

Area - Potential Control Strategies for DFW Attainment Demonstration

Control Strategy Description	Base Year 1999 Emission (TPD)	Future Year 2010 Emission Projection (TPD)	Reduction in Tons Per Day (TPD)	Estimated Percent Reduction	Comments
<p>1) Industrial LPG Boilers - Use of low NO_x burners to reduce NO_x emissions from small industrial boilers fueled by LPG.</p>	0.66	0.33	50.0		
<p>2) Municipal Compliance with International Energy Conservation Codes - The International Energy Conservation Code (IECC) is a comprehensive code that establishes minimum design and construction parameters for energy-efficient buildings. Senate Bill 5, passed by the 77th Legislature in 2001, adopted the Code as the energy code for a majority of the building construction in the state. The bill requires municipalities to establish procedures for administering and enforcing the Code. The bill also sets a goal for municipalities to reduce energy usage by 5% each year, beginning January 1, 2002. However, the goal is not mandatory.</p>					<p>Require additional energy efficiency measures beyond SB 5, such as building design, revisions to codes and standards, and energy management programs for large commercial facilities.</p> <p>This strategy requires the compliance of all municipalities, except school districts, with the IECC.</p> <p>5% targets were set by SB in 2001. However, it is up to individual political subdivisions to adopt ordinances, resolutions, procedures, or plans to demonstrate their commitment to annually achieving the target.</p>
<p>3) TiO₂ Coatings - Titanium dioxide is a photo catalyst, which speeds oxidation on its surface in the presence of UV light. When the surface of TiO₂ is exposed to UV light, reactive oxygen is created. Reactive oxygen has high oxidation efficiency and oxidizes NO_x into nitric acid ions. The resultant nitric</p>					<p>Various international projects are aimed at developing catalytic cement and concrete products that trigger a catalytic reaction that destroys the molecules of nitrogen oxides. In 2002, 7000 road surfaces in Milan, Italy, were covered with catalytic cement, resulting in the concentration of NO_x at street level to be cut by up to 60%. Japanese company (Mitsubishi Materials) is</p>

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acid is then washed away by rain. Any remaining nitric acid ions are neutralized by the alkalinity of the concrete.					already marketing a paving block product, known as NOXER. Also, a Swedish-Finnish consortium of companies is collaborating to develop titanium dioxide products. Lamar University has published a paper on this subject, "Photocatalytic coverings on pavements/buildings for deposition and destructions of NOx/VOC in major Texas urban areas."
4) Pilot lights on gas stoves - This measure will involve replacing residential natural gas stove pilot light ignition with electronic ignition systems.		3.3	1.37	40.9	
5) Pilot lights on residential hot water heaters - A large number of houses in the non-attainment and affected counties have active pilot lights that burn throughout the year. Pilot lights are used on all natural gas appliances to ignite the main burner when there is a demand for heating, water heating, etc. This measure will involve replacing residential hot water heater pilot light ignition with electronic ignition systems.		3.3	0.79	23.6	
6) NOx Reductions from electric generating facilities - Co-					"Co-generation generates electricity and useful heat or steam in the same process.

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Generation/Combined Heat and Power					With the high concentration of heat-intensive process equipment used at refineries and chemical plants in the HGB there should be significant opportunity to take advantage of co-generation." There may be less potential in DFW.
7) NOx Reductions from electric generating facilities - Replacing Existing Electric Generating Facilities with Combined Cycle Turbines or Renewable Energy					"NOx reductions of 90% at electrical generating facilities are technically achievable through the use of Tier III controls (flue gas clean-up plus burner modifications). However, even greater reductions are achieved by retiring old, highly polluting generating facilities and replacing them with ultra-low emissions, natural gas combined-cycle combustion turbines, or zero-emissions renewable energy resources. The difference between a retrofit strategy and a retirement/replacement strategy is at least 13 tpd in the HGB."
8) Efficiency Based Natural Gas Rates "Setting natural gas rates on an inverted block rate will reward conservation."					
9) Boilers & Process Heaters - Additional regulations can be adopted for minor sources of NOx emissions from boilers and process heaters greater than 2.0 MMBtu/hr. The emission					The following boilers and process heaters would be exempt: -firing 1.8 billion Btu/yr or less, for > 2.0 MMBtu/hr but < 5.0 MMBtu/hr units. -firing 9.0 billion Btu/yr or less, for = or >

