional /Kerosene /Total: All Combustor Types	294	E3GAL
2104001000	Stationary Fuel Comb /Residential /Anthracite Coal /Total: All Combustor Types	0	TON
2104002000	Stationary Fuel Comb /Residential /Bituminous/Subbituminous Coal /Total: All Combustor Types	18,000	TON
2104004000	Stationary Fuel Comb /Residential /Distillate Oil /Total: All Combustor Types	65	E3GAL
2104006000	Stationary Fuel Comb /Residential /Natural Gas /Total: All Combustor Types	107,389	E6FT3
2104007000	Stationary Fuel Comb /Residential /Liquified Petroleum Gas /Total: All Combustor Types	4,870	E3BBL
2104011000	Stationary Fuel Comb /Residential /Kerosene /Total: All Heater Types	32	E3BBL

Non-Fuel Use Adjustment:

Because certain fuels are used as source materials for a final product (petroleum products become fertilizer or plastics products), this amount of fuel is removed from the amount potentially included in nonpoint combustion.

Point Source Subtraction:

Because the EIA fuel usage covers usage by both point and nonpoint facilities, Missouri subtracted the amount of fuel used at the 505 point sources to ensure this fuel use wasn't counted in both the point and nonpoint categories. To do this, point source data was first checked to ensure it was appropriate. Five emission units were changed from a status of "insignificant" or "inactive" back to "active" because they had reported a non-zero throughput and emissions greater than zero. All point source SCCs in Missouri's database are active in the EIS. During the review of individual fuel usage at the facility level, several facilities were noted to be using an incorrect SCC code (institution using an SCC for industrial fuel use SCC, industrial facility using electric fuel usage SCC, etc). These errors were corrected and the revised categorization is described in the following section for each facility type.

The provided crosswalk of point source SCCs was used to determine point source fuel usage by fuel type.

1. Coal (210*001000 and 210*002000): There is no anthracite coal usage in Missouri per the EIA, and emissions for 210*001000 are all zero. Fourteen industrial facilities and three institutional

facilities report bituminous/subbituminous coal usage in 2011. Of those, five of seven kiln operators use coal as a feedstock but do not directly report the tonnage of coal used at the facility (their emission factors are based on the tons of final product produced). Adding up the statewide total tonnage of coal used in each category, the totals are below:

Source type	Number of Facilities	Missouri Reported Coal Usage (tons)	EIA Estimated Coal Usage (tons)
Industrial	14	854,158	710,400
Commercial/Institutional	3 (all universities)	123,684	134,125

Missouri reports more tonnage of coal used in industrial point sources than the EIA estimates is used by all sources, point or nonpoint. This is likely an artifact of differing dataset years – Missouri point source data is 2011-specific and the EIA data is from 2010. All industrial nonpoint coal usage is zeroed out for Missouri.

Commercial/Institutional use is within 10% of each other, and given the year of data discrepancy, it is assumed all C/I coal usage is accounted for in the point source inventory, so nonpoint coal usage is zeroed out.

Residential coal use for heating is zeroed out based on the assumption that these units would be subject to state inspection and/or permitting and none have been identified.

2. Kerosene (210*011000): No industrial kerosene usage is reported by point sources. Only one institutional facility reports kerosene usage as a point source (Whiteman Air Force Base in Johnson County 29101). With a reported usage of 90,000 gal in 2011, the Johnson County point source usage is more than what the method would estimate for county-level nonpoint usage (1,300 gal). Instead of zeroing out the single county kerosene estimate for Johnson County, the 90 thousand gallons of kerosene usage in a single county is subtracted from the state level usage of 294 thousand gallons, and the remaining nonpoint kerosene usage (204 thousand gallons) is distributed throughout the state. No adjustments are made to residential kerosene usage.

