



Industrial, Commercial, and Institutional Fuel Combustion:

Documentation for EPA's Nonpoint Emissions Estimation Tool

ICI Tool Version 1.4



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U.S. Environmental Protection Agency
Emissions Inventory and Analysis Group
Office of Air Quality Planning and Standards
Research Triangle Park, NC, USA

Submitted by:

Abt Associates
5001 South Miami Blvd., Suite 210
Durham, NC, USA

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1. Introduction

Emissions from Industrial, Commercial, and Institutional (ICI) fuel combustion are often a significant portion of most areas' total emissions inventory. Unless all ICI combustion emission sources are covered in a geographic area's point source inventory, it is necessary for inventory preparers to estimate ICI combustion nonpoint source emissions. Because there are specific challenges associated with estimating ICI nonpoint source emissions, the U.S. EPA in conjunction with Abt Associates developed a Microsoft® Access-based ICI Combustion Tool to assist State, Local, and Tribal agencies in estimating nonpoint emissions from ICI fuel combustion for the 2014 National Emission Inventory.

The primary data source behind the ICI Combustion Tool is total state-level ICI energy consumption data released annually as part of the Energy Information Administration's State Energy Data System (SEDS). The ICI Combustion Tool processes the SEDS data and adjusts the data to account for the fraction of fuel consumed by nonroad mobile sources whose emissions are included in the nonroad inventory and by non-fuel combustion uses of energy, such as product feedstocks. Through a user-friendly interface, users can update the underlying assumptions in the adjustment methodology. The ICI Combustion Tool also includes a nonpoint source to point source crosswalk and allows the user to perform point source activity subtractions to avoid double counting of emissions between their point and nonpoint inventories. The ICI Combustion Tool generates outputs in EPA's Emissions Inventory System (EIS) format, ready for submission to the EIS. This documentation provides an overview of the ICI Combustion Tool and the procedures for developing a credible estimate of nonpoint emissions from ICI fuel-combustion sources.

2. Source Classification Codes and Pollutants Included in ICI Tool

Table 1 displays the source categories included in the ICI Combustion Tool and Table 2 displays the pollutant types covered.

Table 1. Source Categories Included in ICI Tool

SCC	Description
Industrial	
2102001000	Anthracite Coal /Total: All Boiler Types
2102002000	Bituminous/Subbituminous Coal /Total: All Boiler Types
2102004001	Distillate Oil /Boilers
2102004002	Distillate Oil /IC Engines
2102005000	Residual Oil /Total: All Boiler Types
2102006000	Natural Gas /Total: Boilers and IC Engines
2102007000	Liquified Petroleum Gas /Total: All Boiler Types
2102008000	Wood /Total: All Boiler Types
2102011000	Kerosene /Total: All Boiler Types
Commercial/Institutional	
2103001000	Anthracite Coal /Total: All Boiler Types
2103002000	Bituminous/Subbituminous Coal /Total: All Boiler Types
2103004001	Distillate Oil /Boilers
2103004002	Distillate Oil /IC Engines
2103005000	Residual Oil /Total: All Boiler Types
2103006000	Natural Gas /Total: Boilers and IC Engines
2103007000	Liquified Petroleum Gas /Total: All Combustor Types
2103008000	Wood /Total: All Boiler Types
2103011000	Kerosene /Total: All Combustor Types

Table 2. Pollutants Included in ICI Tool

Category	Pollutant(s)
Criteria	Carbon monoxide
	Nitrogen oxides
	PM ₁₀
	PM _{2.5}
	Sulfur dioxide
	Volatile organic compounds
Hazardous	Polycyclic organic matter
	Metals
	Dioxins/furans
	Other HAPs emitted from fuel combustion
PM Precursor	Ammonia

3. Overview of Calculations

ICI combustion nonpoint source emissions are calculated using Equation 1. The sector reference represents Industrial or Commercial/Institutional, and fuel types include: coal, natural gas, distillate oil, residual oil, liquefied petroleum gas, kerosene and wood.

$$E_{s,f} = A_{s,f} * F_{s,f} \quad (1)$$

where E is emissions, A is emissions activity, F is emission factor, S is sector, and f is fuel type.