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specifications for gas-fired boilers and process heaters should be 0.036lb/MMBtu, or 30 ppmv @ 3.0% O ₂ , dry and 0.072lb /MMBtu, or 60 ppmv @ 3.0% O ₂ , dry for liquid-fired boilers and process heaters					5.0 MMBtu/hr units. The TCEQ has an existing rule for NO _x emission reductions from major sources in DFW non-attainment area (=50 tpy NO _x). But no rule has proposed emission specifications for minor source of NO _x in DFW. New rules can be proposed for NO _x emission reductions from minor sources by extending 30 TAC §§117.471-117.481 for HGB area (< 25 tpy) to the 9 DFW non-attainment counties depending on number of estimated units operated.
10) Stationary Gas Turbines - Additional regulations can be adopted for minor sources of NO _x emissions from stationary gas turbines greater than 1.0 megawatt placed into operation on or before 10/1/01 and all stationary gas turbines placed into operation after 10/1/01. The emission specifications for all stationary gas turbines should be 0.15 lb/MMBtu.					The TCEQ has an existing rule for NO _x emission reductions from major sources in DFW non -attainment area (=50 tpy NO _x). But no rule has proposed emission specifications for minor source of NO _x in DFW. New rules can be proposed for NO _x emission reductions from minor sources by extending 30 TAC §§117.471-117.481 for HGB area (< 25 tpy) to DFW 9 non-attainment counties depending on number of estimated units operated.
11) Engines - Additional regulations can be adopted for minor sources of NO _x emissions from engines. The					The following engines would be exempt: I) less than 50 hp ii) used for research and testing

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<p>emission specifications for;</p> <p>i) Stationary gas-fired engines should be 0.60g/hp-hr for landfill gas and 0.50 g/hp-hr for all others.</p> <p>ii) Stationary dual-fuel engines should be 5.83g/hp-hr for all</p> <p>iii) Diesel engines placed into service before 10/01/01, not modified, reconstructed or relocated after 10/01/01, should be 11.0g/hp-hr.</p> <p>iv) All other diesel engines 50 hp and above, installed, modified, reconstructed or relocated after 10/01/01 should be between 2.8 g/hp-hr and 6.9 g/hp-hr, depending on horsepower and the year the engine was installed, modified, reconstructed or relocated.</p> <p>v) Units with annual capacity factor of 0.0383 or less should be 0.060lb/MMBtu.</p>					<p>iii) used for performance verification & testing</p> <p>iv) used solely to power other engines or gas turbines during startup</p> <p>v) used exclusively for emergency, except for 52 hours/year for testing/ maintenance (excluding new, modified, reconstructed, or relocated diesel engines placed into service after 10/01/01)</p> <p>vi) used for officially declared disaster/state of emergency</p> <p>vii) used for directly/exclusively for agricultural operations for growing crops/raising animals</p> <p>vii) diesel engines placed into service before 10/1/01 operating < 100 hr/yr and haven't been modified, reconstructed, or relocated on or after 10/1/01</p> <p>viii) new, modified, reconstructed, or relocated stationary diesel engine placed into service on or after 10/01/01 that operates < 100hr/yr for reasons other than emergencies, and meets emission specifications for non-road engines in CFR 89.112(a)</p> <p>The TCEQ has an existing rule for emission of NOx reductions from major sources in DFW non-attainment area (50 tpy NOx). But no rule proposed emission specifications for minor source of NOx in DFW.</p> <p>Further NOx reductions from minor source of emission, can be achieved by extending</p>

