SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Area Source Emission Inventory Methodology

Commercial Cooking

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Executive Summary

This methodology uses previous studies' findings to calculate emissions based on the total count of applicable restaurants in the South Coast AQMD. The categories in Table 1 – Description of Emissions Inventory Categories Related to Commercial Cooking outlines the equipment inventory categories (EIC) included in the emission inventory for facilities within the South Coast Air Quality Management District (South Coast AQMD) jurisdiction.

Table A - DESCRIPTION OF EMISSIONS INVENTORY CATEGORIES (EIC) RELATED TO COMMERCIAL COOKING

CES	EIC	Name	MSC	SRC	MAT
60418	690-680-6000-0000	Commercial Charbroiling	690	680	6000
66811	690-682-6000-0000	Deep-fat frying, commercial	690	682	6000
82180	690-684-6000-0000	Cooking (unspecified)	690	684	6000

Data on existing restaurants was pulled through correspondence with Health Departments of Los Angeles, Orange, San Bernardino, and Riverside Counties, along with City Health Departments of Long Beach, Los Angeles, Pasadena, and Vernon. Restaurants were initially filtered by zip code and facility type (as coded independently by each county's respective health department). An additional filter was applied to remove facilities which would not generate emissions. For example, keywords such as "coffee," "tea," or "juice" in the names of the business are most likely not businesses that engage in commercial cooking and therefore excluded in the total restaurant count. On the other hand, keywords such as "steak" or "grill" resulted in an inclusion of the business.

Emission factors for each unique cooking equipment type and typical food items cooked were obtained from the UC Riverside Center for Environmental Research and Technology study (1997 CE-CERT study) [1.] For average food throughputs, the likelihood of specific equipment-food combinations to be present in an establishment, and estimates of equipment type counts in an establishment, tables 4, 5, 9, and 13 of the Charbroiling Activity Estimation study from Public Research Institute were utilized (2001 PRI Study)[2]. For the categorization of South Coast AQMD's restaurant population by restaurant type, restaurant categorization obtained from Dun & Bradstreet was utilized (Dun & Bradstreet 2024). Specific cooking equipment types are associated with each of the AQMP commercial cooking emission inventory categories shown in Table 1 (commercial charbroiling includes chain-driven and underfired charbroilers, deep-fat frying only includes deep-fat frying, and unspecific cooking includes all other cooking equipment such as clamshell and flat griddles). Emissions per applicable equipment type and per restaurant were calculated. Staff then determined the emissions inventory for each AQMP emission category based on the number of applicable restaurants estimated for the South Coast AQMD

[1] University of California Riverside, College of Engineering, Center for Environmental Research and Technology, Final Report: Further Development of Emission Test Methods and Development of Emission Factors for Various Commercial Cooking Operations, Contract No. 96027, July 1997.

[2] Public Research Institute, Charbroiling Activity Estimation, Contract Num 98-721, June 2001

jurisdiction using the previously described facility filtering exercise. Emission estimates include the South Coast Air Basin (SCAB) and Salton Sea Air Basin (SSAB).

Restaurant Count and Data Collection

Staff reached out to the offices of the four counties within the South Coast AQMD jurisdiction (Los Angeles, Riverside, San Bernardino, Orange) to request restaurant permitting data from their respective health departments. Additionally, staff received data from the city health departments of Long Beach, Los Angeles, Vernon, and Pasadena for comparison purposes.

Each county's data set contained information, such as facility name and address. The data sets also listed supplemental data that aided in further filtering and categorizing, such as owner name and program element. The "program element" category is used to classify food facilities such as number of seats and potential risk level associated with each restaurant's operations. For example, restaurants handling raw meat are generally classified as higher risk than those serving precooked foods. "Program Elements" between different health departments are not standardized and are developed internally by each health department. See Appendix A for county health department classification descriptions.

Data Filtering and Final Count of Restaurants

Staff applied a variety of filters to each data set to create a more accurate set of restaurants to be considered as commercial cooking establishments. First, a filter checks if the facility ZIP code is within South Coast AQMD jurisdiction. If a ZIP code is only partially within SCAQMD jurisdiction, all facilities with that ZIP code are included in the final facility count, and facilities outside the South Coast AQMD jurisdiction are excluded

After filtering ZIP codes, staff used each county's program element data to make assumptions regarding whether a facility belonging to that particular program element is likely to be a source of commercial cooking emissions. For example, if a facility is labeled to serve "pre-packaged foods," that facility is unlikely to operate cooking equipment, so all facilities assigned to this category are automatically excluded from the final facility count. See Appendix A for classification descriptions and decisions made to include or exclude restaurants based on their county-level descriptions.