The key emissions activity data inputs in the emissions estimation methodology are:

1. Total Industrial and total Commercial/Institutional energy consumption by fuel type and state for a given year;
2. Industrial energy consumed for non-fuel purposes by fuel type and state in that year;
3. ICI distillate oil and liquefied petroleum gas (LPG) consumption by state from nonroad mobile sources for the year of interest;
4. ICI energy consumption by sector, state, and fuel type for point sources for the given year; and
5. County-level employment by ICI sector and state for the year of interest.

The ICI Tool also relies on emission factors relating emission rates to the volume of fuel burned by sector/fuel type, and the sulfur content of coal consumed in each sector by state for the given year.

ICI combustion emissions are directly related to the sector, type, and volume of fuel burned. The EIA is responsible for developing official federal government estimates of energy consumption. The EIA estimates annual energy consumption at the state-level as part of the State Energy Data System (SEDS) (EIA, 2015a). The SEDS reports energy consumption estimates by state, sector, fuel type, and year. The SEDS provides data for each of five consuming sectors, including Industrial and Commercial (note that the SEDS' definition of "Commercial" includes Institutional sector use). The EIA also publishes additional detailed estimates of state-level fuel oil and kerosene consumption estimates in their *Fuel Oil and Kerosene Sales* publication (EIA, 2013a). This publication provides state-level annual end use sales of No.1, No. 2, and No. 4 distillate fuel oil for commercial, industrial, oil company, farm, off-highway construction, and other uses – these data are used to differentiate stationary from mobile source distillate fuel consumption.

4. Activity Data Adjustments

4.1 Fuel Specific 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 are 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 2013 from the EIA’s *Annual Coal Distribution Report 2013* are used to allocate coal consumption between the two types of coal (EIA, 2015b). The 2013 ratio of anthracite coal consumption to total coal consumption is used for this allocation procedure.

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* are combined with assumptions used in the regulatory impact analysis (RIA) for EPA’s nonroad diesel emissions rulemaking (EIA, 2015b; EPA, 2003).

For distillate fuel, Table 3 presents the assumptions that are applied to the state-level Commercial sector distillate oil consumption data published in *Fuel Oil and Kerosene Sales* to estimate Commercial sector stationary source consumption.

Table 3. Stationary Source Adjustments for Industrial Sector Distillate Fuel Consumption

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

^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 percent 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*).

Table 4 presents the assumptions that are applied to the state-level Commercial sector distillate oil consumption data published in Fuel Oil and Kerosene Sales to estimate Commercial sector stationary source consumption.

Table 4. Stationary Source Adjustments for Commercial Sector Distillate Fuel Consumption

Sector	Distillate Fuel Type	% of Total Consumption from Stationary Sources
Commercial	No. 1 Distillate Fuel Oil	80
	No. 2 Distillate Fuel Oil	100
	No. 2 Distillate/Ultra-Low, Low, and High Sulfur Diesel	0 ^a
	No. 4 Distillate Fuel Oil	100

^a A very small portion of total commercial/institutional diesel is consumed by point sources (SCC 203001xx).

In order to avoid double-counting of LPG consumption, the ICI Tool uses data from the EPA National Mobile Inventory Model (NMIM) for 2006 to calculate the national volume of nonroad LPG consumption from agriculture, logging, mining, and construction source categories. This estimate is 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 is assumed that these proportions are appropriate for future inventory years. This estimate of the nonroad portion of LPG consumption is subtracted from each state's ICI LPG consumption estimate reported in SEDS.

4.2 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 are 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 is also assumed that kerosene and motor gasoline are 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, non-coke coal and residual oil are derived from non-fuel (feedstock) and total energy use statistics contained in EIA's *2010 Manufacturing Energy Consumption Survey (MECS)* (EIA, 2013b) and are presented in Table 5.