3. Residual Oil (210*005000): Two institutional facilities and three industrial facilities report point source residual oil usage in 2011. The two institutional facilities are Northwest Missouri State University (Nodaway County, 29147) and SSM DePaul Health Center (St. Louis County, 29189) with usage of 6.79 and 3.782 thousand gallons respectively. The total commercial/institutional statewide residual oil usage is 172 thousand gallons, so the single counties with point source usage are adjusted. The three industrial sources account for 58 thousand gallons of the statewide usage of 966 thousand gallons, so the three counties with activity (St. Genevieve 29186, Mississippi Lime, 37 thousand gallons; St. Louis City 29510, JW Aluminum, 18.47 thousand gallons; Greene 29077, Carlisle Power Transmission, 3.1 thousand gallons) are adjusted. No adjustments are made to residential residual oil usage.

4. LPG (210*007000): Three institutional and nineteen industrial facilities reported point source LPG usage as listed in the table below. Over half of Missouri's estimated industrial LPG (7,882 thousand gallons of 15,772 thousand gallons) is accounted for in the point source inventory. Each of the nineteen counties with point source fuel usage is adjusted in either the commercial/institutional or industrial category. No adjustments are made to residential LPG usage.

County	Commercial/Institutional Facility Name	Fuel Use (thou gal)
29169		490.94
	INSTALN MGMNT CMND AND FT LEONARD WOOD-FORT LEONARD WOOD	490.94
29189		1.49
	MSD, MISSOURI RIVER WWTP-MO RIVER WASTERWATER TREATMENT PLANT	1.49
29213		23.54
	COLLEGE OF THE OZARKS-BRANSON	23.54
County	**Industrial Facility Name**	**Fuel Use (thou gal)**
29031		178.94
	BUZZI UNICEM USA-CAPE GIRARDEAU	1.94
	NORDENIA U.S.A. INC-NEELY'S LANDING-SITE 1	177.00
29033		10.08
	AGRISERVICES OF BRUNSWICK LLC WEST-BRUNSWICK WEST	10.08
29065		40.00
	ROYAL OAK ENTERPRISES INC-SALEM BRIQUET PLANT	40.00
29071		74.58
	BULL MOOSE TUBE COMPANY-BULL MOOSE TUBE COMPANY	74.58
29091		17.74
	ARMSTRONG HARDWOOD FLOORING COMPANY-WEST PLAINS	17.74
29093		6,716.00
	DOE RUN COMPANY-BUICK SMELTER	6,716.00
29095		391.00
	VANCE BROTHERS INC-BRIGHTON	391.00
29105		0.84
	BRUNSWICK FRESHWATER GROUP-LEBANON MISSOURI FACILITY	0.84
29125		1.16
	KINGSFORD MANUFACTURING CO-BRIQUETTING PLANT	1.16
29133		9.30
	CONSOLIDATED GRAIN AND BARGE CO-DORENA FACILITY	9.30
29143		43.91
	MAHAN GIN CO-MAHAN GIN CO	43.91
29145		1.19
	FAG BEARINGS CORPORATION-JOPLIN	1.19
29175		50.60
	THOMAS HILL ENERGY CENTER POWER DIVISION-THOMAS HILL	50.60
29201		30.80
	CROWDER GIN COMPANY INC-CROWDER	30.80
29207		298.91
	J. P. ROSS COTTON CO INC-J. P. ROSS COTTON CO INC	71.00
	W. W. WOOD PRODUCTS-DUDLEY	227.91
29510		16.95
	SOUTHERN METAL PROCESSING-SOUTHERN METAL PROCESSING	16.53
	ST. LOUIS METALLIZING COMPANY-ST LOUIS	0.42
Grand Total (Commercial/Institutional and Industrial)		**8,397.97**

5. Wood (210*008000):

Three institutional and fourteen industrial facilities reported point source wood combustion in 2011. These facilities reported a combination of wood throughput units of measure (tons, pounds, BTU) and usage was converted to mmBTU for adjustment of EIA data. Residential wood combustion is covered as a separate category.