Another filtering layer is applied based on facility names and permit notes (if available). The purpose of this filtering layer is to identify facilities which could potentially operate commercial cooking equipment based on their naming scheme. This exercise serves as an additional layer of verification to ensure all facilities that could potentially operate emissions are included in the final count. Inversely this exercise also removes facilities which are included due to county level designations which do not operate commercial cooking equipment. One of such establishments are the Poke shops which are labeled as "high risk" facilities to the health department due to serving raw fish, but do not cook on site due to the nature of the dish. The keyword bank used for this check can be found in Appendix B of this document. List of final count of restaurants included in the commercial cooking facility universe can be found in Table 2 – Final Count of Restaurants in Commercial Cooking Universe.

Table B – Final Count of Restaurants in Commercial Cooking Universe

Basin	Number of Restaurants
SCAB LA	15,736
SCAB OR	6,692
SCAB RS	3,209
SCAB SB	3,929
SCAB TT	**29,566**
SSAB RS	1,278
MDAB RS	32
SS/MD TT	**1,310**

Emission Calculation and Throughput Assumptions

With the final restaurant count established, annual emissions-per-restaurant factors are determined for each commercial cooking emission inventory category (commercial charbroiling, commercial deep-fat frying, and unspecified cooking). These calculations rely on emission factors from existing literature and can be found in Table 3. The resulting emissions-per-restaurant factors for each emission inventory category are then applied to the total restaurant count to estimate the aggregate PM and VOC emissions within the South Coast AQMD for each emission inventory category of commercial cooking. This approach assumes that the calculated factor accurately represents the average emissions across all restaurants and accounts for the probability that a restaurant has a specific equipment type and the likelihood that each equipment type would be utilized to cook a particular type of meat.

Emission Factors by Equipment Type and Food Cooked

Emission factors (Shortened to *EF*s in calculations) per ton of food cooked for commercial cooking processes were obtained from the 2002 EPA National Emissions Inventory[3] (obtained from the 2009 emissions inventory report published by the San Joaquin Valley Air Pollution Control District (SJVAPCD)[4] and based on the 1997 CE-CERT study). These emission factors are presented in pounds of pollutant per ton of food cooked, by equipment type, and type of food cooked in Table 3.

[4] https://www.aqmd.gov/nav/about/jurisdiction.
tion, Appendix C: Emission factors and county-level activity data used to calculate 2002 emissions by category.
[4] https://ww3.arb.ca.gov/ei/areasrc/districtmeth/sjvalley/commercialcooking2006.pdf.

Table C – Emission factors for commercial cooking processes and food cooked.

Emission Inventory Category	Equipment Type	Emission Factors (lb/ton food cooked)			
		Food	PM10	PM2.5	VOC
Commercial Charbroiling	Underfired Charbroilers	Steak	34.4	33.6	1.72
		Hamburger	65.4	63.8	7.88
		Poultry	21	19.8	3.64
		Pork	21	19.8	3.64
		Seafood	6.6	6.4	0.76
		Other	34.4	33.6	1.72
	Chain-Driven Charbroilers	Steak	14.8	14.6	4.54
		Hamburger	14.8	14.6	4.54
		Poultry	21	19.8	3.64
		Pork	21	19.8	3.64
		Seafood	6.6	6.4	0.76
Deep-Fat Frying, commercial	Deep-Fat Fryers	Poultry	BDL	BDL	0.24
		Pork	BDL	BDL	0.24
		Seafood	BDL	BDL	0.28
		Potatoes	BDL	BDL	0.42
Cooking (unspecified)	Flat Griddles	Steak	10	7.6	0.14
		Hamburger	10	7.6	0.14
		Poultry	BDL	BDL	0.8
		Pork	BDL	BDL	0.8
		Seafood	BDL	BDL	0.22
		Other	10	7.6	0.14
	Clamshell Griddles	Steak	1.7	1.44	0.02
		Hamburger	1.7	1.44	0.02
		Poultry	BDL	BDL	0.11
		Pork	BDL	BDL	0.11
		Seafood	BDL	BDL	0.03

Note: BDL – below detectable limit

Total suspended particulate matter (TSP) and total organic gases (TOG) are calculated based on a speciation between PM10 and VOC, respectively, while PM2.5 has its own emission factors for its calculations.[5] Speciation profiles are available on California Air Resources Board's (CARB) chemical speciation webpage[6]. PM speciation profile #501 – "Commercial charbroiling" is used for charbroiling, and PM speciation profile #502 – "Cooking" is used for deep fat frying and unspecified cooking. Both profiles show a PM10/TSP equal to one. As a result, PM10 = TSP for all cooking categories. The TOG to VOC conversion rate is based upon CARB's chemical speciation profiles for a profile of "Species unknown

[5] https://ww2.valleyair.org/media/zeyfmb4q/commercialcooking2019-final-031725.pdf
[6] https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling

– all category composite," falling under CARBs Organic Profile #600, which is consistent with the methodology from SJVAPCD.

