Title V Applicability Determination

The Title V program in Sacramento applies to any stationary source that has the potential to emit the following air pollutants at the following levels:

Nitrogen Oxides (NOx)……..……25 tons per year
Reactive Organic Compounds (ROCs)…….…25 tons per year
Carbon Monoxide (CO)……..……..100 tons per year
Sulfur Oxides (SOx)……..…100 tons per year
Particulate Matter <10 microns (PM10)…….100 tons per year
Any single hazardous air pollutant……10 tons per year
Combined total hazardous air pollutants……....25 tons per year

Agricultural sources could potentially exceed the Title V thresholds for NOx and/or ROCs. Therefore, agricultural sources should calculate their potential to emit to determine if Title V applies. The table below can be used to estimate the potential to emit from typical agricultural operations.

Potential to Emit Calculations		
Category	**Total NOx (tons/year)**	**Total ROCs (tons/year)**
Portable Irrigation Pumps:	n/a	n/a
Stationary Irrigation Pumps:	①	②
Dairy Operations:	n/a	③
Confined Animal Facilities:	n/a	n/a
Boilers	④	⑤
Gasoline Storage/Dispensing Tanks	n/a	⑥
Total Potential to Emit: Add all emissions for each column. If the total emissions from each column (NOx and ROCs) is less than 25, you are not subject to Title V. If the total from either column (NOx or ROCs) is equal to, or exceeds, 25, you **are** subject to Title V.		

Portable Irrigation Pumps:
Portable irrigation pumps are considered non-road engines. Emissions from non-road engines are not included in Title V applicability determinations.

Portable irrigation pumps are those pumps that are transportable in nature (not bolted or designated to a specific site) and which do not operate for more than 12 months at any given site.

Stationary Irrigation Pumps:

A stationary pump is a pump that remains at the same location for more than 12 months or for the entire duration of the season. The potential to emit from stationary irrigation pumps will be calculated as follows:

$$NOx = \frac{1.18 \times 10^{-4} \text{ ton NOx}}{\text{Acre-yr} * \text{ft}} \times \boxed{\quad}_{H} \times \boxed{\quad} \text{ Acres} \times \boxed{\quad}_{P} = \boxed{\quad} \frac{\text{Ton NOx}}{\text{Year}}$$

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$$ROC = \frac{9.55 \times 10^{-6} \text{ ton ROC}}{\text{Acre-yr} * \text{ft}} \times \boxed{\quad}_{H} \times \boxed{\quad} \text{ Acres} \times \boxed{\quad}_{P} = \boxed{\quad} \frac{\text{Ton ROC}}{\text{Year}}$$

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Where

P = $\frac{\text{Percent of irrigation performed with } \textbf{stationary} \text{ internal combustion engines (non-electrified pumps)}}{100}$

Example:

If 40% of the field is irrigated with stationary diesel-fired engines, 10% with portable diesel-fired engines, 40% with propane-fired engines and 10% of the pumps are electric, then P equals:

$$P = \frac{40+40}{100} = \frac{80}{100} = 0.8$$

H = The maximum well depth for the region (the maximum head in feet). This can be determined by identifying the *Thomas Guide* page number in which the majority of the farm in located and selecting the depth from the table below:

Thomas Guide Page No.	Well Depth	Thomas Guide Page No.	Well Depth	Thomas Guide Page No.	Well Depth
235	10	297	30	377	35
236	10	298	85	378	80
237	60	299	150	379	100
238	80	317	50	381	150
239	150	318	150	417	30
256	30	319	150	418	70
257	15	337	30	419	150
258	80	338	90	420	150
259	150	339	110	421	230
260	120	340	140	422	300
261	50	341	50	436	10
277	90	342	50	437	10
278	50	357	50	439	50
279	100	358	100	455	10
280	150	359	110	456	10
281	180	360	100	474	10

If the Thomas Guide page number is unknown, use a well depth of 400 ft.

Dairy Operations:

A dairy farm produces fugitive volatile organic compound (VOC) emissions from milking centers, cow housing, corrals, manure storage, and manure application; and non-fugitive emissions from waste lagoons and manure digesters. With fugitive ROCs not subject to federal potential to emit determinations, lagoon emissions are the only emissions that need to be calculated for Title V applicability determinations. The potential to emit will be calculated using US EPA's publication Compilation of Air Pollutant Emission Factors -- AP-42, which suggests an emission factor for lagoons of 6.3 lb-ROC per year (0.00315 ton-ROC per year) for mature cows (milking cows or dry cows) and 4.4 lb-ROC (0.0022 ton-ROC per year) for all other cows (heifers and calves).

