

Industrial Fuel Combustion Emission Inventory,

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Level III

October 20th, 2014

Prepared by:

Alamo Area Council of Governments

**Prepared in Cooperation with the
Texas Commission on Environmental Quality**

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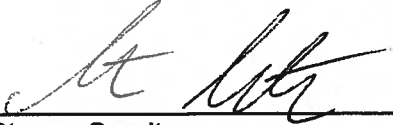
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APPROVAL SHEET

This document is a Quality Assurance Project Plan (QAPP) for the Industrial Fuel Combustion Emission Inventory.



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Oct 20/2014
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During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list. Paper copies need not be provided to individuals if equivalent electronic information systems can be used.

1 PROJECT DESCRIPTION AND OBJECTIVES

AACOG has prepared this Level III Quality Assurance Project Plan (QAPP) for the Texas Commission on Environmental Quality (TCEQ) following EPA guidelines. The nature of the technical analysis and tasks to be conducted as part of this project are consistent with quality assurance (QA) Category III – National Risk Management Research Laboratory (NRMRL) QAPP requirements for secondary data projects. This QAPP is in effect for the duration of this project, November 1st, 2014 through August 14th, 2015.

1.1 Purpose of Study

The Clean Air Act (CAA) is the comprehensive federal law that regulates airborne emissions across the United States.¹ This law authorizes the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Of the many air pollutants commonly found throughout the country, EPA has recognized six “criteria” pollutants that can injure health, harm the environment, and/or cause property damage. Air quality monitors measure concentrations of these pollutants throughout the country. Although the San Antonio-New Braunfels metropolitan statistical area (MSA) has recorded ozone concentrations in violation of the 2008 75 ppb ozone standard in 2012 and 2013, the timing of the violations was late enough in the NAAQS review cycle that the area was not included in EPA’s designation process and the region avoided a non-attainment designation. Ozone is produced when volatile organic compounds (VOC) and nitrogen oxides (NO_x) react in the presence of sunlight.² In the San Antonio region, ozone concentrations are typically highest during the months of May, June, August, and September. Ozone precursors can be generated by natural processes, but the majority of chemicals that form ground-level ozone in the San Antonio-New Braunfels MSA originate from anthropogenic sources.

To conduct analysis that determines the emission reductions required to bring the area into compliance with the national standard, local and state air quality planners need an accurate account of ozone pre-cursor emissions and their sources in the region. The compilation of the industrial fuel combustion emissions inventory (EI) will provide valuable updates to the regional inventory and provide a greater understanding of the impact of industrial fuel combustion on air quality. By understanding these varied sources that create ozone precursor pollutants, planners, political leaders, and citizens can work together to protect health and the environment.

1.2 Project Objectives

Emissions from non-point source industrial fuel combustion will be calculated for the San Antonio-New Braunfels MSA. Under U.S. Energy Information Administration’s (EIA) classification scheme, the “industrial” sector includes industries classified under the North American Industrial Classification System (NAICS) in the following categories:

- Codes 11 (Agriculture, Forestry, Fishing, and Hunting),
- Codes 21 (Mining, Quarrying, and Oil and Gas Extraction),
- Codes 23 (Construction), and

¹ US Congress, 1990. “Clean Air Act”. Available online: <http://www.epa.gov/air/caa/>. Accessed: 07/19/2010.

² EPA, Sept. 23, 2011, “Ground-level Ozone”. Available online: <http://www.epa.gov/air/ozonepollution/>. Accessed: 10/31/2011.

- Codes 31-33 (Manufacturing).

Sources of industrial fuel use and emissions include many different types of businesses, industries, and operations. Fuel use emissions from point sources, transportation, and oil/natural gas production activities are not included in this study because they are listed in other sections of the San Antonio-New Braunfels MSA emission inventory. Types of fuel included in this emission inventory category are listed in Table 1-1. This emission inventory category does not include sources that burn coal, petroleum coke and breeze, and non-biomass “other” because these fuels are only combusted by point sources, commercial/institutional buildings, and residential buildings.