Restaurant Categories

Restaurant categories were classified to be Fast Food, Seafood, Ethnic, Steak and Barbecue, and Family, based on the 2001 PRI Study. The 2024 Dun & Bradstreet restaurant data for cities within the South Coast AQMD jurisdiction was then used to determine the percentage distribution of these categories in the region, as shown in Table 4. The 8-digit SIC (SIC8) codes from this dataset were used to filter and assign restaurant categories. Appendix C presents the SIC8 codes associated with restaurant establishments likely to use commercial cooking equipment and the corresponding categories. The SIC8 codes used for filtering were based on the 2001 PRI study and on the codes used by CARB in 2025 for their Commercial Cooking emission inventory methodology.

Table 4 – Percentage of restaurants in South Coast AQMD that fall under each Restaurant Category

% of Restaurants in each category	
Fast Food	28.62%
Seafood	2.43%
Ethnic	54.48%
Steak & BBQ	4.32%
Family	10.15%

In calculations, entries from Table 4 will be labeled as PoR (Percent of restaurants).

Annual Amounts of Food Cooked (Throughput Assumptions)

As part of the development of this methodology, two studies on restaurant population and operations were reviewed, the1999 Pacific Environmental Services survey study (1999 PES Study)[7] and the 2001 PRI Study. Discussions were held both with internal staff as well as CARB staff on which study had the best estimations for the average meat cooked per equipment type. The 1999 PES Study focused on South Coast AQMD specific populations while the 2001 PRI Study was a California statewide study. To identify the most accurate source for our methodology, staff conducted an assessment based on per capita consumption capacity for the South Coast AQMD jurisdiction. The result of the consumption capacity assessment showed whether consumption estimates from other sources, such as the per capita food availability system from the United States Department of Agriculture (USDA)[8], line up with consumption estimates from our own methodology. Through this exercise, South Coast AQMD staff concluded that utilizing the geometric mean throughput from the 2001 PRI Study coupled with restaurant distributions from Dun & Bradstreet provided the most reasonable estimations. Provided in Table 5 are the percentage difference values between South Coasts expected consumption capacity and the calculated consumption capacity:

[8] https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system

Table 5 – Percentage difference between consumption capacities from South Coast AQMD and other outside sources

% of Restaurants in each category		
Meat (lbs/year)	PRI Mean	PES Mean
Steak	-9%	117%
Hamburger	-12%	37%
Poultry	-8%	89%
Difference summed over all meat	-9%	78%

Although the 2001 PRI Study provides many valuable data points, it does not provide the average amount of potatoes cooked (the same is observed from the 1999 PES Study). Due to the lack of data on potato throughput, and since potato deep-frying is a major component of air pollution of the deep-fat frying emission inventory category, another dataset was required to perform our analysis. SJVAPCD utilized frozen potatoes per capita as a surrogate to estimate weekly amounts of potatoes cooked by deep-fat fryers.[9] Mirroring SJVAPCD's approach, staff used the 2023 USDA – Economic Research Service estimate of per capita farm weight of frozen potato sold[10] with a value of 58.89 lbs/person-year (note that CARB used a different total still sourced from USDA for 2022 of 53.25 lbs/person-year) . This value was multiplied by the 2023 South Coast AQMD population[11] and divided by the total number of restaurants with deep-fat fryers in the South Coast AQMD (estimated through calculations based on the final restaurant count of South Coast AQMD Jurisdiction and the percent of restaurants that use deep-fat fryers according to the 2001 PRI study). The result is 36,824.85 pounds of potatoes cooked per deep-fat fryer within the South Coast AQMD for 2023. In calculations, the amount of meat cooked per year will be referred to as *TP*, or throughput. Table 6 shows the average amounts of food cooked per week and per year.

[9] SJVAPCD. 2019 Area Source Emissions Inventory Methodology 690 – Commercial Cooking Operations. https://ww2.valleyair.org/media/zeyfmb4q/commercialcooking2019-final-021225.pdf (2006 version used but same methodology)

[10] https://www.ers.usda.gov/data-products/vegetables-and-pulses-data/vegetables-and-pulses-yearbook-tables

[11] 2023 SCAQMD population data obtained from Southern California Association of Governments (January 14, 2025).

Table 6 – Average amounts of food cooked per equipment type.