		Heat Input (mmbtu)	
County and Total	**Point Source Facility Name**	**Commercial/ Institutional**	**Industrial**
29019		4,142.82	
	UNIVERSITY OF MISSOURI (MU)-POWER PLANT	4,142.82	
29053			5,525.00
	HUEBERT FIBERBOARD INC-BOONVILLE		205,525.00
29065			188,951.00
	ROYAL OAK ENTERPRISES INC-SALEM BRIQUET PLANT		188,951.00
29091			254,018.80
	ARMSTRONG HARDWOOD FLOORING COMPANY		62,108.80
	ROYAL OAK ENTERPRISES INC-WEST PLAINS BRIQUETTE		85,662.00
	SMITH FLOORING COMPANY-MOUNTAIN VIEW		106,248.00
29105			191,348.24
	INDEPENDENT STAVE CO INC-LEBANON PLANT		191,348.24
29107			2,491.84
	REMINGTON ARMS-REMINGTON ARMS, BLDG #1		2,491.84
29147		127,890.93	
	NORTHWEST MISSOURI STATE UNIVERSITY	127,890.93	
29157			18,179.20
	ATLAS EPS-PERRYVILLE		18,179.20
29161		95,404.50	
	MISSOURI UNIV. OF SCIENCE AND TECHNOLOGY	95,404.50	
29201			225,493.34
	HAVCO WOOD PRODUCTS INC		225,493.34
29203			25,961.73
	HARDWOODS OF MISSOURI LLC-BIRCH TREE		25,961.73
29207			16,945.34
	AMES TRUE TEMPER INC-BERNIE NORTH PLANT		16,945.34
29213			68,276.00
	ROYAL OAK ENTERPRISES-ROYAL OAK		

		Heat Input (mmbtu)	
County and Total	**Point Source Facility Name**	**Commercial/ Institutional**	**Industrial**
	ENTERPRISES		68,276.00
29215			3,046.33
	WOODPRO CABINETRY INC-CABOOL		3,046.33
29510			1,277.12
	ANHEUSER-BUSCH INC-ST. LOUIS		1,277.12
Grand Total		**227,438.25**	**1,201,513.94**

6. Natural Gas (210*006000):
   Fifty commercial/institutional and 218 industrial facilities reported point source natural gas usage in 2011. The number of facilities and total gas (in mmcf) used in 2011 is summarized to the county level below. No adjustment is made to residential natural gas usage.

	Commercial/Institutional		Industrial	
County	Number of Facilities	Heat Input (mmcf)	Number of Facilities	Heat Input (mmcf)
29007			6	877.11
29009			5	735.95
29017			1	1,291.95
29019	4	75.39	5	1,557.42
29021	1	124.83	9	1,317.80
29023			5	376.32
29027	2	7.80	2	137.03
29031	2	111.07	3	1,413.71
29037			1	37.90
29039			2	254.05
29045			1	8.82
29047	1	149.95	13	2,451.53
29051			2	153.98
29053	1	60.06	3	38.33

	Commercial/Institutional		Industrial	
County	Number of Facilities	Heat Input (mmcf)	Number of Facilities	Heat Input (mmcf)
29069			4	19.58
29071			8	92.69
29073			1	36.94
29077	3	420.00	6	796.79
29079			1	76.35
29083			3	50.96
29087			2	74.64
29091			2	53.45
29095	6	1,644.31	12	3,420.53
29097	3	64.79	7	609.79
29099			7	6,143.30
29101	3	396.60	1	84.12
29105			3	16.22
29107			1	122.94
29109			1	96.66