Table 1-1: Industrial Fuel Combustion Descriptions and SCC Codes

Fuel Type	SCC Code	Description
Distillate	2102004000	“A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils”
Residual	2102005000	“A general classification for the heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations” ³
Natural Gas	2102006000	“A gaseous mixture of hydrocarbon compounds, the primary one being methane” ⁴
Butane	2102007000	“A normally gaseous straight-chain or branch-chain hydrocarbon extracted from natural gas or refinery gas streams”
Propane	2102007000	“normally gaseous straight-chain hydrocarbon”
Wet Wood	2102008000	Combustion of pulping liquor
Dry Wood	2102008000	Combustion of all other wood types
Kerosene	2102011000	“A light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps” ⁵

³ Energy Information Administration. “Petroleum & Other Liquids”. Available online: http://www.eia.gov/dnav/pet/TblDefs/pet_cons_psup_tbldef2.asp. Accessed 09/25/14.

⁴ Energy Information Administration. “Natural Gas”. Available online: <http://www.eia.gov/tools/glossary/?id=natural%20gas>. Accessed 09/25/14.

⁵ Energy Information Administration. “Petroleum & Other Liquids”. Available online: http://www.eia.gov/dnav/pet/TblDefs/pet_cons_psup_tbldef2.asp. Accessed 09/25/14.

PROJECT ORGANIZATION AND RESPONSIBILITIES

1.3 Responsibilities of Project Participants

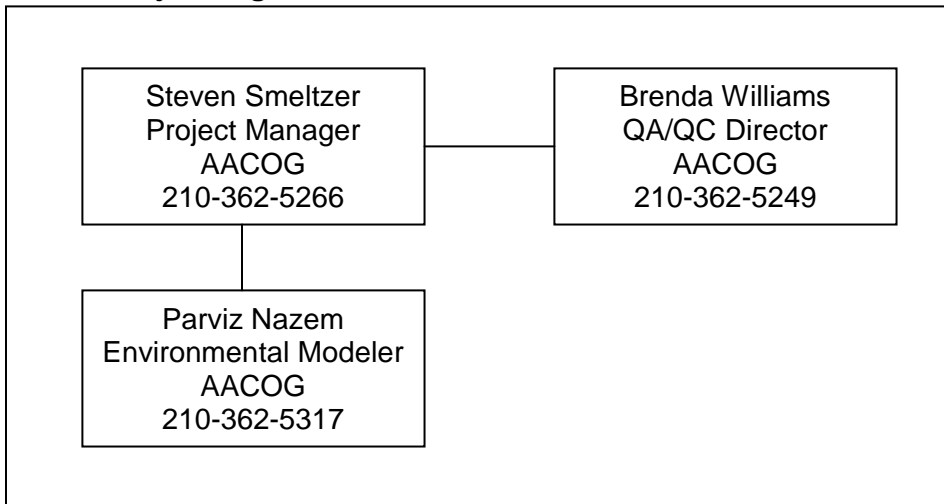
This study will be conducted by the Alamo Area Council of Governments (AACOG) under contract 582-14-40051-FY14-01 with the Texas Commission on Environmental Quality (TCEQ). Staff working on this project and their specific responsibilities are listed below. “The project manager is ultimately responsible for assessing whether the performance and acceptance criteria for the intended modeling use were met and works iteratively with the intended users of the results.”⁶

Table 1-2: AACOG’s project team participants and their responsibilities.

Participant	Project Responsibility
Steven Smeltzer	Project manager and expert on developing emission inventories. He will ensure the project implementation follows all contract requirements and that project quality standards are met on all deliverables. He will assist in interactions with TCEQ as required.
Parviz Nazem	Expert on developing emission inventory and will be responsible for collecting and analyzing raw production data
Brenda Williams	Expert on emission inventory and will be responsible for implementing project review and quality assurance

In addition, TCEQ staff will participate in the review of the technical documentation generated during this project.

1.4 Project Organization Chart



⁶ EPA, December, 2002. “Guidance for Quality Assurance Project Plans for Modeling EPA QA/G-5M”. EPA/240/R-02/007. Washington, DC. Available online: <http://www.epa.gov/quality/qs-docs/g5m-final.pdf>. Accessed 02/13/2014.