Emission Inventory Category	Equipment Type	Average Amount of Food Cooked per Equipment Type		
		Food	lbs cooked per week	lbs cooked per year
Commercial Charbroiling	Underfired Charbroilers	Hamburger	87.27	4,538.04
		Poultry	150.80	7,841.60
		Pork	58.11	3,021.72
		Seafood	64.95	3,377.40
		Steak	86.38	4,491.76
		Other	34.50	1,794.00
	Chain-Driven Charbroilers	Hamburger	372.34	19,361.68
		Poultry	161.32	8,388.64
		Pork	47.17	2,452.80
		Seafood	44.00	2,288
		Steak	81.49	4,237.48
Deep-Fat Frying, commercial	Deep-Fat Fryers	Hamburger	118.34	6,153.68
		Poultry	191.13	9,938.76
		Pork	41.94	2,180.88
		Seafood	61.81	3,214.12
		Steak	69.02	3,589.04
		Potatoes	708.17	36,824.84
Cooking (unspecified)	Flat Griddles	Hamburger	111.51	5,798.52
		Poultry	108.36	5,634.72
		Pork	59.42	3,089.80
		Seafood	50.72	2,637.44
		Steak	67.39	3,504.28
		Other	48.60	2,527.20
	Clamshell Griddles	Hamburger	452.31	23,520.12
		Poultry	152.56	6,898.84
		Pork	84.04	4,370.08
		Seafood	211.96	11,021.92
		Steak	75.33	3,917.16

Food x Equipment Type Factors

Food x Equipment Type Factors (FETFs) refer to how likely it is for a food and equipment combination to exist within a restaurant. The assumption begins that there is either zero or one unit of an equipment type at any given restaurant. Using data from tables 4 and 9 of the 2001 PRI Study, we obtained the percentage breakdown of restaurants utilizing a given type of cooking equipment (Table 7) and restaurants cooking a given type of meat (Table 8), respectively.

Table 7 – Percentage of Restaurants utilizing a particular equipment type

Restaurant Category	Chain-Driven Charbroilers	Underfired Charbroilers	Deep-Fat Fryers	Flat Griddles	Clamshell Griddles
Fast Food	18.6%	30.8%	96.8%	51.9%	14.7%
Seafood	0.0%	52.6%	100.0%	36.8%	10.5%
Ethnic	3.5%	47.5%	81.9%	62.7%	4.0%
Steak & BBQ	6.9%	55.2%	82.8%	89.7%	0.0%
Family	10.1%	60.9%	91.4%	82.9%	1.4%
Total	7.9%	45.4%	87.3%	62.7%	6.3%

Table 8 – Percentage of Restaurants utilizing a particular equipment type

Restaurant Category	Steak	Hamburger	Poultry w/ Skin	Poultry w/o Skin	Pork	Seafood	Other Meat
Ethnic	76.6%	36.6%	41.1%	84.5%	72.9%	77.1%	11.3%
Fast Food	37.6%	77.1%	35.0%	70.7%	43.3%	42.0%	4.5%
Family	98.6%	90.0%	51.4%	81.4%	85.7%	82.9%	4.3%
Seafood	52.6%	42.1%	31.6%	57.9%	31.6%	100.0%	5.3%
Steak & BBQ	86.2%	62.1%	72.4%	82.8%	100.0%	79.3%	17.2%
Total	69.3%	53.3%	41.8%	80.0%	67.2%	70.1%	9.0%

As first presented in the April 23, 2024 meeting of the Commercial Cooking Inventory Methodology Sub-Workgroup, the following calculations were applied to the methodology. Tables 7 and 8 provide information used to determine a restaurant's actual capacity for a particular food and equipment combination and to identify the limiting factor. For example, 98.6% of restaurants labeled "Family" cook steak, but only 6.9% of restaurants labeled "Family" utilize chain-driven charbroilers. Therefore, a maximum of 6.9% of restaurants within South Coast AQMD cook Steak via a chain-driven charbroiler, no matter the average throughput of steak cooked by chain-driven charbroilers. To calculate each FETF, staff took the minimum of the two values found in tables 7 and 8 for the appropriate food and equipment type combination for a given restaurant category as seen in Equation 1.

Equation 1 – Food x Equipment Type Factor given an equipment type, food type, and restaurant category

$$FETF_{equipment\ type, food\ type, restaurant\ category} = \min\left(\%\ of\ restaurants\ cooking\ food\ type_{restaurant\ category}, \%\ of\ restaurants\ using\ equipment\ type_{restaurant\ category}\right)$$

Annual Emissions by Equipment Type

With all the previous data, it is now possible to lay out the equation for calculating the emissions from a specific food type, equipment type, and restaurant category combination, seen in Equation 2:

Equation 2 – Emissions per restaurant of a particular pollutant type given the equipment type, food type, and restaurant category

$$Emissions\ per\ Restaurant_{equipment\ type,food\ type\ ,restaurant\ category} = PoR_{restaurant\ category} * FETF_{equipment\ type,food\ type,restaurant\ category} * EF_{equipment\ type,food\ type,pollutant} * TP_{equipment\ type,food\ type} * \frac{1\ ton}{2000\ lb} * \frac{52\ weeks}{1\ year} * (1 - CF_{equipment\ type} * PoR_{CF\ Applicable})$$