Therefore:

Dairy Emissions = Mature Cow Emissions + Other Cows Emissions

Mature Cow Emissions = 0.00315 ton ROC x [**M**] Mature Cows = [ ] Tons ROC / Year

(Mature Cow Emissions)

Where **M** = The total number of mature cows (milk cows and dry cows) whose manure is flushed to a lagoon. Do not include cows whose manure is scraped.

Other Cow Emissions = 0.0022 ton ROC x [**O**] Other Cows = [ ] Tons ROC / Year

(Other Cow Emissions)

Where **O** = The total number of other cows (heifers and calves) whose manure is flushed to a lagoon. Do not include cows whose manure is scraped.

Dairy Emissions = [Mature Cow Emissions] + [Other Cows Emissions] = [ ] Tons ROC / Year

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Confined Animal Facilities:

Sacramento's current position is that 100% of the emissions from confined animal facilities (feedlots, poultry operations, etc.) are fugitives. Therefore, none of the emissions generated by the animals themselves will be counted toward Title V applicability. However, emissions from auxiliary operations, such as the use of incinerators to dispose of dead animals, must be included in the potential to emit determination.

Boilers:
Boiler emissions will be calculated by assuming each boiler operates 24 hrs per day, 365 days per year. Emissions will be calculated using US EPA's publication Compilation of Air Pollutant Emission Factors -- AP-42.

Boilers Fired on Gaseous Fuels:

NOx Emissions = $\frac{0.438 \text{ ton NOx}}{\text{MMBtu/hr}}$ x [ ] MMBtu/hr = [ ] Tons NOx/Year

Total heat input from all boilers combined (in million BTU per hr)

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ROC Emissions = $\frac{0.024 \text{ ton ROC}}{\text{MMBtu/hr}}$ x [ ] MMBtu/hr = [ ] Tons ROC/Year

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Other Fuels: Check with district

Gasoline Storage/Dispensing Tanks:
ROC emissions from gasoline storage tanks will be calculated using the emission factors suggested in the CAPCOA document titled: Air Toxics "Hot Spots" Program, Gasoline Service Station Industrywide Risk Assessment Guidelines. Because fugitive emissions from gasoline tanks are not included in Title V emission calculations, only the loading and breathing emissions will be calculated.

ROC Emissions =(Loading E.F. + Breathing E.F.) * No. of gallons per year

Where:

Loading E.F. = 0.0084 lb/gal or 4.2×10^{-6} (Aboveground and Underground tanks)

Breathing E.F. = 0.0021 or 1.05×10^{-6} (Aboveground tanks)
0.00084 or 4.2×10^{-7} (Underground tanks)

Aboveground Tanks:

ROC Emissions = $\frac{5.25 \times 10^{-6} \text{ tons}}{\text{gallon}}$ x [ ] $\frac{\text{gallons gasoline}}{\text{year}}$ = [ ] $\frac{\text{tons}}{\text{year}}$

Underground Tanks:

ROC Emissions = $\frac{4.62 \times 10^{-6} \text{ tons}}{\text{gallon}}$ x [ ] $\frac{\text{gallons gasoline}}{\text{year}}$ = [ ] $\frac{\text{tons}}{\text{year}}$

Total ROC Emissions = [ABOVEGROUND TANK] tons/year + [UNDERGROUND TANK] tons/year = [ ] Tons/year

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Engines E.F. Details:

$$\text{Irrigation E.F.} = \frac{\text{Engine EF} * \text{Water Usage} * \text{Area CF} * \rho H_2O * \text{Energy CF}}{\text{Pump Efficiency}}$$

Where:

Engine E.F. NOx E.F. = 14 g/hp-hr (AP-42) = 0.0309 lb/hp-hr or 1.54×10^{-5} tons/hp-hr
ROC E.F. = 1.13 g/hp-hr (AP-42) = 0.00249 lb/hp-hr or 1.25×10^{-6} tons/hp-hr

Water Usage = 2.85 acre-ft/year (assumes crop field)

Area CF = Unit conversion factor --- 43,560 ft^2 per acre

ρH_2O = Density of water in lb per cubic foot --- 62.4 lb/ft^3

Energy CF = Unit conversion factor --- 5.05×10^{-7} hp-hr/ft-lb

Pump Efficiency = 0.51 (51%)

Thus,

Irrigation E.F. NOx = $(1.54 \times 10^{-5} * 2.85 * 43{,}560 * 62.4 * 5.05 \times 10^{-7})/.51 = 1.18 \times 10^{-4}$
Irrigation E.F. ROC = $(1.25 \times 10^{-6} * 2.85 * 43{,}560 * 62.4 * 5.05 \times 10^{-7})/.51 = 9.55 \times 10^{-6}$