1.5 Project Schedule

Emission inventory development will be performed in three steps: (1) update of a 2012 industrial fuel combustion inventory for the San Antonio – New Braunfels MSA; (2) update of 2018 industrial fuel combustion inventory for the San Antonio – New Braunfels MSA, and (3) update of EPS3 format input files for the 2012 and 2018 industrial fuel combustion inventories. The table below shows the overall schedule for completion of this project.

Table 1-3. Summary of project schedule and milestones.

Work Element	Deliverable Date
Deliverable 3.1.1: QAPP Drafts submitted to TCEQ for review and approval	October 20 th , 2014
Deliverable 3.1.2: Final Report Draft Report Final Report and EPS3 emission files	July 14 th , 2015 August 14 th , 2015

2 SCIENTIFIC APPROACH

2.1 Data Needed

Data reviewed for this project will include comprehensive and significant scientific reports or data that can be used to determine emissions from industrial fuel combustion. The updates will utilize data from existing studies, industry-specific fuel consumption activity factors derived from the Energy Information Administration (EIA), county-level manufacturing data from the County Business Patterns (CBP), and EPA approved emissions factors.

The default method used by EPA to calculate emissions for the 2008 and 2011 National Emissions Inventory (NEI) relies on allocating statewide consumption of natural gas, distillate fuel oil, residual fuel oil, and liquefied petroleum gas (LPG) down to the county level based on total manufacturing employment, after subtracting for point source fuel consumption and non-road fuel consumption. This approach does not account for substantial variations in the fuel intensity of manufacturing processes within the manufacturing sector, and it does not specifically account for non-manufacturing fuel consumption that the EIA classifies as “industrial.” The proposed methodology is based on the approach that the Capital Area Council of Governments (CAPCOG)⁷ used to calculate industrial fuel combustion emissions in the Austin-Round Rock MSA.

2.2 Sources of Data to be Used

AACOG will estimate the fuel consumed in each county for each establishment type and then apply emissions factors from AP-42 and other EPA approved sources to calculate VOC, NO_x, and CO emissions.

2.2.1 Employment Database

Employment data will be collected from the U.S. Census County Business Patterns (CBP)⁸, Texas Workforce Commission (TWC) employment database, and other applicable sources. CBP reports the number of establishments for each NAICS code within the following ranges:

- 1-4 employees,
- 5-9 employees,
- 10-19 employees,
- 20-49 employees,
- 50-99 employees,
- 100-249 employees,
- 250-499 employees,
- 500-999 employees, and
- 1,000 or more employees.

The TWC employment database, available through Texas Department of Transportation (TxDOT), provides the employment for each business by North American Industry Classification System (NAICS) code.

⁷ CAPCOG, July 2013. “Area Source Industrial Fuel Combustion in Austin-Round Rock Metropolitan Statistical Area for 2006”. Available online:

http://www.capcog.org/documents/airquality/reports/2013/Task_3.4a-

[CAPCOG_Industrial_Fuel_Combustion_Emissions_Inventory_Final.pdf](http://www.capcog.org/documents/airquality/reports/2013/Task_3.4a-CAPCOG_Industrial_Fuel_Combustion_Emissions_Inventory_Final.pdf). Accessed 09/26/2014.

⁸ U.S. Census Bureau, May 2014. “County Business Patterns (CBP)”. Available online:

<http://www.census.gov/econ/cbp/>. Accessed 09/25/2014.