All the terms of Equation 2 have been outlined before except for CF, which stands for Control Factor. The Control Factor is the percentage that emissions are reduced from an uncontrolled equipment type via control technology and associated regulation. CFs are equipment specific, and only chain-driven charbroilers have control technologies that are able to lower emissions within the commercial cooking sector at this time as required by South Coast AQMD Rule 1138 – Control of Emissions from Restaurant Operations (Rule 1138). [12] Therefore, the CF for chain-driven charbroilers is 0.83 (in line with demonstrated control from commercially available catalytic oxidizers) and the CF for all other equipment is 0, indicating uncontrolled emissions. The chain-driven charbroiler CF is only applicable to 85.4% of chain-driven charbroilers under Rule 1138 as it existed in 2023. Therefore, $PoR_{CF\ Applicable}$ is 0.854 for chain-driven charbroilers and 0 for all other equipment. Additional conversion factors can be seen in the equation that convert the original EF into a rate of lb of emissions per lb of meat and convert the original throughput values from lbs of meat per week into lbs of meat per year. For the results of the above equation to be useful, it needs to be added over all restaurant categories and food types.

Equation 3 – Emissions per restaurant of a particular pollutant from a given equipment type

$$Emissions\ per\ Restaurant_{equipment\ type,polluitant} = \sum_{food\ type,restaurant\ category} Emissions\ per\ Restaurant_{equipment\ type,food\ type,restaurant\ category,pollutant}$$

[12] https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1138.pdf

Table 9 – Annual Emissions per Restaurant by equipment type and pollutants (lbs per year)

Emission Inventory Category	Equipment Type	Annual emissions per restaurant by equipment type and pollutant			
		Food	PM 10	PM2.5	VOC
Commercial Charbroiling	Underfired Charbroilers	Hamburger	56.90	55.51	6.86
		Poultry	35.14	33.13	6.09
		Pork	13.97	13.17	2.42
		Seafood	4.96	4.81	0.57
		Steak	34.41	33.61	1.72
		Other	2.93	2.86	0.15
		Total	**148.31**	**143.09**	**17.81**
	Chain-Driven Charbroilers	Hamburger	2.08	2.06	0.64
		Poultry	1.28	1.21	0.22
		Pork	0.37	0.35	0.07
		Seafood	0.11	0.11	0.01
		Steak	0.46	0.45	0.14
		Total	**4.30**	**4.17**	**1.08**
Deep-Fat Frying, commercial	Deep-fat fryers	Hamburger	-	-	-
		Poultry	-	-	0.70
		Pork	-	-	0.17
		Seafood	-	-	0.31
		Steak	-	-	-
		Potatoes	-	-	7.73
		Total	**-**	**-**	**8.92**
Cooking (unspecified)	Flat Griddles	Hamburger	13.30	10.11	0.19
		Poultry	-	-	1.20
		Pork	-	-	0.7
		Seafood	-	-	0.17
		Steak	10.18	7.74	0.14
		Other	1.20	0.91	0.02
		Total	**24.68**	**18.76**	**2.45**
	Clamshell Griddles	Hamburger	1.36	1.15	0.02
		Poultry	-	-	0.23
		Pork	-	-	0.03
		Seafood	-	-	0.01
		Steak	0.23	0.19	0.00
		Total	**1.58**	**1.34**	**0.07**

Emission Inventory Calculation

With the final restaurant count in the South Coast AQMD and the Commercial Charbroiling, Cooking (unspecified), and Deep-Fat Frying emission inventory categories' annual emissions-per-restaurant totals, the emission inventory for PM10, PM2.5, and VOC in the South Coast AQMD can be calculated on the aggregate for each commercial cooking emission inventory category, seen in Table 10.

Table 10 – Equipment Type and Emission Inventory Category (numbers in bold) annual emission-per-restaurant factors using estimated equipment units per restaurant.

Emission Inventory Category	Equipment Type	Annual emission-per-restaurant (lbs per restaurant per year)		
		PM10	PM2.5	VOC
Commercial Charbroiling	Underfired	148.31	143.09	17.81
	Chain-Driven	4.30	4.17	1.08
	Final Category Emission-Per-Restaurant Factor	**155.68**	**150.24**	**19.65**
Deep-Fat Frying	Deep-Fat Fryers	-	-	8.92
	Final Category Emission-Per-Restaurant Factor	**-**	**-**	**8.92**
Cooking (Unspecified)	Flat Griddles	24.68	18.76	2.45
	Clamshell Griddles	1.58	1.34	0.07
	Final Category Emission-Per-Restaurant Factor	**26.26**	**20.10**	**2.52**

SUMMARY OF UPDATED COMMERICAL COOKING EMISSIONS:

Using the highest-level formula for emission calculations for PM10, PM2.5, and VOC is:

Equation 4 – Total Emissions of a particular pollutant in South Coast AQMD jurisdiction

$$Total\ Emissions_{pollutant} = Restaurant\ Population_{Final\ Count}\ x\ Emissions\ per\ Restaurant_{pollutant}$$

Table 11 shows only the final emission inventory category emission-per-restaurant factors in pounds of pollutant per year per restaurant. These emission factor values are the final values used for emission inventory calculations.