	Commercial/Institutional		Industrial	
County	Number of Facilities	Heat Input (mmcf)	Number of Facilities	Heat Input (mmcf)
29113			2	77.80
29115			1	7.58
29117			1	1.11
29119			1	1,286.92
29121			1	440.05
29123			1	118.81
29127			1	537.38
29133			1	20.97
29143			2	718.34
29145			4	75.31
29147	1	7.78	3	895.56
29155	1	81.00	3	90.78
29157			2	84.15
29159			7	2,497.04
29161			1	0.72

	Commercial/Institutional		Industrial	
County	Number of Facilities	Heat Input (mmcf)	Number of Facilities	Heat Input (mmcf)
29163			3	111.57
29165	2	216.56	2	124.03
29169	1	634.41		
29183	2	128.48	8	502.16
29186			2	115.07
29187			2	433.31
29189	6	969.57	15	2,019.31
29195			2	1,599.82
29201			3	196.35
29205			1	85.85
29207			2	915.80
29213	1	101.34		
29215			1	155.89
29217			2	762.29
29219			1	2.20

	Commercial/Institutional		Industrial	
County	**Number of Facilities**	**Heat Input (mmcf)**	**Number of Facilities**	**Heat Input (mmcf)**
29221			2	76.79
29225			2	18.63
29229			1	26.48
29510	10	1,700.22	21	3,106.54
Grand Total	**50**	**6,894.16**	**218**	**39,451.43**

7. Diesel/Distillate (210*00400*):

Nineteen commercial/institutional and 61 industrial facilities reported point source diesel usage in 2011. The list of facilities and their usage in thousand gallons are listed in the following table. The individual county fuel usage is adjusted by these amounts which are divided in half to apply equal portions to the boiler and I/C engine SCCs. No adjustment is made to residential diesel usage.

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
29007			0.02
	AMEREN MISSOURI-AUDRAIN POWER STATION		0.02
29013			8.82
	BUTLER MUNICIPAL POWER PLANT-BUTLER		8.82
29019		21.47	0.54
	CHRISTIAN HEALTH SYSTEMS-BOONE HOSPITAL CENTER	21.00	
	COLUMBIA ENERGY CENTER-PEABODY ROAD		0.54
	UNIVERSITY OF MISSOURI (MU)-POWER PLANT	0.47	
29021		2.41	2.10
	ALTEC INDUSTRIES INC-ST. JOSEPH		2.10
	HEARTLAND REGIONAL MEDICAL CENTER EAST-ST. JOSEPH	2.41	
29027			312.02
	AMEREN MISSOURI-CALLAWAY NUCLEAR POWER PLANT		312.02
29031			9.09
	JACKSON MUNICIPAL UTILITIES-JACKSON		6.14
	PROCTER & GAMBLE PAPER PRODUCTS CO-NEELY'S LANDING		2.95
29045			0.94
	KAHOKA ELECTRIC GENERATING PLANT		0.94
29047			44.25
	FORD MOTOR CO-KANSAS CITY ASSEMBLY PLANT		0.80
	INDEPENDENCE POWER AND LIGHT-MISSOURI CITY STATION		43.45
29053		1.80	

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
	OFFICE OF ADMINISTRATION FMDC	1.80	
29071			1.59
	AMEREN MISSOURI-LABADIE PLANT		1.59
29077			2.17
	3M COMPANY-SPRINGFIELD ITSD/TMD		0.50
	ARCHIMICA INC-SPRINGFIELD		0.43
	CITY UTILITIES OF SPRINGFIELD MISSOURI-JAMES RIVER		0.15
	CITY UTILITIES OF SPRINGFIELD MISSOURI-JOHN TWITTY		0.26
	CITY UTILITIES OF SPRINGFIELD-FULBRIGHT WATER		0.73
	DAIRY FARMERS OF AMERICA INC-SPRINGFIELD		0.10
29079			8.83
	TRENTON MUNICIPAL UTILITIES-TRENTON PEAKING PLANT		8.83
29083			7.70
	APAC MO, INC-TIGHTWAD (LEESVILLE) QUARRY		7.70
29095		36.03	73.77
	ALLIANT TECHSYSTEMS INC-LAKE CITY		0.98
	BARBER & SONS AGGREGATES-LEES SUMMIT		46.66
	BAYER CROPSCIENCE-KANSAS CITY		26.13
	CROWN CENTER REDEVELOPMENT CORPORATION	1.25	
	RESEARCH MEDICAL CENTER-MIDWEST DIVISION-RMC, LLC	0.78	
	U. S. DEPT OF ENERGY-KANSAS CITY PLANT (NNSA)	34.00	
29097			0.14