Table 5. Industrial Sector Non-Fuel Use Estimates

Fuel	% of Total Energy Consumption from Non-Fuel Use				Source
	Northeast	Midwest	South	West	
Non-Coke Coal	63	38	26	4 ^b	2010 MECS
Natural Gas	1	5	14	2	2010 MECS
LPG	33	88	99	6 ^b	2010 MECS
Distillate Oil	4 ^a	4 ^a	4 ^a	4 ^a	2010 MECS
Residual Oil	5 ^b	50	68	20 ^b	2010 MECS

^a Nonfuel use of distillate fuel oil was not reported at the regional level, therefore the default nonfuel use fractions are based on national nonfuel use of distillate fuel oil.

^b Nonfuel use was reported in EIA data as "less than 0.5". In these cases a value of 0.25 was used to estimate the default nonfuel use fractions.

4.3 Point Source Energy Adjustment

To ensure that fuel consumption is not double-counted in the point source inventory, it is also necessary to subtract point source inventory fuel use from the fuel consumption estimates developed from the above steps. Equation 2 illustrates the approach to performing point source subtractions.

$$N_{s,f} = T_{s,f} - P_{s,f} \quad (2)$$

where N is nonpoint fuel consumption, T is total fuel consumption, P is point source fuel consumption, s is sector, and f is fuel type.

The first step in the point source subtraction procedure is to identify how each ICI combustion nonpoint source classification code (SCC) links to associated ICI combustion point SCCs. The ICI Combustion Tool includes two such crosswalks: one between each Industrial fuel combustion nonpoint SCC and related point SCCs, and an analogous crosswalk developed for Commercial/Institutional fuel combustion SCCs. One issue to note is that natural gas consumed as pipeline fuel is not included by the SEDS within the Industrial sector. Therefore, it is necessary to exclude pipeline natural gas consumption in performing natural gas combustion subtraction. This consumption may be included within industrial sector natural gas internal combustion engine records (SCC 202002xx).

An issue that must be considered is the geographic resolution at which point source subtractions should be performed. While the locations of point sources is accurately known at (and below) the county-level, total ICI combustion activity is much less clear. Because of the level of uncertainty associated with the county distribution of total ICI fuel consumption, states may wish to perform the ICI combustion point source subtractions at the state-level, and then allocate the resulting nonpoint source fuel consumption to counties. On the contrary, if states have more accurate county-level fuel consumption values then point source subtraction can be performed at the county-level. The ICI Tool is designed to prioritize county-level data over state-level data, so where county-level data exists, the ICI Tool will perform county-level subtractions before using state-level data.

If an agency does not have county- or state-level point source activity data, emissions data can be used in the place of activity data in the point source subtraction procedure. The procedure

follows the same steps, except that the emissions are calculated first, and then the point source activity data are subtracted from the total emissions.

5. County Allocation of State Activity

Because the EIA only reports energy consumption down to the state-level, it is necessary to develop a procedure to allocate EIA's fuel consumption estimates (after adjustments noted in sections above) to counties. For the NEI, the procedure relies on the use of allocation factors developed from the county-level number of employees in the Industrial sector and the county number of employees in the Commercial/Institutional sector. Because EIA fuel consumption data originate from fuel sector-specific surveys of energy suppliers,¹ we reviewed these survey forms/instructions for further details on what individual economic sectors EIA considers to comprise the Industrial and Commercial sector. Based on this review, we compiled employment data for manufacturing sector North American Industrial Classification System (NAICS) codes (i.e., NAICS 31-33) for use in allocating Industrial fuel combustion. The only source of NAICS-code based EIA definitions of the Commercial energy sector is a "rough crosswalk" between Commercial building types and NAICS codes developed for EIA's Commercial Building Energy Consumption Survey (CBECS) (EIA, 2013c). With the exception of NAICS code 814 (Private Households), this crosswalk links all NAICS codes between 42 and 92 with Commercial building energy consumption.