Table 11 – Final emission per restaurant factors

Emission Inventory Category	PM10 (lb per year per restaurant)	PM2.5 (lb per year per restaurant)	VOC (lb per year per restaurant)
Commercial Charbroiling	155.68	150.24	19.65
Deep-Fat Frying	-	-	8.92
Cooking (Unspecified)	26.26	20.10	2.52

See emissions for base year 2023 for South Coast Air Basin and Salton Sea Air Basin in Table 12.

Table 12 – Emissions in tons per day for base year 2023.

Emission Inventory Category	Pollutant	Emissions in tons per day (SCAB)	Emissions in tons per day (SSAB)	Emissions in tons per day (SCAB + SSAB)
Commercial Charbroiling	**PM**	6.31	0.27	6.58
	PM10	6.31	0.27	6.58
	PM2.5	6.08	0.26	6.35
	TOG	2.27	0.10	2.38
	VOC	0.80	0.03	0.83
Deep-Fat Frying	**PM**	-	-	-
	PM10	-	-	-
	PM2.5	-	-	-
	TOG	0.36	0.02	0.38
	VOC	0.36	0.02	0.38
Cooking (Unspecified)	**PM**	1.06	0.05	1.11
	PM10	1.06	0.05	1.11
	PM2.5	0.81	0.04	0.85
	TOG	0.29	0.01	0.30
	VOC	0.10	0.00	0.11

Factors Contributing to Uncertainty of Emission Inventory

As staff developed this methodology, two studies (1999 PES Study and 2001 PRI Study) were evaluated by staff to determine throughput for each restaurant as part of the commercial cooking facility universe. Both studies provided valuable insight into the diversity of restaurants located within the South Coast AQMD jurisdiction. The 1999 PES study was a South Coast AQMD focused study while the 2001 PRI Study was focused statewide. Ultimately the 2001 PRI Study was used as part of this methodology document due to results of the consumption capacity assessment conducted by staff. It is important to acknowledge that both studies are over 25 years old as of the drafting of this methodology document

and data presented in those studies potentially no longer represent the restaurant population present today. In 2026, CARB initiated a statewide effort to update and expand data on commercial cooking activity. It is very likely that the commercial cooking emission inventory referenced in this document will be updated with the latest available information once the CARB research effort concludes.

Appendix A – County Health Department Restaurant Classification

Each county health department categorizes restaurants and food serving businesses in their own way. The following tables show each county's descriptor for the categories and their unique descriptions.

Table A1 – Los Angeles County

Los Angeles County Health Department Restaurant Descriptions	
Program Element Description	**Included**
FOOD MKT RETAIL (1-1,999 SF) LOW RISK	N
RESTAURANT (151 +) SEATS HIGH RISK	Y
RESTAURANT (61-150) SEATS MODERATE RISK	Y
RESTAURANT (0-30) SEATS LOW RISK	N
RESTAURANT (31-60) SEATS MODERATE RISK	Y
RESTAURANT (0-30) SEATS HIGH RISK	Y
RESTAURANT (61-150) SEATS HIGH RISK	Y
RESTAURANT (151 +) SEATS MODERATE RISK	Y
RESTAURANT (0-30) SEATS MODERATE RISK	N
RESTAURANT (31-60) SEATS HIGH RISK	Y
FOOD MKT RETAIL (1-1,999 SF) MODERATE RISK	N
RESTAURANT (61-150) SEATS LOW RISK	N
FOOD MKT RETAIL (2,000+ SF) LOW RISK	N
FOOD MKT RETAIL (2,000+ SF) MODERATE RISK	N
RESTAURANT (31-60) SEATS LOW RISK	N
FOOD MKT RETAIL (2,000+ SF) HIGH RISK	N
FOOD MKT RETAIL (1-1,999 SF) HIGH RISK	N
RESTAURANT (151 +) SEATS LOW RISK	N

Table A2 – Orange County

Orange County Health Department Restaurant Descriptions	
Classification	**Included**
BED AND BREAKFAST	Y
CATERING 2000-5999 SQ FT - COMPLEX	Y
CATERING 6000+ SQ FT - COMPLEX	Y
CATERING UNDER 2000 SQ FT - COMPLEX	Y
CENTRALIZED UTENSIL WASHING STATION	N
DEPENDENT FOOD OPERATION RETAIL	Y
DEPENDENT FOOD OPERATION WHOLESALE	Y
FOOD MARKET - ADDITIONAL PREP AREA	N
FOOD MARKET - PACKAGED FOOD <300 SQ FT-NO PHF	N
FOOD MARKET - PACKAGED FOOD 1-1999 SQ FT	N