2.2.2 Manufacturing Fuel Use besides Kerosene

To estimate combustion from manufacturing activities for all fuels except kerosene, the Energy Information Administration's (EIA's) Manufacturing Energy Consumption Survey (MECS)⁹ will be used. "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). 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."¹⁰

If data is not reported by the MECS for a specific SCC code because the reported value was less than 0.5 trillion British thermal unit (BTU) or because the relative standard error for that NAICS/fuel type combination was greater than 50%, fuel combustion will be set to zero. To estimate fuel combustion by county, a ratio of 2012 manufacturing employment data for each county to the fuel consumption factors for the San Antonio-New Braunfels MSA will be used. In order to avoid double counting fuel consumed by industrial point sources, all point sources in the region will be identified using the latest TCEQ point source database.¹¹ The industrial fuel combustion crosswalk for point source subtractions is provided in Section 6. The TWC database will be used to calculate total employment for each point source and subtract the results from total county employment by SCC Code. Any non-road industrial fuel use by agriculture, logging, mining, and construction will also be removed to avoid double counting of emissions.

2.2.3 Manufacturing - Kerosene Fuel Usage

While the MECS provides detailed data on consumption of distillate fuel oil, it does not specifically provide data for kerosene. The EIA's "Adjusted Annual Sales of Fuel Oil and Kerosene" will be used because MECS does provide state-level consumption of "industrial" kerosene consumption. This report does not include "farm" consumption. The statewide total of kerosene usage will be applied to each county based on the total number of employees in manufacturing in each county minus the number of employees in industrial point sources in the county.

2.2.4 Non-Manufacturing Industrial Fuel Consumption

The "industrial sector" as defined by the EIA encompasses not only manufacturing, but also farming, mining, and construction. If a farm, mine, or construction establishment operates permanent, stationary combustion equipment, it would be considered part of the area source industrial fuel combustion inventory.

For natural gas and kerosene, statewide data are available from the EIA that allow emissions to be calculated apart from fuel consumption in the manufacturing sector. Data is also available on distillate consumption in the farming, construction, and mining sectors, but there is not enough information available to determine whether any of the reported statewide consumption of distillate in these sectors includes combustion by stationary equipment or

⁹ Energy Information Administration. March 2012. "Manufacturing Energy Consumption Survey (MECS)". Available online: <http://www.eia.gov/consumption/manufacturing/index.cfm>. Accessed 09/25/2014.

¹⁰ Andrew Bollman, Alpine Geophysics, Jonathan Dorn, Eastern Research Group, Inc., Frank Divita, Jr., Abt Associates, Inc., and Roy Huntley, U.S. Environmental Protection Agency, August 15, 2012. "A Procedure for Estimating Nonpoint Source Air Pollutant Emissions from Industrial, Commercial, and Institutional Fuel Combustion". Presented at 2012 International Emission Inventory Conference. Tampa, Florida. Available online: <http://www.epa.gov/ttnchie1/conference/ei20/session5/abollman.pdf>. Accessed 09/25/2014.

¹¹ TCEQ, May 19, 2014. "Point Source Emissions Inventory". Available online: <http://www.tceq.state.tx.us/airquality/point-source-ei/psei.html>. Accessed 09/25/2014.

whether it is exclusively for non-road equipment use; consequently, these will not be included in the emission inventory.

2.2.5 Temporal Profiles

The monthly profile of industrial fuel combustion emissions will be based on natural gas consumption reported for the industrial sector in Texas for 2012 in EIA's "Texas Natural Gas Industrial Consumption".¹² Hourly and weekday/weekend temporal profiles will be based on the existing profiles in TCEQ's photochemical modeling emission files.¹³

2.2.6 Emissions Factors

Table 2-1 lists the heat conversion factors and emissions factors to calculate annual emissions for each fuel and county. For distillate, residual, and LPG industrial consumption, the calculation to convert from pounds of emissions per physical unit to emissions per MMBTU, will be the ratio between energy consumed¹⁴ and physical unit consumed¹⁵ from MECS. Distillate fuel use for internal combustion (IC) engine emission factors are based on EPA's data provided in California Air Resources Board's (CARB) "Commercial and Industrial Fuel Combustion" documentation.¹⁶ According to CARB, "the VOC emission factor for diesel IC engines is based on the EPA's speciation profile for this source (weight percents 11.6% methane, 2.8% ethane)¹⁷ and the assumption that VOC equals non-methane non-ethane hydrocarbons."¹⁸

¹² U.S. Energy Information Administration. August 29, 2014. "Texas Natural Gas Industrial Consumption". Available online: <http://www.eia.gov/dnav/ng/hist/n3035tx2m.htm>. Accessed 09/25/2014.