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					30 TAC §§117.471-117.481 for HGB area (< 25 tpy) to DFW 9 non- attainment counties depending on number of estimated units operated.
12) Stationary internal combustion engines Engines fired with fossil-derived fuel must meet --a NOX limit of 25ppm or a 96% reduction if rich burn and 65ppm or a 90% reduction if lean burn. for waste –derived fuel – a 140ppm limit if lean burn and 210 if rich burn					
13) Cumulative impact – When a diesel or back up diesel generator is added in an area, the impact of the additional generator should be evaluate to determine the combined risk of all existing sources.					
14) Options for Oil and Gas Compressor Engine Retrofits - Currently uncontrolled, small compressor engines would be required to install controls such as catalytic converters for NOx emission reductions.					
15) Graphic Arts: Offset Lithography - Reformulation of material usage to limit the VOC content in inks, blanket and roller wash, and fountain solution.	1.10	0.53	0.57	51.68	The proposed reformulation of material used in lithography printing are as follows, a) Ink – 100 gm/l or 0.835 lb/gal VOC Content limit.

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					b) Blanket and Roller Wash – 300 gm/l or 2.505 lb/gal VOC Content limit. c) Fountain Solution – 80 gm/l or 0.662 lb/gal VOC Content limit.
16) Graphic Arts: Flexography Reformulation of material usage to limit the VOC content in inks, blanket and roller wash, and fountain solution.	0.053	0.028	0.0247	46.73	The proposed reformulation of material used in flexography printing are as follows, a) Ink – 100 gm/l or 0.835 lb/gal VOC Content limit. b) Blanket and Roller Wash – 300 gm/l or 2.505 lb/gal VOC Content limit.
17) Graphic Arts: Letterpress - Reformulation of material usage to limit the VOC content in inks, blanket and roller wash, and fountain solution.	0.01411	0.00687	0.0072	51.33	The proposed reformulation of material used in letterpress printing are as follows, a) Ink – 100 gm/l or 0.835 lb/gal VOC Content limit. b) Blanket and Roller Wash – 300 gm/l or 2.505 lb/gal VOC Content limit.
18) Graphic Arts: Screen Reformulation of material usage to limit the VOC content in inks, blanket and roller wash, and fountain solution.	0.066	0.034	0.032	47.95	The proposed reformulation of material used in screen printing are as follows, a) Ink – 200 gm/l or 1.67 lb/gal VOC Content limit. b) Blanket and Roller Wash – 300 gm/l or 2.505 lb/gal VOC Content limit.
19) Graphic Arts: Other Reformulation of material usage to limit the VOC content in inks, blanket and roller wash, and fountain solution.	0.54	0.27	0.27	50.05	The other printing facilities like book, digital, quick and manifold business form printing were assigned to lithographic printing category. The proposed reformulation of material used in other printing are as follows a) Ink – 100 gm/l or 0.835 lb/gal VOC

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					Content limit. b) Blanket and Roller Wash – 300 gm/l or 2.505 lb/gal VOC Content limit. c) Fountain Solution – 80 gm/l or 0.662 lb/gal VOC Content limit.
<p>20) Architectural and Industrial Maintenance (AIM) Coatings Controls - The rule would regulate the use of certain surface coatings (e.g., paints) applied by industry, contractors and homeowners to coat houses, buildings, industrial equipment, etc. Because users of these coatings are small and widespread, requiring the use of add-on control devices is technically and economically infeasible. Reductions in VOC emissions would therefore need to be obtained through product reformulation.</p>	<p>Architectural Coating – 23.06 30.3 in 2002</p>	<p>Architectural Coating – 20.41</p>	<p>Architectural Coating – 2.65</p>	<p>Architectural Coating – 11.47</p>	<p>These coatings are currently regulated by federal rules, which provide for 20% emissions reductions. Federal rule is cited as 40 CFR 59 Sections 59.400 - 59.413. There was a TX state rule but it was repealed since federal rule was more stringent. Any further reductions would require a more stringent state rule (e.g., Calif.'s SCAQMD's AIM coatings rule). Federal rule applies (to manufacturers & importers of coatings).</p>
<p>21) Furniture & Fixtures Surface Coating (metal furniture scc) - For the coating of metal furniture, low VOC coatings would be used and/or the addition of control devices for preventing airborne emissions. The current rule could be made stricter and made similar to other states' rules.</p> <p>SCAQMD Limits (V24502*)</p>		<p>2.2 1.003</p>	<p>0.80 1.226</p>	<p>36.0 (Difference between uncontrolled and controlled 2010 emissions) 55</p>	<p>Since this rule would affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.</p>