The ICI Combustion Tool compiles employment data for these NAICS codes from two Bureau of the Census publications – *County Business Patterns* (for private sectors) and *Census of Governments* (for public administration sectors) (Bureau of the Census, 2015a; Bureau of the Census, 2015b). For NAICS code 92, county-level employment is estimated from local government employment data in the *Census of Governments*.² Employment estimates from each source are then combined to estimate total Commercial/Institutional sector employment by county. The state-level fuel combustion by fuel type estimates in each sector are then allocated to each county using the ratio of the number of Industrial or Commercial/Institutional employees in each county in a given state.

Due to concerns with releasing confidential business information, County Business Patterns (CBP) withholds values for a given county/NAICS code if it would be possible to identify data for individual facilities. In such cases, the Census reports a letter code, representing a particular employment size range. We used the following procedure to estimate data for withheld counties/NAICS codes.

1. County-level employment for counties with reported values are totaled by state for the applicable NAICS code.
2. The value from step 1 is subtracted from the state employment value for the NAICS code.
3. Each of the withheld counties is assigned an initial employment estimate reflecting the midpoint of the CBP range code (e.g., code A, which reflects 1-19 employees, is assigned an estimate of 10 employees).
4. The initial employment estimates from step 3 are then summed to the state level.
5. The value from step 2 is divided by the value from step 4 to yield an adjustment factor to apply to the initial employment estimates to yield employment values that will sum to the state employment total for the applicable NAICS code.
6. The final county-level employment values are estimated by multiplying the initial employment estimates from step 3 by the step 5 adjustment factors.

¹ For natural gas, for example – EIA-176 "Annual Report of Natural and Supplemental Gas Supply and Disposition."

² County-level federal and state government employment data are not available from the Bureau of the Census.

Table 6 illustrates the employment estimation procedure with an example of CBP data reported for Maine.

Table 6. NAICS Code 31-33 (Manufacturing) Employment Data for Maine

FIPSSTATE	FIPSCTY	NAICS	EMPFLAG	EMP
23	001	31----		6,774
23	003	31----		3,124
23	005	31----		10,333
23	007	31----		1,786
23	009	31----		1,954
23	011	31----		2,535
23	013	31----		1,418
23	015	31----	F	0
23	017	31----		2,888
23	019	31----		4,522
23	021	31----		948
23	023	31----	I	0
23	025	31----		4,322
23	027	31----		1,434
23	029	31----		1,014
23	031	31----		9,749

1. The total of employees not including counties 015 and 023 is 52,801.
2. *County Business Patterns* reports 59,322 state employees in NAICS 31—the difference is 6,521.
3. County 015 is given a midpoint of 1,750 (since range code F is 1,000-2,499) and County 023 is given a midpoint of 17,500.
4. State total for these two counties is 19,250.
5. $6,521/19,250 = 0.33875$.

The final employment estimate for county 015 is $1,750 \times 0.33875 = 593$. The county 023 final employment estimate is computed as $17,500 \times 0.33875 = 5,928$.

6. Emission Factors

Table A-3 lists the criteria pollutant emissions factors used in the ICI Combustion Tool. The criteria and hazardous air pollutant emission factors for each nonpoint source fuel combustion category included in the ICI Combustion Tool are primarily EPA emission factors. 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 SO₂ 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 are obtained from the EIA's quarterly coal report (EIA, 2012). For anthracite coal, an ash content value of 13.38% and a sulfur content of 0.89% are applied to all states.

For distillate combustion, the SO₂ emission factors are based on the sulfur content of distillate. The default values are based on the distribution of sales of high-sulfur (> 500 ppm), low sulfur (15 – 500 ppm) and ultra-low-sulfur (< 15 ppm) distillate fuels from the EIA's Distillate Sales data (EIA, 2013a). Because the percent sulfur in distillate fuels is changing due to regulations in many areas, S/L/T agencies are encouraged to review and update these assumptions.