¹³ TCEQ, May 28, 2013. Available online: <ftp://amdaftp.tceq.texas.gov/pub/TX/ei/basecase/area/>. Accessed 09/26/2014.

¹⁴ U.S. Energy Information Administration. September, 2014. "Monthly Energy Review: Table 3.8b Petroleum Consumption: Industrial Sector". Available online: http://www.eia.gov/totalenergy/data/monthly/pdf/sec3_20.pdf. Accessed 09/26/2014.

¹⁵ U.S. Energy Information Administration. September, 2014. "Monthly Energy Review: Table 3.8b Heat Content of Petroleum Consumption: Industrial Sector". Available online: http://www.eia.gov/totalenergy/data/monthly/pdf/sec3_25.pdf. Accessed 09/26/2014.

¹⁶ California Air Resources Board. "ATTACHMENT A: COMMERCIAL AND INDUSTRIAL FUEL COMBUSTION". Available Online: http://www.arb.ca.gov/ei/areasrc/ccosmeth/att_a_commercial_industrial_combustion.doc. Accessed 09/25/2014.

¹⁷ EPA, October 1999. "Volatile organic compound/particulate matter speciation database management system (SPECIATE), version 3.1 (for microcomputers). Prepared by the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC.

¹⁸ California Air Resources Board. "ATTACHMENT A: COMMERCIAL AND INDUSTRIAL FUEL COMBUSTION". Available Online: http://www.arb.ca.gov/ei/areasrc/ccosmeth/att_a_commercial_industrial_combustion.doc. Accessed 09/25/2014.

Table 2-1: Emission Factors and Heat Conversion Rates

Fuel	Energy Consumed (2012)	Physical Units Consumed (2012)	Heat Conversion Rate	VOC Factor	NO _x Factor	CO Factor	Emission Factor Source
Distillate – IC Engines (<600 hp)	n/a	n/a	n/a	0.2 lbs/1,000 gallons	604 lbs/1,000 gallons	130 lbs/1,000 gallons	CARB emission factors based on EPA data
Distillate – Boilers	1,283 trillion BTU	219.73 million barrels	138.023 MMBTU/1,000 gallons	0.2 lbs/1,000 gallons	20 lbs/1,000 gallons	5 lbs/1,000 gallons	AP-42, Table 1.3-1 for boilers <100 MMBTU/hour for CO and NO _x , and Table 1.3-3 for industrial boilers VOC
Residual	70 trillion BTU	10.95 million barrels	152.207 MMBTU/1,000 gallons	0.28 lbs/1,000 gallons	55 lbs/1,000 gallons	5 lbs/1,000 gallons	AP-42, Table 1.3-1 for boilers <100 MMBTU/hour for CO and NO _x , and Table 1.3-3 for industrial boilers VOC
Natural Gas	n/a	n/a	1,025 MMBTU/MMCF	5.5 lbs/MMCF	100 lbs/MMCF	84 lbs/MMCF	AP-42, Table 1.4-1 for CO and NO _x (small, uncontrolled boilers) and Table 1.4-2 for VOC.
LPG (Butane/isobutane)	2,335 trillion BTU (LPG)	671.965 million barrels (LPG)	82.735 MMBTU/gallon (LPG)	1.1 lbs/1,000 gallons	15 lbs/1,000 gallons	8.4 lbs/1,000 gallons	AP-42, Table 1.5-1
LPG (Propane)	2,335 trillion BTU (LPG)	671.965 million barrels (LPG)	82.735 MMBTU/gallon (LPG)	1.0 lbs/1,000 gallons	13 lbs/1,000 gallons	7.5 lbs/1,000 gallons	AP-42, Table 1.5-1
Wet Wood	n/a	n/a	n/a	0.017 lbs/MMBTU	0.22 lbs/MMBTU	0.60 lbs/MMBTU	AP-42, Table 1.6-2 and 1.6-3
Dry Wood	n/a	n/a	n/a	0.017 lbs/MMBTU	0.49 lbs/MMBTU	0.60 lbs/MMBTU	AP-42, Table 1.6-2 and 1.6-3
Kerosene	n/a	n/a	135 MMBTU/1,000 gallons	0.19 lbs/1,000 gallons	19.29 lbs/1,000 gallons	4.82 lbs/1,000 gallons	EPA's <code>sici_fuel_combustion_2011_tx_rev</code> from the 2011 NEI and ERG's "CenSARA Area Combustion EI"