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
	EBV EXPLOSIVES ENVIRONMENTAL CO-JOPLIN		0.14
29099			1.57
	AMEREN MISSOURI-RUSH ISLAND PLANT		1.45
	METAL CONTAINER CORPORATION-ARNOLD		0.12
29101		11.96	0.09
	HOLDEN POWER PLANT-HOLDEN		0.09
	WHITEMAN AIR FORCE BASE-WHITEMAN	11.96	
29107			6.67
	HIGGINSVILLE MUNICIPAL POWER FACILITY		6.67
29109			0.48
	BCP INGREDIENTS-VERONA PLANT		0.48
29113			0.31
	BODINE ALUMINUM INC-TROY		0.31
29115			0.80
	MARCELINE MUNICIPAL UTILITY		0.80
29117			13.98
	CHILLICOTHE MUNICIPAL UTILITIES-CHILLICOTHE		13.98
29119			35.56
	WAL-MART NORTH DATA CENTER-PINEVILLE		35.56
29125			361.82
	KINGSFORD MANUFACTURING CO-BRIQUETTING PLANT		361.82
29143			15.92
	BUNGE NORTH AMERICA INC-LINDA ELEVATOR		15.00
	NEW MADRID POWER PLANT-MARSTON		0.92

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
29145			0.12
	LA-Z-BOY, INCORPORATED-LA-Z-BOY MIDWEST		0.12
29147			0.02
	ENERGIZER BATTERY MANUFACTURING INC-MARYVILLE PLANT		0.02
29151			1.03
	CENTRAL ELECTRIC POWER COOPERATIVE-CHAMOIS PLANT		1.03
29159			0.07
	PITTSBURGH-CORNING CORP-SEDALIA		0.07
29161			12.30
	ROLLA MUNICIPAL UTILITIES-MULTIPLE PEAKING PLANTS		12.30
29163			85.89
	ASHLAND INC-MISSOURI CHEMICAL WORKS		85.84
	WAYNE B SMITH INC-LOUISIANA		0.05
29165		9.29	
	KCI AIRPORT - KCMO AVIATION DEPT-KCI AIRPORT	9.29	
29169		44.48	
	INSTALN MGMNT CMND AND FT LEONARD WOOD	44.48	
29175			73.43
	THOMAS HILL ENERGY CENTER POWER DIVISION		73.43
29183		4.57	183.67
	AMEREN MISSOURI-SIOUX PLANT		177.41
	MEMC ELECTRONIC MATERIALS INC-ST. PETERS PLANT		6.26

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
	ST. JOSEPH HEALTH CENTER-ST. JOSEPH HEALTH CENTER	4.57	
29187			51.88
	LEAD BELT MATERIALS CO INC-BONNE TERRE		9.78
	LEAD BELT MATERIALS CO INC-PARK HILLS		12.89
	VALLEY MINERALS, LLC-BONNE TERRE		29.21
29189		44.98	69.95
	AMEREN MISSOURI-MERAMEC PLANT		0.39
	MONSANTO WORLD HEADQUARTERS-LINDBERGH BLVD		30.64
	MONSANTO-CHESTERFIELD VILLAGE		29.74
	REICHHOLD, INC-VALLEY PARK		0.42
	ROCKWOOD PIGMENTS NA INC-E HOFFMEISTER		0.78
	ST. LOUIS AIRPORT AUTHORITY-LAMBERT INTERNATIONAL	19.15	
	ST. LUKE'S HOSPITAL-WOODS MILL ROAD	13.01	
	ST. MARYS HEALTH CENTER-RICHMOND HEIGHTS	0.53	
	THE BOEING COMPANY-ST. LOUIS		7.98
	WASHINGTON UNIVERSITY-DANFORTH CAMPUS	12.29	
29195			5.15
	MARSHALL MUNICIPAL UTILITIES		5.15
29205			14.20
	SHELBINA POWER PLANT-SHELBINA POWER PLANT		14.20
29213		30.00	25.07
	COLLEGE OF THE OZARKS-BRANSON	30.00	