7. Running the ICI Tool

The ICI Combustion Tool includes a user-friendly graphical interface that walks the user through the development of their nonpoint ICI combustion emissions inventory. The ICI Combustion Tool allows the user to select the state(s) of interest, import state- or county-level point source inventory data, modify the default assumptions used in the Tool, and export their final nonpoint ICI emissions inventory in EIS staging format. Figures 1 through 5 below show snapshots of the user interface.

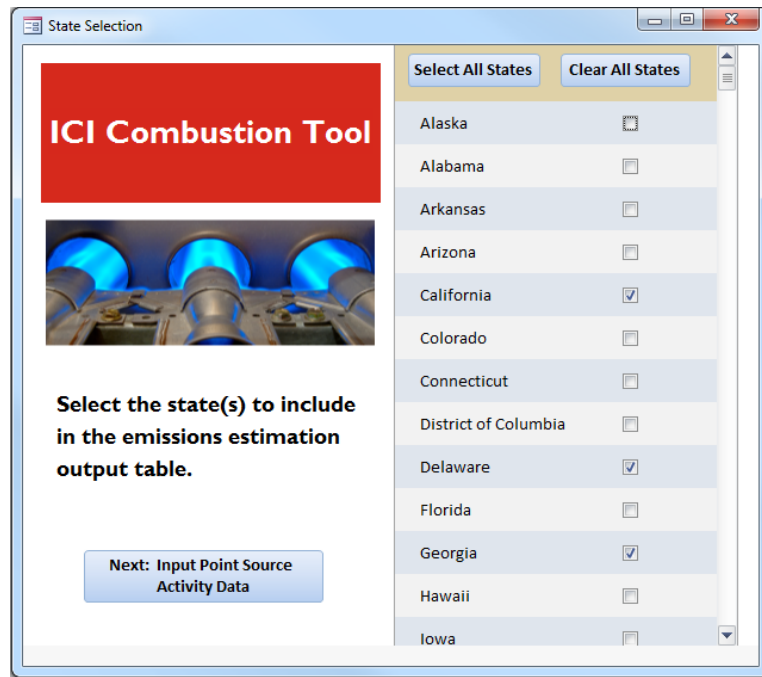


Figure 1. Snapshot of state selection interface

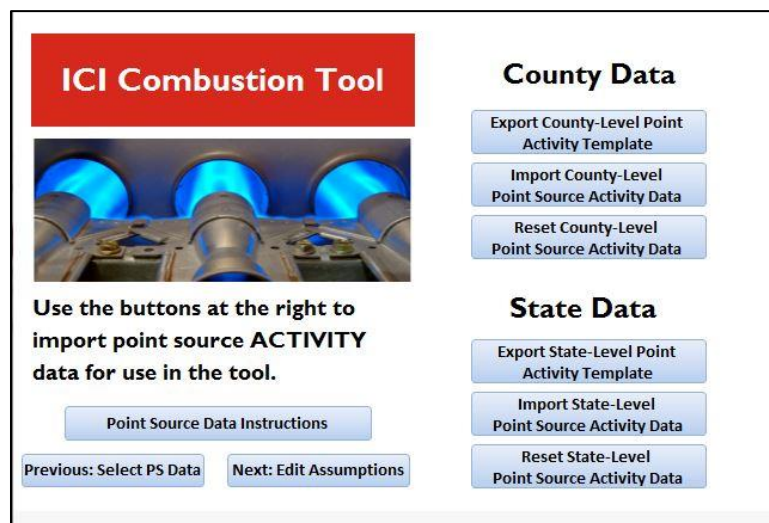


Figure 2. Snapshot of point source activity data import interface

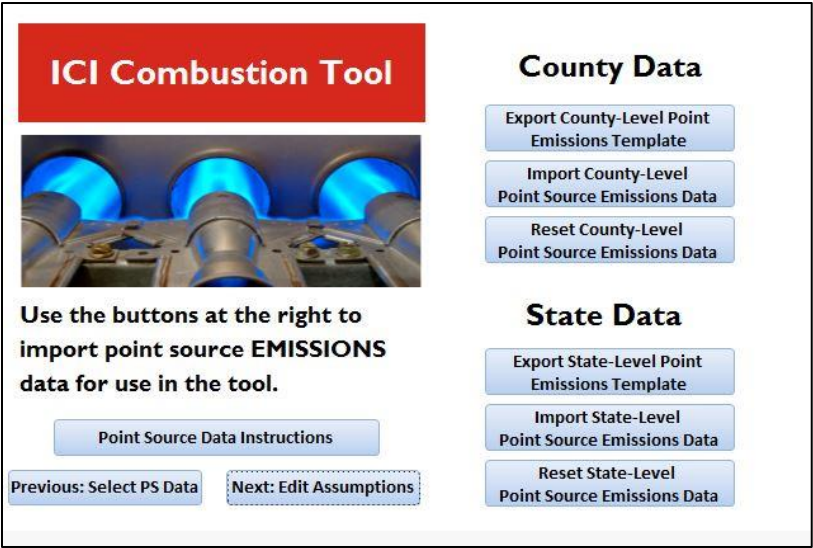


Figure 3. Snapshot of point source emissions data import interface

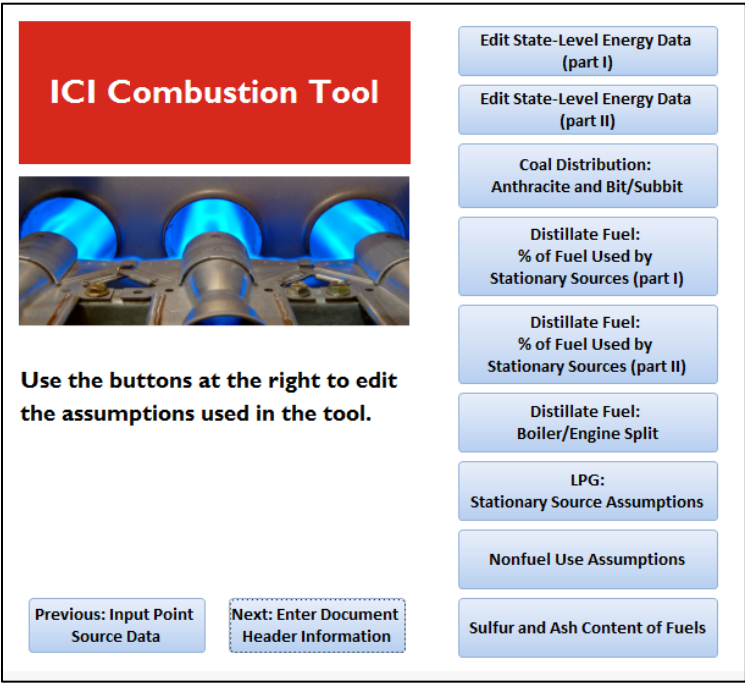


Figure 4. Snapshot of assumptions interface

ICI Combustion Tool

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Organization Name*	<input type="text" value="DNR"/>
Document Title*	<input type="text" value="EIS"/>
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Comment	<input type="text"/>
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Data Category*	<input type="text" value="Nonpoint"/>
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Previous: Edit Assumptions

Next: Run ICI Combustion Tool

** Indicates required field.*

Figure 5. Snapshot of Document Header interface

7. References

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Appendix A. SCC Crosswalks and Emission Factors

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
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
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10200229	External Combustion Boilers	Industrial	Subbituminous Coal	Cogeneration
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)
50390002	Waste Disposal	Solid Waste Disposal - Industrial	Auxillary Fuel/No Emissions	Coal
2102004001 - Stationary Source Fuel Combustion; Industrial; Distillate Oil; Boilers				
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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)
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
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
39990021	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2 Oil): Flares
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
2102004002 - Stationary Source Fuel Combustion; Industrial; Distillate Oil; IC Engines				
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)
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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
30890002	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Process Heaters