Orange County Health Department Restaurant Descriptions	
Classification	**Included**
FOOD MARKET - PACKAGED FOOD 2000+SQ FT	N
FOOD MARKET LIMITED 2000-5999 SQ FT	N
FOOD MARKET LIMITED 30000+ SQ FT	N
FOOD MARKET LIMITED 6000-29999 SQ FT	N
FOOD MARKET LIMITED UNDER 2000 SQ FT	N
FOOD MARKET W/ 1 PREP AREA 2000 SQ FT	N
FOOD MARKET W/ 1 PREP AREA 2000-5999 SQ FT	N
FOOD MARKET W/ 1 PREP AREA 30000+ SQ FT	N
FOOD MARKET W/ 1 PREP AREA 6000-29999 SQ FT	N
FOOD MARKET W/ 2+ PREP AREAS <6000 SQ FT	N
FOOD MARKET W/ 2+ PREP AREAS 30000+ SQ FT	N
FOOD MARKET W/ 2+ PREP AREAS 6000-29999 SQ FT	N
FOOD SALVAGER	N
LICENSED HEALTH CARE KITCHEN 0-60 BEDS	N
LICENSED HEALTH CARE KITCHEN 101-150 BEDS	N
LICENSED HEALTH CARE KITCHEN 151-200 BEDS	N
LICENSED HEALTH CARE KITCHEN 201+ BEDS	N
LICENSED HEALTH CARE KITCHEN 61-100 BEDS	N
LIMITED SERVICE CHARITABLE FEEDING OPERATION	N
NON PROFIT CHARITABLE FEEDING RETAIL	N
NON PROFIT CHARITABLE FEEDING WHOLESALE	N
PACKAGED WAREHOUSE 2000-5999 SQ FT RETAIL	N
PACKAGED WAREHOUSE 2000-5999 SQ FT -WHOLESALE	N
PACKAGED WAREHOUSE 30000+ SQ FT - WHOLESALE	N
PACKAGED WAREHOUSE 30000+ SQ FT RETAIL	N
PACKAGED WAREHOUSE 6000-29999 SQ FT RETAIL	N
PACKAGED WAREHOUSE 6000-29999 SQ FT-WHOLESALE	N
PACKAGED WAREHOUSE UNDER 2000 SQ FT RETAIL	N
PACKAGED WAREHOUSE UNDER 2000 SQ FT-WHOLESALE	N
PACKING SHED	N
PRIVATE SCHOOL - COMPLEX FOOD PREP	N
PRIVATE SCHOOL - LIMITED PREP	N
PRIVATE SCHOOL - PREPACKAGED	N
PROCESSING PLANT (UNPKG) 2000-5999 SQ FT	N
PROCESSING PLANT (UNPKG) 30000+ SQ FT	N
PROCESSING PLANT (UNPKG) 6000-29999 SQ FT	N
PROCESSING PLANT (UNPKG) UNDER 2000 SQ FT	N
PUBLIC SCHOOL - LIMITED OPEN FOOD FEE EXEMPT	N

Orange County Health Department Restaurant Descriptions	
Classification	**Included**
PUBLIC SCHOOL - PREPACKAGED FEE EXEMPT	N
PUBLIC SCHOOL - PRODUCTION KITCHEN FEE EXEMPT	N
RESTAURANT 101+ PERSONS - MINIMAL PREP	N
RESTAURANT 101-150 PERSONS - COMPLEX	Y
RESTAURANT 101-150 PERSONS - LIMITED PREP	N
RESTAURANT 151-200 PERSONS - COMPLEX	Y
RESTAURANT 151-200 PERSONS - LIMITED PREP	N
RESTAURANT 201+ PERSONS - COMPLEX	Y
RESTAURANT 201+ PERSONS - LIMITED PREP	N
RESTAURANT 31-60 PERSONS - COMPLEX	Y
RESTAURANT 31-60 PERSONS - LIMITED PREP	N
RESTAURANT 61-100 PERSONS - COMPLEX	Y
RESTAURANT 61-100 PERSONS - LIMITED PREP	N
RESTAURANT 61-100 PERSONS - MINIMAL PREP	N
RESTAURANT UNDER 31 PERSONS - COMPLEX	Y
RESTAURANT UNDER 31 PERSONS - LIMITED PREP	N
RESTAURANT UNDER 31 PERSONS - LIMITED PREP	N
RESTAURANT UNDER 60 PERSONS - MINIMAL PREP	N
SATELLITE FOOD SERVICE – PREPACKAGED FOOD	N
SATELLITE FOOD SERVICE – UNPACKAGED FOOD	N
SEASONAL FOOD FACILITY	Y
SENIOR FEEDING NUTRITION SITE	N
SWAP MEET/PREPACKAGED FEEDING SITE	N
USDA PROCESSING PLANT 2000-5999 SQ FT	N
USDA PROCESSING PLANT 6000+ SQ FT	N
USDA PROCESSING PLANT UNDER 2000 SQ FT	N
VENDING MACHINES	N
WHOLESALE BAKERY 2000-5999 SQ FT	N
WHOLESALE BAKERY 30000+ SQ FT	N
WHOLESALE BAKERY 6000-29999 SQ FT	N
WHOLESALE BAKERY UNDER 2000 SQ FT	N