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<p>22) Machinery & Equipment, Miscellaneous Metal Parts & Products Surface Coating - For the coating of various metal parts, low VOC coatings would be used and/or the addition of control devices for preventing airborne emissions. The current rule could be made stricter and made similar to other states' rules.</p> <p>Maximum Achievable Control Technology (MACT) Standard (V24501*)</p>		1.5	0.54	36.0 (Difference between uncontrolled and controlled 2010 emissions)	
		1.384	0.7776	36	100 km range
<p>23) Sheet, Strip and Coil Surface Coating - For the coating of metal sheet, strip, and coils, low VOC coatings would be used and/or the addition of control devices for preventing airborne emissions. The current rule could be made stricter and made similar to other states' rules.</p> <p>Control Measure: Incineration (V22303*)</p> <p>BAAQMD Rule 11 Amended (V22302*)</p>		4.5	1.6	36.0 (Difference between uncontrolled and controlled 2010 emissions)	
		0.445	4.01	90.0	
		2.585	1.87	42	
24) Consumer Products (personal)	12.0 in 2002	12.8	10.9	85.0	

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<p>care products) - California Air Resources Board's Consumer Products Long-Term Limits Rule measures depend on future technological innovation and market incentive methods developed and implemented before 2010.</p> <p>Federal consumer solvent rule (V24901*)</p> <p>California Air resources board Consumer Products Mid Term limits (V24902*)</p>		<p>9.61</p> <p>5.77</p>	<p>3.2</p> <p>7.05</p>	<p>25</p> <p>55</p>	
<p>25) Consumer Products (household products)- California Air Resources Board's Consumer Products Long-Term Limits Rule measures depend on future technological innovation and market incentive methods developed and implemented before 2010.</p> <p>Federal consumer solvent rule (V24901*)</p> <p>California Air resources board Consumer Products Mid Term limits (V24902*)</p>	<p>7.9 in 2002</p>	<p>6.37</p> <p>3.82</p>	<p>2.214</p> <p>4.67</p>	<p>25</p> <p>55</p>	

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26) California Consumer Product Rules - California Air Resources Board's Consumer Products Long-Term Limits Rule measures depend on future technological innovation and market incentive methods developed and implemented before 2010.					
27) Commercial and Consumer Products Requirements (coatings and related products; adhesives and sealants; miscellaneous) - Reduce VOCs emitted from consumer products in homes and institutions. Reductions are achieved by reformulation of the products. "Consumer product" means a chemically formulated product used by household and institutional consumers (i.e. detergents; cleaning compounds; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings).	19.8 in 2002				SCC 2460500000, 2460600000, 2460900000 ??
28) Agricultural Pesticide Application- California Federal Implementation Plan Rule for agricultural pesticide emissions reduction by reformulation of pesticides		0.0076	0.0015	20	Since 1997, 42 counties around the state have adopted restrictions on use of highly volatile herbicides at certain times of year (a majority of which coincide with ozone season months) through Department of Agriculture regulation and is tied to

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to reduce VOCs and by encouraging better pesticide management practices by working with local agricultural agencies and rewarding good practices or innovation. Reformulation –FIP rule (V29502*)		12.41	3.104	20	crops/vegetation and not air quality (4 TAC §7.53). This is authorized via state statute which allows a county, with the approval of the Agriculture Dept, to restrict the use of a regulated herbicide if it is determined that the herbicide would adversely affect crops or vegetation in an area of the county. A county’s commissioner’s court must hold a hearing to determine whether to issue an order to restrict the herbicide’s use. (VTCS, Agriculture Code, §76.144). 100 km range
29) Degreasing Operations/Surface Cleaning Controls (cold cleaning) - Use of low-VOC solvent for batch cold cleaning degreasing machines to clean contaminants from parts, products, tools, machinery, and equipment.		1.9	0.6	31	Degreasing uses a solvent to remove grease, oil, or dirt from the surface of a part prior to surface coating or welding.
30) Cutback Asphalt - Develop state rule (revise existing rules) that would prohibit the sale or transport of conventional cutback asphalt. Encourage the use of low-emission emulsion asphalt and hot-mix asphalt by reducing VOC upper limit in the definition of “exempt cut-back asphalt” as lower emission asphalt becomes		0.1	0.1	100	Conventional cutback asphalt releases VOCs for over a year after application.