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
39000499	Industrial Processes	In-process Fuel Use	Residual Oil	General
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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-fired
30600903	Industrial Processes	Petroleum Industry	Flares	Natural Gas
30609903	Industrial Processes	Petroleum Industry	Incinerators	Natural Gas
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
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 **
39000699	Industrial Processes	In-process Fuel Use	Natural Gas	General
39900601	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	Natural Gas

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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	Auxillary 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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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
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	Auxillary 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 ($\geq 20\%$ 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)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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 Subtraction

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
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
50190002	Waste Disposal	Solid Waste Disposal - Government	Auxillary Fuel/No Emissions	Coal
50290002	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxillary Fuel/No Emissions	Coal
2103004001 - Stationary Source Fuel Combustion; Commercial/Institutional; Distillate Oil; Boilers				
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
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
2103004002 - Stationary Source Fuel Combustion; Commercial/Institutional; Distillate Oil; IC Engines				
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
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 **
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	Reciprocating: 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	Auxillary Fuel/No Emissions	Natural Gas
50290006	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxillary 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
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	Auxillary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
50290010	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxillary 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 ($\geq 20\%$ 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)
20300909	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust
50100603	Waste Disposal	Solid Waste Disposal - Government	Fire Fighting	Structure: Kerosene

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
2103004000 - 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

Table A-3. Criteria Pollutant Emission Factors for ICI Area Source Categories

SCC	Description	Emission Factor Units ¹	VOC	NO _x	CO	SO ₂	PM2.5-FIL	PM10-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
2102004000	Industrial Distillate Oil	lb/1000 gal	0.2	20	5	142 * S%	0.25	1	1.3	0.8
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 ²	3.2
2102007000	Industrial LPG ³	lb/1000 gal	0.52	14.23	7.97	0.06	0.01	0.02	0.03	0.3 ⁴
2102008000	Industrial Wood ⁵	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.007 ⁶
2102011000	Industrial Kerosene	lb/1000 gal	0.19	19.29	4.82	142 * S% ⁷	0.24	0.96	1.25	0.77
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
2103004000	Comm/Inst Distillate Oil	lb/1000 gal	0.34	20	5	142 * S%	0.83	1.08	1.3	0.8
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 gal	0.52	14.23	7.97	0.06	0.01	0.02	0.03	0.05
2103008000	Comm/Inst Wood ⁵	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.005 ⁶
2103011000	Comm/Inst Kerosene	lb/1000 gal	0.33	19.3	4.8	142 * S%	0.8	1.04	1.3	0.8

Source: Unless otherwise noted, ERTAC emission factors used to support the 2011 NEI (Huntley, 2009).

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

² The EPA ERTAC emission factor workbook (Huntley, 2009) for this emission factors (EF) contains an error. The change log in the ERTAC workbook conflicts with the actual changes made to the emission factors spreadsheet. The PM-CON EF should be 0.32 lb/MMcf for 2102006000 instead of the 0.49 lb/MMcf value reported in the ERTAC workbook.

³ Emission factors from Commercial/Institutional LPG.

⁴ The EPA ERTAC emission factor workbook (Huntley, 2009) for this emission factors (EF) contains an error. The change log in the ERTAC workbook conflicts with the actual changes made to the emission factors spreadsheet. The NH₃ EF should be 0.3 lb/1000 gal for 2102007000 instead of the 0.05 lb/1000 gal value reported in the ERTAC workbook.

⁵ Emission factors from AP-42, Section 1.6, Wood Residue Combustion in Boilers (EPA, 2003).

⁶ 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).

⁷ The EPA ERTAC emission factor workbook (Huntley, 2009) for this emission factors (EF) contains an error. The ERTAC workbook uses the equation 157*S%. The correct EF equation is 142*S%.