San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

Title V and Greenhouse Gases Fact Sheet

Am I subject to Title V permitting requirements because of my greenhouse gas emissions?

As of July 1, 2011, per the Federal Environmental Protection Agency (EPA), Greenhouse Gases (GHG) is considered a regulated pollutant for sources with a potential to emit greater than 100,000 short tons on a carbon dioxide equivalent (CO_{2e}) basis. If regulated, the source becomes a Major Source subject to Title V permitting for GHG if it has a potential to emit greater than 100 short tons of GHG on a mass basis. Note that for Title V, emissions are calculated using short tons, not metric tons (as is usual for GHG).

For Title V regulations, GHG's include the following six "well-mixed" compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFC), hydrofluorocarbons (HFC), and sulfur hexafluoride (SF_6).

EPA has guidance available at http://www.epa.gov/nsr/ghgpermitting.html. Please note that this page includes both Title V permitting and Prevention of Significant Deterioration (PSD) permitting.

If you would like help in determining if your facility is subject to Title V, what you can do to avoid Title V, or guidance through the application process if you must obtain a Title V permit, please call one of our Small Business Assistance staff at one of the numbers listed below.

Modesto:	(209) 557-6446
Fresno:	(559) 230-5888
Bakersfield:	(661) 392-5665

Should your facility need to apply for a Title V permit, applications must be submitted by June 28, 2012. Forms are available at the following link:

http://www.valleyair.org/busind/pto/ptoforms/titlevidx.htm.

Calculating GHG on a Carbon Dioxide Equivalent (CO_{2e}) Basis

Carbon dioxide equivalents are found by multiplying the mass emissions of a GHG by its global warming potential (GWP). For Title V purposes, the GWP are taken from the Mandatory Reporting Rule found in 40 CFR Part 98, Subpart A, Table A-1. There is a table at the end of this fact sheet detailing the GWP of the 6 GHG included in Title V. The full table is available at the following link:

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr98_main_02.tpl

Calculating GHG on a Mass Basis

EPA has established default GHG emission factors for combustion sources in 40 CFR Part 98, Subpart A, Tables C-1 and C-2 at the following link:

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr98_main_02.tpl

Sample Calculations

Example 1: For a company with one natural gas fired, 100 MMBtu/hr boiler, allowed to operate 24/7 (8760 hours per year).

The GHG emissions factors are:
CO_2: 116.5 lb/MMBtu
CH_4: 0.002 lb/MMBtu
N_2O: 0.0002 lb/MMBtu

Step 1: Calculate the CO_{2e} emissions, to see if GHG are a regulated pollutant for this facility.

CO_2 = 100 MMBtu/hr * 8760 hr/yr * 116.5 lb/MMBtu * 1 lb CO_{2e}/1 lb CO_2 * 1 ton/2,000 lb
= 51,027 tons CO_{2e}

CH_4 = 100 MMBtu/hr * 8760 hr/yr * 0.002 lb/MMBtu * 21 lb CO_{2e}/1 lb CH_4 * 1 ton/2,000 lb
= 18.4 tons CO_{2e}

N_2O = 100 MMBtu/hr * 8760 hr/yr * 0.0002 lb/MMBtu * 310 lb CO_{2e}/1 lb N_2O * 1 ton/2,000 lb
= 27.2 tons CO_{2e}

CO_{2e} = 51,027 + 18.4 + 27.2
= 51,072.6 tons CO_{2e}

As this amount is less than 100,000 tons CO_{2e}, GHG are not a regulated pollutant for this facility, and a Title V permit is not required.

Example 2: For a company with one natural gas fired, 300 MMBtu/hr boiler, limited to an annual fuel consumption of 2,450,000 MMBtu/yr to keep from being a Major Source of NOx.

Use the same GHG emission factors from Example 1.

Step 1: Calculate the CO_{2e} emissions, to see if GHG are a regulated pollutant for this facility.