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available.					
Control Measure: Switch to emulsified asphalt (V27201*)		0	8.86	100	This is for 100 km range
31) Asphalt Roofing - There are two variations to this strategy: a) Require asphalt kettles to have close fitting lids and limit the temperature at which such kettles may operate; and/or b) Require afterburners on all kettles, virtually eliminating VOC emissions.					
32) Options for Oil and Gas Compressor Engine Retrofits - Currently uncontrolled, small compressor engines would be required to install controls such as catalytic converters for NOx emission reductions.					
33) Capture and Control Vapors from Gasoline Cargo Tankers -Hose and Fittings -This measure would require vapor connections to be fitted with closure devices to prevent VOC loss. <u>Potential Mobile</u> ---- 2003 California SIP					Gasoline cargo tanks are equipped with a vapor recovery system that returns and collects gasoline vapor during the loading at terminals or bulk plants and unloading at service stations respectively. The tanks also include valves and fittings to prevent the loss of vapor during transport. These trucks utilize hoses and fittings during

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<p>Sec. II – Mobile Source</p> <p>ON –RD HVY DUTY –2 : Capture and control vapors from Gasoline.</p>					<p>the transfer process of delivering gasoline and collecting gasoline vapor. However, they do not employ control technologies to reduce VOC emissions that occur through the evaporation of gasoline from the transfer hoses and connections on the tanks after the delivery is completed. In 2005, California will propose regulations for enhanced vapor recovery systems for gasoline cargo tankers to reduce these VOC losses.</p> <p>Hose and fittings. This measure would require the vapor connections on fuel cargo tankers to be fitted with closure devices such as poppeted adapters or manually operated valves, and product and vapor recovery hoses to have poppeted caps or adapters. This measure would also require a monthly inspection and maintenance program to check the vapor connections and hoses on the fuel cargo tankers.</p>
<p>34) Capture and Control Vapors from Gasoline Cargo Tankers -Tank Purging - This measure would require that cargo tanks be purged using an approved method prior to any maintenance or repair being performed.</p> <p><u>Potential Mobile</u> ---- 2003 California SIP</p>					<p>Tank purging. A separate but related measure is the requirement for purging (degassing) the tankers prior to maintenance or repair. In California gasoline cargo tanks must undergo annual testing for pressure integrity as a requirement for certification (CP-204). Before this testing can be performed, the cargo tank must first be purged of any residual gasoline vapors, which may skew the results of the pressure testing. The requirement for</p>

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Sec. II – Mobile Source ON –RD HVY DUTY –2 : Capture and control vapors from Gasoline.					purging does not extend to maintenance and repair of gasoline cargo tanks. These events can be a significant source of VOC emissions. This measure would require that cargo tanks be purged using an approved method prior to any maintenance or repair being performed. Currently, there are three purging methods available.
35) Capture and Control Vapors from Gasoline Cargo Tankers -Component Standards - This measure would require standards for individual components of the system. <u>Potential Mobile</u> ---- 2003 California SIP Sec. II – Mobile Source ON –RD HVY DUTY –2 : Capture and control vapors from Gasoline.			0.79	23.6	A third element of this measure is the certification of gasoline cargo tank components. In California gasoline cargo tanks are required annually to demonstrate compliance with a leak rate standard. The current procedure tests the pressure integrity of the cargo tank vapor recovery system as a whole but does not contain performance specifications or standards for the individual components of the system. This measure would include developing performance specifications and standards for individual components and methodology for testing and certifying these components.
36) Water Dispersible Chemical Agent Resistant Coating (Pennsylvania Army National Guard) - The Combined Support & Maintenance Shop (CSMS) East of the Pennsylvania Army National Guard has become the model for pollution prevention in the Army National Guard by replacing its solvent-borne coating					See other articles at: http://www.epa.gov/air/caaac/2004

