San Joaquin Valley
Unified Air Pollution Control District

Emission Inventory Methodology
020 – COGENERATION – UNSPECIFIED FUEL TYPES

I. Purpose

This document describes the method used to estimate area source emissions of criteria pollutants (NO, SOX, VOC, CO, and PM10) from cogeneration facilities in the San Joaquin Valley Air Basin.

II. Applicability

This emissions source category applies to Cogeneration units such as: Industrial Boilers (Bituminous, Lignite, Natural Gas, Coke, Wood etc…), and Industrial and Commercial-Institutional internal combustion engines (Natural Gas, Oil/Diesel, Propane, Duel Fuel and etc…) that do not reconcile to other cogeneration categories. The emissions calculations from this Area Source Methodology apply to the following CES and REIC code(s):

CES	REIC	Description
74682	020-995-0012-0000	Cogeneration- Other (Unspecified)

III. Point Source Reconciliation

This source category reconciles area source emissions from 17 cogeneration Emissions Inventory Codes (EICs) shown in Appendix A. These SIC/SCC combinations are to be used in the Point Source Inventory when entering or updating emissions from these types of emissions units.

IV. Methodology Description

The District's permits database was checked against the California Energy Commission's (CEC) database[a] of all cogeneration plants and types of fuels used at each facility. All of the facilities identified by the CEC within the San Joaquin Valley Air Basin are under District permit. Therefore, all of the emissions for this area source category are reported through the point source inventory.

V. Activity Data

The activity data for each facility associated with this source category is reported through the District's point source inventory.

VI. Emission Factors

The emission factors for each cogeneration process at each facility associated with this source category are reported through the District's point sources inventory.

VII. Assumptions

The California Energy Commission's database of cogeneration plants in California is accurate and complete.

VIII. Sample Calculations

Not applicable

IX. Temporal Variation

The temporal data for each facility associated with this source category is reported through the District's point sources inventory.

X. Spatial Variation

The spatial data for each facility associated with this source category is reported through the District's point sources inventory.

XI. Growth Factor

The growth factors associated with this emissions category are presented in Appendix B.

XII. Control Factor

Emission units within this area source category may be subject to the following District Rules:

Rule No.	Rule Description	Year of Full Implementation	Control Level (%)
4305	Boilers, Steam Generators and Process Heaters-Phase II	2000	0.38
4352	Solid Fuel Fired Boilers, Steam Generators, and Process Heaters	N/A	N/A
4701	Internal Combustion Engines-Phase I	2001	0.12
4702	Internal Combustion Engines-Phase II	2005	0.58
4703	Stationary Gas Turbines	2008	0.24

*Not Available

XIII. ARB Chemical Speciation

Profile Description	Profile #	Fractions			
		ROG	VOC	PM_{10}	$PM_{2.5}$
Species unknown-all categories composite	600	0.6986	0.6986	NA	NA
Unspecified	900	NA	NA	0.7	0.42

XIV. Assessment Of Methodology

Since all cogeneration facilities in the San Joaquin Valley Air Basin are permitted, there are no area source emissions in this category. All cogeneration emissions are reported through the point source inventory.

XV. Emissions Comparison

The 2004 emissions inventory data as of June1, 2006 in ARB's CEIDARS database (http://www.arb.ca.gov/app/emsinv/dist/rpts/sub_eic.php) is shown below. The CEIDARS emissions data is not static and is subject to change. Included is a comparison of how the methodology will affect the data being submitted to the CEIDARS database.

CEIDARS Inventory Year 2004							
Category County	Process Rate (MMCF)	Emissions (Tons/Year)*					
		CO	NOx	SOx	VOC	PM10	PM2.5
Cogeneration- Other							
Fresno	0.00	0.00	0.00	0.00	0.00	0.00	NR
Kern	0.00	0.00	0.00	0.00	0.00	0.00	NR
Kings	0.00	7.30	18.30	73.00	3.65	7.30	NR
Madera	0.00	0.00	0.00	0.00	0.00	0.00	NR
Merced	0.00	3.65	18.25	0.00	0.00	0.00	NR
San Joaquin	0.00	0.00	0.00	0.00	0.00	0.00	NR
Stanislaus	0.00	7.30	32.85	0.00	0.00	0.00	NR
Tulare	0.00	0.00	0.00	0.00	0.00	0.00	NR
TOTAL	0.00	18.25	69.4	73.00	3.65	7.30	NR

*Emissions in CEIDARS are reported in tons per day to 1/100th of a ton. Therefore, emissions of less than 0.005 tons per day (0.18 tons per year) are reported as zero.
NR = not reported