County and Total	Facility Name	Diesel Usage (thousand gallons) Commercial/ Institutional	Industrial
	TABLE ROCK ASPHALT CONSTR CO INC-HWY 248 QUARRY		25.07
29217			1.44
	3M COMPANY-NEVADA - COMMERCIAL GRAPHICS		1.44
29510		58.35	32.10
	BARNES JEWISH HOSPITAL-ST LOUIS	24.60	
	MALLINCKRODT INC-N SECOND		17.22
	PROCTER AND GAMBLE-ST. LOUIS		3.79
	SOUTHERN METAL PROCESSING		11.09
	TRIGEN-ST. LOUIS ENERGY CORP-ASHLEY STREET STATION	3.84	
	WASHINGTON UNIV MEDICAL SCHOOL-BOILER PLANT	29.91	
Grand Total		**265.33**	**1,465.49**

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Emission Totals:

The final statewide nonpoint ICI and residential emissions submitted to the 2011 NEI are as follows:

SCC	SCC Description	CO	NH_3	NO_X	PM_{10} FIL	PM_{10} PRI	$PM_{2.5}$ FIL	$PM_{2.5}$ PRI	PM CON	SO_2	VOC
2102001000	Stationary Fuel Comb /Industrial /Anthracite Coal /Total: All Boiler Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2102002000	Stationary Fuel Comb /Industrial /Bituminous/Subbituminous Coal /Total: All Boiler Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2102004001	Stationary Fuel Comb /Industrial /Distillate Oil /Boilers	7.42	1.19	29.66	1.48	3.41	0.37	2.30	1.93	63.18	0.30
2102004002	Stationary Fuel Comb /Industrial /Distillate Oil /IC Engines	192.81	0.12	895.82	63.03	64.52	59.03	60.51	1.48	59.03	0.30
2102005000	Stationary Fuel Comb /Industrial /Residual Oil /Total: All Boiler Types	2.27	0.36	24.98	9.41	10.09	6.13	6.81	0.68	160.43	0.13
2102006000	Stationary Fuel Comb /Industrial /Natural Gas /Total: Boilers and IC Engines	994.10	37.87	1,183.46	2.37	6.39	1.30	5.09	3.79	7.10	65.09