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with new water dispersible Chemical Agent Resistant Coatings (CARC) for routine surface coating operations. The water dispersible CARC emits virtually no hazardous air pollutants (HAP) and the VOC content is lower than the standard solvent based CARC used throughout the Army, dramatically reducing emissions of these pollutants. It is estimated that switching to water dispersible CARC will reduce VOC emissions by 2.6 tons in the first year. Using water dispersible CARC reduces overspray during the coating process, which decreases the volume of paint used and the particulates emitted. Reduced overspray along with less frequent repainting means a reduction in human exposure to the paint.					
37) Petroleum Dry Cleaners and Cleaning Solvents - Implement contingency rule requiring that dry cleaning facilities must comply with dryer, filtration system, and fugitive emissions requirements.	2.11	0.729		72	Establish compliance date for 30 TAC §§115.552 - 115.559 and expand to cover other 5 counties in DFW.
38) Municipal Solid Waste Landfills- Gas collection (SCAQMD /BAAQMD) (V28402*)		0.377 0.231	0.26 0.539	70.0 70	30 TAC §§115.152 - 115.159 can be expanded to other 5 counties in DFW. 100 km range
39) Auto body Refinishing/Coatings		2.9	1.0	37.0	

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<p>Controls - The steps involved in automobile refinishing include surface prep, painting, and equipment cleaning. Emissions occur at all three stages due to evaporation of the solvents in the primers, paints, and other coatings and in the cleaning solutions. This is based on the EPA's proposed standards to reduce VOC from coatings and increasing the efficiency of spray nozzles in applying coatings. The current rule could be made stricter and made similar to other states' rules.</p> <p>a) CARB BARCT Limits (V24602*)</p> <p>b) California FIP rule (V24603*)</p>		1.533	1.35	47	
		0.318	2.575	89	
40) Control Of VOC emissions from nail salons.					
41) Emission control at gasoline dispensing facilities in Ellis, Johnson, Kaufman, Rockwall, and Parker counties. A combined strategy of leak detection and repair using Method 21 or infrared camera technology plus a membrane processor.				Should be similar to Stage II vapor recovery.	Stage II vapor recovery is not currently required in these counties. In lieu of adding Stage II controls to gasoline dispensing facilities (gdf), another approach may be to limit fugitive emissions at gdfs by requiring the installation of a commercially available standalone membrane processor coupled with a modified LDAR program.
42) Chain drive charbroilers install catalytic oxidation equipment to control emissions. Controls PM and VOC emitted during cooking.					Recent studies indicate that research can be close to 62 % Source – Bay Areas 2004 Ozone Strategy

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Exemptions – charbroilers that cook less than 875 lbs of meat per week or emit less than 1 lb per day.					Projected cost effectiveness - \$4650 per ton and \$3070 for VOC and PM
<p>43) Co-composting operations to limit VOC and ammonia – the mixing of biosolids or manure with bulking agents to produce compost.</p> <p>Exemptions – ag composting, greenwaste, composting, woodwaste composting, operations less than 1,000 tpy</p>					<p>Expected to reduce composting emissions by 17 %.</p> <p>Cost effectiveness ranges from \$8700 to \$10,000 per ton of ammonia and VOC , just VOC - \$23,000 to 26,500</p>
<p>44) Food Product Manufacturing and Processing Operations – Any facility that emits over 440 lbs of organic compound emissions per month and produces, formulates, configures food or food products, like spices, extracts, flavorings, and colorings.</p> <p>Exempt – wineries, bakeries, and breweries</p>					South Coast projects 2 tons from an inventory of 2.47 tons/day
<p>45) Livestock waste – ex – dairies – waste must be transported out of the district, controlled, processed, or spread – designed to reduce ammonia, VOC</p>				50	Small impact on VOC and potential reductions of PM

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46) Solvent cleaning and degreasing - Cold Cleaning					South Coast – 25 g/l VOC standard, rest have 50 grams/ltr for cleaning solution
47) Solvent cleaning and degreasing - Wipe Cleaning			25 g/l reduces emission by 0.0756 tpd		South Coast – 25 g/l VOC standard, rest have 50 grams/ltr for cleaning solution

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