External combustion rates for distillate fuel oil and residual oil are based on AP-42, Table 1.3-1 for boilers <100 MMBTU/hour for CO and NO_x, and Table 1.3-3 for VOC based on non-methane total organic compounds (NMTOC).¹⁹ The emissions rates for distillate consumed in internal combustion engines are based on AP-42, Table 3.3-1.²⁰ The heat content of natural gas combustion by residential, commercial, industrial, and transportation sectors is from the EIA's Monthly Energy Review²¹; the heat content of kerosene combustion by all sources is also from the EIA's Monthly Energy Review²².

The emissions rates for natural gas are based on AP-42, Table 1.4-1 for CO and NO_x (small, uncontrolled boilers) and Table 1.4-2 for VOC.²³ The emissions rates for LPG combustion are based on AP-42, Table 1.5-1.²⁴ Emission factors for wet wood and dry wood are based on AP-42, Table 1.6-2 and 1.6-3.²⁵ The emission rates for kerosene are based on the emission rates listed in EPA's *ici_fuel_combustion_2011_tx_rev* 2011 NEI for NO_x and CO. The kerosene VOC emission factor is from ERG's report "CenSARA Area Combustion Emissions Inventory Enhancement Project".²⁶

Since there isn't a strict 1:1 correspondence between each of the emission rates and the fuel consumption figures, adjustments need to be made to the fuel combustion data. Following CAPCOG's methodology, the emission inventory will be calculated based on 50% of distillate fuel being consumed by internal combustion devices and 50% by external combustion devices. This ratio is the same as used in EPA's 2011 "National Emissions Inventory."²⁷ For LPG emission calculations, a 13.28% butane/86.72% propane ratio will be used based on EIA's "Product Supplied" in the Gulf Coast Petroleum Administration Defense District (PADD) for 2012

¹⁹ U.S. Environmental Protection Agency, Corrected May 2010. "AP-42, 5th Edition, Volume I, Chapter 1: External Combustion Sources, Section 3: Fuel Oil Combustion". Available online: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf>. Accessed: 09/25/2014.

²⁰ U.S. Environmental Protection Agency, August 2000. "AP-42, 5th Edition, Volume I, Chapter 3: Internal Combustion Sources, Section 3: Gasoline and Diesel Industrial Engines". Available online: <http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf>. Accessed: 09/25/2014.

²¹ U.S. Environmental Protection Agency, Sept. 2014 "Monthly Energy Review: Table A4. Approximate Heat Content of Natural Gas". Available online: <http://www.eia.gov/totalenergy/data/monthly/pdf/sec13.pdf>. Accessed: 09/26/2014.

²² U.S. Environmental Protection Agency, Sept. 2014 "Monthly Energy Review: Table A1. Approximate Heat Content of Petroleum Products". Available online: <http://www.eia.gov/totalenergy/data/monthly/pdf/sec13.pdf>. Accessed: 09/26/2014.

²³ U.S. Environmental Protection Agency, July 1998. "AP-42, 5th Edition, Volume I, Chapter 1: External Combustion Sources, Section 4: Natural Gas Combustion". Available online: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>. Accessed: 09/25/2014.

²⁴ U.S. Environmental Protection Agency, July 2008. "AP-42, 5th Edition, Volume I, Chapter 1: External Combustion Sources, Section 5: Liquefied Petroleum Gas Combustion". Available online: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s05.pdf>. Accessed: 09/25/2014.

²⁵ U.S. Environmental Protection Agency, September 2003. "AP-42, 5th Edition, Volume I, Chapter 1: External Combustion Sources, Section 6: Wood Residue Combustion in Boilers". Available online: <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s06.pdf>. Accessed: 09/25/2014.