Table A3 – Riverside County

Riverside County Health Department Restaurant Descriptions	
Permit Type	**Included**
Additional Food Market - Bakery	N

Riverside County Health Department Restaurant Descriptions	
Permit Type	**Included**
Additional Food Market - Deli	N
Additional Food Market Operation	Y
Bar/Tavern => 6000 sq ft	N
Bar/Tavern 1 to 2000 sq ft	N
Bar/Tavern 2001 to 5999 sq ft	N
Caterer - Shared Kitchen	Y
Food Market 2001 to 5999 sq ft	N
High Risk Truck/Trailer	N
Restaurant => 6000 sq ft	Y
Restaurant 1 to 2000 sq ft	Y
Restaurant 2001 to 5999 sq ft	Y

Table A4 – San Bernardino County

San Bernardino County Health Department Restaurant Descriptions	
Category	**Included**
1620 - Public Eating Pl (0-24 Seats)	Y
1621 - Public Eating Pl (25-99 Seats)	Y
1622 - Public Eating Pl (100-Up Seats)	Y
1646 - Convenience Store (0-499 SqFt)	N
1647 - Convenience Store (500-2499 SqFt)	N
1648 - Convenience Store (2500-Up SqFt)	N
1650 - Camp Public Eating Place	N
1652 - Snack Bar - Prepackaged	N
1653 - Snack Bar - Limited Prep	N
1654 - Snack Bar - Food Preparation	N
1655 - School Prepackaged Food	N
1656 - School Limited Food Preparation	N
1657 - School Full Service Preparation	N
1660 - Satellite Food Distribution	Y
1682 - Prepackaged (0-499 SqFt)	N
1683 - Prepackaged (500-2499 SqFt)	N
1684 - Prepackaged (2500-Up SqFt)	N
1686 - PEP Op for a Processor (Req. Addtl Permit)	N

Appendix B – Keyword Bank for Restaurant Filtering

Table B1 – Keyword Bank for filtering by registered Establishment Name

Keyword Bank and Inclusion/Exclusion Assignment (Y/N)	
Keyword	**Assignment**
Steak	Y
Cafe	N
Coffee	N
Juice	N
Grill	Y
Jamba	N
Bagel	N
Donut	N
Pizza	N
Poke	N
AMPM	N
Chevron	N
Shell	N
Regal	N
Tea	N
Bake	N
Yogurt	N
Gelato	N
Deli	N
Pastry	N
Bar	N
Boba	N
Theater	N
Cinema	N
Theatre	N
Movie	N
Cream	N
Concession	N
College	Y
School	Y
Health Institute	N
Health care	N
Church	N
Hospital	N
7-Eleven	N

Appendix C – Eight-Digit SIC Codes for Commercial Cooking and Restaurant Categories

Table C1 – Eight-Digit SIC Codes used for Commercial Cooking, Descriptions, and Restaurant Category Assignment

SIC8 Code	SIC8 Description	Restaurant Category
58120100	Ethnic food restaurants	Ethnic
58120101	American restaurant	Ethnic
58120102	Cajun restaurant	Ethnic
58120103	Chinese restaurant	Ethnic
58120104	French restaurant	Ethnic
58120105	German restaurant	Ethnic
58120106	Greek restaurant	Ethnic
58120107	Indian/Pakistan restaurant	Ethnic
58120108	Italian restaurant	Ethnic
58120109	Japanese restaurant	Ethnic
58120110	Korean restaurant	Ethnic
58120111	Lebanese restaurant	Ethnic
58120112	Mexican restaurant	Ethnic
58120113	Spanish restaurant	Ethnic
58120114	Sushi bar	Ethnic
58120115	Thai restaurant	Ethnic
58120116	Vietnamese restaurant	Ethnic
58120117	Pakistani restaurant	Ethnic
58120500	Family restaurants	Family
58120501	Restaurant, family: chain	Family
58120502	Restaurant, family: independent	Family
58129907	Diner	Family
58120300	Fast food restaurants and stands	Fast Food
58120302	Carry-out only (except pizza) restaurant	Fast Food
58120306	Drive-in restaurant	Fast Food
58120307	Fast-food restaurant, chain	Fast Food
58120308	Fast-food restaurant, independent	Fast Food
58120310	Grills (eating places)	Fast Food
58120311	Hamburger stand	Fast Food
58129904	Chicken restaurant	Fast Food
58120700	Seafood restaurants	Seafood
58120701	Oyster bar	Seafood
58120702	Seafood shack	Seafood
58120800	Steak and barbecue restaurants	Steak and Barbecue
58120801	Barbecue restaurant	Steak and Barbecue
58120802	Steak restaurant	Steak and Barbecue