CO_2 = 2,450,000 MMBtu/yr * 116.5 lb/MMBtu * 1 lb CO_{2e}/1 lb CO_2 * 1 ton/2,000 lb
= 142,712.5 tons CO_{2e}

CH_4 = 2,450,000 MMBtu/yr * 0.002 lb/MMBtu * 21 lb CO_{2e}/1 lb CH_4 * 1 ton/2,000 lb
= 51.5 tons CO_{2e}

N_2O = 2,450,000 MMBtu/yr * 0.0002 lb/MMBtu * 310 lb CO_{2e}/1 lb N_2O * 1 ton/2,000 lb
= 76 tons CO_{2e}

CO_{2e} = 142,712.5 + 51.5 + 76
= 142,840 tons CO_{2e}

As this amount is greater than 100,000 tons CO_{2e}, GHG are a regulated pollutant for this facility, and a Title V permit will be required if it is a Major Source for GHG.

Step 2: Calculate the GHG mass emissions to see if the facility is a Major Source.

CO_2 = 2,450,000 MMBtu/yr * 116.5 lb/MMBtu * 1 ton/2,000 lb
= 142,712.5 tons CO_2

CH_4 = 2,450,000 MMBtu/yr * 0.002 lb/MMBtu * 1 ton/2,000 lb
= 2.5 tons CH_4

N_2O = 2,450,000 MMBtu/yr * 0.0002 lb/MMBtu * 1 ton/2,000 lb
= 0.3 tons N_2O

GHG = 142,712.5 + 2.5 + 0.3
= 142,715.3 tons GHG

As this amount is greater than 100 tons, this facility is a Major Source for GHG emissions, and is subject to Title V permitting. Note that if they could reduce their permitted annual fuel consumption enough, their CO_{2e} potential to emit could be reduced to below 100,000 tons/yr, and they would no longer be subject to Title V permits.

40 CFR Part 98, Subpart A, Table A-1

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
Carbon dioxide	124–38–9	CO_2	1
Methane	74–82–8	CH_4	21
Nitrous oxide	10024–97–2	N_2O	310
HFC–23	75–46–7	CHF_3	11,700
HFC–32	75–10–5	CH_2F_2	650
HFC–41	593–53–3	CH_3F	150
HFC–125	354–33–6	C_2HF_5	2,800
HFC–134	359–35–3	$C_2H_2F_4$	1,000
HFC–134a	811–97–2	CH_2FCF_3	1,300
HFC–143	430–66–0	$C_2H_3F_3$	300
HFC–143a	420–46–2	$C_2H_3F_3$	3,800
HFC–152	624–72–6	CH_2FCH_2F	53
HFC–152a	75–37–6	CH_3CHF_2	140
HFC–161	353–36–6	CH_3CH_2F	12
HFC–227ea	431–89–0	C_3HF_7	2,900
HFC–236cb	677–56–5	$CH_2FCF_2CF_3$	1,340
HFC–236ea	431–63–0	CHF_2CHFCF_3	1,370
HFC–236fa	690–39–1	$C_3H_2F_6$	6,300
HFC–245ca	679–86–7	$C_3H_3F_5$	560
HFC–245fa	460–73–1	$CHF_2CH_2CF_3$	1,030
HFC–365mfc	406–58–6	$CH_3CF_2CH_2CF_3$	794
HFC–43–10mee	138495–42–8	$CF_3CFHCFHCF_2CF_3$	1,300
Sulfur hexafluoride	2551–62–4	SF_6	23,900
PFC–14 (Perfluoromethane)	75–73–0	CF_4	6,500
PFC–116 (Perfluoroethane)	76–16–4	C_2F_6	9,200
PFC–218 (Perfluoropropane)	76–19–7	C_3F_8	7,000
Perfluorocyclopropane	931–91–9	$C\text{-}C_3F_6$	17,340
PFC–3–1–10 (Perfluorobutane)	355–25–9	C_4F_{10}	7,000
Perfluorocyclobutane	115–25–3	$C\text{-}C_4F_8$	8,700
PFC–4–1–12 (Perfluoropentane)	678–26–2	C_5F_{12}	7,500
PFC–5–1–14 (Perfluorohexane)	355–42–0	C_6F_{14}	7,400
PFC–9–1–18	306–94–5	$C_{10}F_{18}$	7,500