²⁶ Darcy Wilson, Marty Wolf, Stacie Enoch, and Bebhinn Do, Eastern Research Group, Inc. October 31, 2012. "CenSARA Area Combustion Emissions Inventory Enhancement Project". Morrisville, NC. Available online: www.censara.org/filedepot_download/56064/16. Accessed: 09/25/2014.

²⁷ U.S. Environmental Protection Agency. "Documentation of Industrial, Commercial, and Institutional Fuel Combustion Emissions Estimates for 2011". Available online: ftp://ftp.epa.gov/EmisInventory/2011nei/doc/ici_fuel_combustion_by_state/ici_fuel_combustion_2011_tx_rev.zip. Accessed: 09/25/2014.

(Table 2-2).²⁸ “Pulping liquor” emissions will be based on the “wet wood” emissions factors and all other biomass fuel use will be based on “dry wood” emissions factors.

Table 2-2: LPG Supplied by Type for the Gulf Coast PADD, 2012

Fuel Type	Thousand Barrels Annual	Percentage
Propane	222,134	86.72%
Normal Butane	12,930	5.05%
Isobutane	21,101	8.24%

2.2.7 Growth Factors

Emissions will be projected to 2018 using the EIA’s *Annual Energy Outlook 2013* projections for industrial consumption of various fuels for the “West-South Central” census region, which consists of Arkansas, Louisiana, Oklahoma, and Texas.²⁹ The database includes projected fuel use by sector from 2011 to 2040. The 2018 projected consumption of each fuel type will be divided by the baseline activity in order to calculate growth factors. Kerosene will be projected based on the “other petroleum” category.

²⁸ U.S. Energy Information Administration, Sept. 2, 2014. “Petroleum and Other Liquids: Product Supplied, 2011”. Washington, DC. Available online: http://www.eia.gov/dnav/pet/pet_cons_psup_dc_r30_mbbi_a.htm. 09/26/2014.

²⁹ U.S. Energy Information Administration. May 2013. “*Annual Energy Outlook 2013*.” Table 2-7: Energy Consumption by Sector and Source, West South Central, Reference Case. Available online: http://www.eia.gov/oiaf/aeo/tablebrowser/aeo_query_server/?event=ehExcel.getFile&study=AEO2013®ion=1-7&cases=ref2013-d102312a&table=2-AEO2013&yearFilter=0. Accessed 09/25/2014.

3 QUALITY METRICS

In this section, the quality requirements for the data used in this study and the procedures for determining the quality of the data are described. Note that 10% of the data used in this study will be audited. After each section is completed, the QA/QC director will check the data inputs into the formulas and will check all documentation on methodologies. All formulas will be recalculated by the QA/QC director to make sure the results can be replicated and are accurate. The QA/QC director will work closely with the project manager to update the calculations, emission estimates, and documentations. The results of the audit process will be provided in the draft and final emission inventory submitted to TCEQ.

3.1 Data

The data for industrial fuel combustion must meet a number of requirements and include sufficient data to evaluate those requirements prior to use. The data must be reasonably consistent with other studies and the data must be sufficiently complete to be expected to adequately represent emissions.

3.2 Quality Control

The first component is that of quality control (QC), which is a system of routine technical activities implemented by inventory development personnel to measure and control the quality of the inventory as it is being developed. The QC system is designed to:

1. Provide routine and consistent checks and documentation points in the inventory development process to verify data integrity, correctness, and completeness;
2. Identify and reduce errors and omissions;
3. Maximize consistency within the inventory preparation and documentation process; and
4. Facilitate internal and external inventory review processes.

QC activities include technical reviews, accuracy checks, and the use of approved standardized procedures for emission calculations. These activities should be included in inventory development planning, data collection and analysis, emission calculations, and reporting.”³⁰

Equations, data sources, and methodology were checked throughout the development of the emission inventory. “Simple QA procedures, such as checking calculations and data input, can and should be implemented early and often in the process. More comprehensive procedures should target:

- Critical points in the process;
- Critical components of the inventory; and
- Areas or activities where problems are anticipated”³¹

Special emphasis will be put on critical components, such as employment database, industrial fuel use consumption, and emission factors, for quality checks. Industrial fuel combustion data developed through the emission inventory process will be compared to previous data sets from other industrial fuel combustion emission inventories.