2005 Area Source Emissions							
Category County	**Process Rate (MMCF)**	**Emissions (Tons/Year)**					
		CO	**NOx**	**SOx**	**VOC**	**PM10**	**PM2.5**
Cogeneration- Other							
Fresno	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kern	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kings	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Madera	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Merced	0.00	0.00	0.00	0.00	0.00	0.00	0.00
San Joaquin	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stanislaus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tulare	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Change in Emissions 2004 To 2005							
Category County	**Process Rate (MMCF)**	**Change in Emissions (Tons/Year)**					
		CO	**NOx**	**SOx**	**VOC**	**PM10**	**PM2.5**
Cogeneration- Other							
Fresno	0.00	0.00	0.00	0.00	0.00	0.00	NR
Kern	0.00	0.00	0.00	0.00	0.00	0.00	NR
Kings	0.00	-7.30	-18.30	-73.00	-3.65	-7.30	NR
Madera	0.00	0.00	0.00	0.00	0.00	0.00	NR
Merced	0.00	-3.65	-18.25	0.00	0.00	0.00	NR
San Joaquin	0.00	0.00	0.00	0.00	0.00	0.00	NR
Stanislaus	0.00	-7.30	-32.85	0.00	0.00	0.00	NR
Tulare	0.00	0.00	0.00	0.00	0.00	0.00	NR
TOTAL	0.00	-18.25	-69.4	-73.00	-3.65	-7.30	NR

NR = not reported. $PM_{2.5}$ not reported in 2004, therefore no comparison can be made.

XVI. Update Schedule

Since all cogeneration facilities within the San Joaquin Valley Basin are permitted, data for these facilities are collected annually. This methodology is to be updated annually.

XVII. References

a. California Energy Commission. http://www.energy.ca.gov/database/index.html#powerplants. October 5, 2005.

b. ARB CEIDARs database. http://www.arb.ca.gov/app/emsinv/dist/rpts/sub_eic.php

XVIII. Appendix A. SIC and SCC combinations to be used for each EIC reconciled to this source category.

EIC	ARB SIC	SCC	Point Source Type
020-005-0214-0000	4931	10200219	Cogeneration-Industrial- Boiler-Bituminous Coal
020-005-0218-0000	1311	10200307	Cogeneration-Industrial-Boiler-Lignite
020-005-1500-0000	4931	10200405	Cogeneration-Industrial-Boiler-Residual Oil
020-995-0012-0000	4931	10200505	Cogeneration-Industrial-Boiler-Distillate Oil
020-995-0012-0000	4931	10200604	Cogeneration-Industrial-Boiler-Natural Gas
020-005-0130-0000	4939	10200710	Cogeneration-Industrial-Boiler-Process Gas
020-005-0220-0000	4931	10200804	Cogeneration-Industrial-Boiler-Coke
020-005-0230-0000	2431	10200907	Cogeneration-Industrial-Boiler-Wood
020-045-1200-0000	4931	20200103	Cogeneration-Industrial-Turbine Engine-Dist. Oil/Diesel
020-045-0110-0000	4959	20200202	Cogeneration-Industrial-Reciprocating Engine-Natural Gas
020-045-0110-0000	4931	20200203	Cogeneration-Industrial-Turbine Engine-Natural Gas
020-995-0012-0000	4931	20200204	Cogeneration-Industrial-Engine-Natural Gas
020-040-0012-0000	4911	20200403	Cogeneration-Industrial- Large Bore Engine -Duel Fuel
020-995-0012-0000	5084	20201003	Cogeneration-Industrial-Turbine Engine-Propane
020-045-1200-0000	4931	20300102	Cogeneration-Commercial/Institutional-Turbine Engine-Dist.Oil/Diesel
020-045-0110-0000	4931	20300203	Cogeneration-Commercial/Institutional-Turbine Engine-Natural Gas
020-995-0112-0000	4931	20300204	Cogeneration-Commercial/Institutional-Engine-Natural Gas

XIX. **Appendix B.** California Air Resources Board growth parameters for EIC 020-995-0012-0000.

Year	Growth Activity Parameter by County							
	Fresno	Kern	Kings	Madera	Merced	San Joaquin	Stanislaus	Tulare
2000	1.06	1.02	0.90	1.07	1.03	0.86	1.05	0.85
2001	1.07	1.03	0.90	1.09	1.05	0.86	1.07	0.85
2002	1.08	1.04	0.90	1.10	1.06	0.86	1.07	0.85
2003	1.08	1.04	0.91	1.11	1.06	0.86	1.08	0.85
2004	1.09	1.05	0.91	1.12	1.07	0.86	1.09	0.85
2005	1.10	1.06	0.91	1.13	1.08	0.86	1.10	0.85
2006	1.11	1.07	0.92	1.14	1.09	0.87	1.11	0.85
2007	1.12	1.08	0.92	1.15	1.09	0.87	1.12	0.85
2008	1.13	1.09	0.93	1.17	1.10	0.87	1.13	0.85
2009	1.14	1.10	0.93	1.18	1.11	0.87	1.14	0.85
2010	1.15	1.11	0.94	1.19	1.12	0.87	1.16	0.85
2015	1.20	1.15	0.96	1.25	1.16	0.88	1.21	0.85
2020	1.25	1.19	0.98	1.30	1.20	0.89	1.26	0.85
2025	1.30	1.23	1.00	1.36	1.24	0.90	1.31	0.84
2030	1.35	1.28	1.02	1.42	1.29	0.91	1.36	0.84