SCC	SCC Description	CO	NH_3	NO_X	PM_{10} FIL	PM_{10} PRI	$PM_{2.5}$ FIL	$PM_{2.5}$ PRI	PM CON	SO_2	VOC
2102007000	Stationary Fuel Comb /Industrial /Liquified Petroleum Gas /Total: All Boiler Types	31.44	1.18	56.14	0.08	0.20	0.04	0.16	0.12	0.24	2.05
2102008000	Stationary Fuel Comb /Industrial /Wood /Total: All Boiler Types	666.75	7.78	244.47	555.62	574.51	477.83	496.73	18.89	27.78	18.89
2102011000	Stationary Fuel Comb /Industrial /Kerosene /Total: All Boiler Types	0.71	0.11	2.84	0.14	0.32	0.04	0.22	0.18	6.26	0.03
2103001000	Stationary Fuel Comb /Commercial/Institutional /Anthracite Coal /Total: All Boiler Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2103002000	Stationary Fuel Comb /Commercial/Institutional /Bituminous/Subbituminous Coal /Total: All Boiler Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SCC	SCC Description	CO	NH_3	NO_X	PM_{10} FIL	PM_{10} PRI	$PM_{2.5}$ FIL	$PM_{2.5}$ PRI	PM CON	SO_2	VOC
2103004001	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /Boilers	1.36	0.22	5.42	0.29	0.65	0.23	0.58	0.35	11.55	0.09
2103004002	Stationary Fuel Comb /Commercial/Institutional /Distillate Oil /IC Engines	35.25	0.02	163.79	11.52	11.80	11.52	11.80	0.27	10.79	0.09
2103005000	Stationary Fuel Comb /Commercial/Institutional /Residual Oil /Total: All Boiler Types	0.41	0.06	4.46	1.21	1.33	0.45	0.57	0.12	28.66	0.09
2103006000	Stationary Fuel Comb /Commercial/Institutional /Natural Gas /Total: Boilers and IC Engines	2,185.18	12.75	2,601.40	5.20	13.53	2.86	11.19	8.32	15.61	143.08
2103007000	Stationary Fuel Comb /Commercial/Institutional /Liquified Petroleum Gas /Total: All Combustor Types	17.03	0.11	30.41	0.04	0.11	0.02	0.09	0.06	0.13	1.11

SCC	SCC Description	CO	NH_3	NO_X	PM_{10} FIL	PM_{10} PRI	$PM_{2.5}$ FIL	$PM_{2.5}$ PRI	PM CON	SO_2	VOC
2103008000	Stationary Fuel Comb /Commercial/Institutional /Wood /Total: All Boiler Types	840.17	7.00	308.06	700.14	723.95	602.12	625.93	23.80	35.01	23.80
2103011000	Stationary Fuel Comb /Commercial/Institutional /Kerosene /Total: All Combustor Types	0.49	0.08	1.97	0.11	0.24	0.08	0.21	0.13	4.35	0.03
2104001000	Stationary Fuel Comb /Residential /Anthracite Coal /Total: All Combustor Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2104002000	Stationary Fuel Comb /Residential /Bituminous/Subbituminous Coal /Total: All Combustor Types	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2104004000	Stationary Fuel Comb /Residential /Distillate Oil /Total: All Combustor Types	3.41	0.68	12.29	0.74	1.62	0.57	1.45	0.89	29.07	0.48
2104005000	Stationary Fuel Comb /Residential /Residual Oil /Total: All Combustor Types	0	0	0	0	0	0	0	0	0	

SCC	SCC Description	CO	NH_3	NO_X	PM_{10} FIL	PM_{10} PRI	$PM_{2.5}$ FIL	$PM_{2.5}$ PRI	PM CON	SO_2	VOC
2104006000	Stationary Fuel Comb /Residential /Natural Gas /Total: All Combustor Types	2,147.78	1,073.89	5,047.28	10.74	27.92	5.91	23.09	17.18	32.22	295.32
2104007000	Stationary Fuel Comb /Residential /Liquified Petroleum Gas /Total: All Combustor Types	388.63	4.75	1,370.42	1.94	5.04	1.07	4.17	3.10	5.82	53.35
2104011000	Stationary Fuel Comb /Residential /Kerosene /Total: All Heater Types	3.24	0.65	11.66	0.70	1.54	0.54	1.38	0.84	27.60	0.45

QA of Data Created by Tool:

Number of Records: There are 115 counties in Missouri, and 115 location data records. With 25 SCC's per county and 115 counties, there are 2,875 records in the reporting period and emission process tables. With between 13 and 62 pollutants per SCC, there are 97,865 records in the emissions table submitted to the EIS.

The master data table didn't populate the TotalEmissions or activity fields for SCC 2104005000 (Residential Residual Oil) since nonpoint activity was zero. These fields were updated in the master table and EIS staging table.