When errors and omissions are identified, they will be corrected and all documentation will be updated with the corrections. All emission inventory calculation methodologies will be documented and described in detail so external officials and other interested parties can replicate the results. For every emission inventory source, documentation will be consistent and contained data sources, methodology, formulas, and results.

³⁰ Eastern Research Group, Inc, Jan. 1997. “Introduction: The Value of QA/QC’. Quality Assurance Committee Emission Inventory Improvement Program, U.S. Environmental Protection Agency. p. 1.2-1. Available online: <http://www.epa.gov/ttn/chief/eiip/techreport/volume06/vi01.pdf>. Accessed 06/04/2012.

³¹ *Ibid.*, p. 1.2-2.

Pertinent information used for developing the industrial fuel combustion emission inventory will be analyzed to ensure that the information is reasonable (i.e., avoiding extremely low or high values that are indicative of errors). Data that are found to be questionable will be examined in greater detail to determine what errors might be present and what adjustments might be needed. If data are revised, the sources, procedures, and calculations used will be thoroughly documented. The Project Manager will review and approve all data adjustments.

AACOG will use a senior peer reviewer not directly involved in conducting the project to review all methods and results of the work. The senior peer reviewer will be involved in the initial planning stages of this project to ensure the planned approaches are technically sound, and will also provide quality checks and review on all final products prior to submittal to TCEQ to ensure the project procedures were properly implemented. When the emission inventory is completed, documentation and spreadsheets will be sent to TCEQ and other interested parties for review.

4 DATA ANALYSIS, INTERPRETATION AND MANAGEMENT

4.1 Data Reporting Requirements

Primary data on emissions from industrial fuel combustion that are assembled for this study will be reported electronically and documented in the project final report. Any data that are assembled for this study, such as employment data and industrial fuel usage, will also be delivered electronically and documented in the final report. Data that are documented elsewhere, such as data on emission factors or data used to calculate emissions, will be documented in the final report by reference to the original data source. Records will be maintained that include sufficient information to reconstruct each emission inventory calculation.

4.2 Data Management Procedures

Hard copy data received during the course of the project will be cataloged into the file index and made available for copying or checkout. Electronic data files will be stored in a specific project directory on AACOG's fileserver network drives. Original data files will be kept in a separate folder and will not be altered or changed. Project staff will make copies of any data files needed and perform their work with the copy. All project staff will have access to these files and all files on the network drive undergo automatic backup each night such that any information can be easily retrieved as necessary. After the final product is completed and approved by TCEQ, all project data will be archived on CD-ROM for storage.

5 DATA REPORTING

5.1 Project Deliverables

The project final delivery will include a report documenting the industrial fuel combustion emissions inventory improvement project and the information necessary to update TCEQ modeling files. All relevant AQ/QC findings will be included in the final report. The report will describe the steps taken and any background that is relevant to the project. The report shall provide the report in Microsoft Office Word and Adobe Acrobat Reader (*.pdf) formats. The final report will include the following components:

1. An executive summary and abstract.
2. An introduction that discusses background and objectives. Include relationships to other studies if applicable.
3. A discussion of the pertinent accomplishments, shortfalls, and limitations of the work completed.
4. Recommendations, if any, for what should be considered next as a new study.

The final report will provide a comprehensive overview of activities undertaken and data collected and analyzed during the study. The final report will highlight major activities and key findings, provide pertinent analysis, describe encountered problems and associated corrective actions, and detail relevant statistics including data, parameter, or model completeness, accuracy and precision.

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
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)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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)
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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	Fuel Fired Equipment	Residual Oil: Flares

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
		Products		
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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	Fuel Fired Equipment	Natural Gas: Flares

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
		Products		
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
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

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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)

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
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
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)