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## Point - Potential Control Strategies for DFW Attainment Demonstration

| Control Strategy Description | Base Year 1999 Emission (TPD) | Future Year 2009 Emission Projection (TPD) | Reduction in Tons Per Day (TPD) | Estimated Percent Reduction | Comments |
|---|---|---|---|---|---|
| **1) General Surface Coating Application - VOC**<br>TAC, Sections 115.420 - 115.429 can be expanded for 5 counties in DFW. | 0.457 in 2002 | 0.516[1] | 0.23 | 45 | This was done for the 5% IOP SIP. 0.3 tpd VOC reduction from area sources was estimated in 5% IOP. More refined estimate gave 0.89 tpd for areas sources and 0.23 tpd for point sources. |
| **2) Chemical Manufacturing – VOC**<br>Loading racks; Transportation & Marketing- Tank trucks/Cars loading; Petroleum storage tank-Loading racks: 30 TAC §§115.211 - 115.219 could be revised to require a 95% control efficiency rather than the 90% level of the current rule.<br>The rule could also be extended to 5 counties in DFW at either 90% or 95 % control level. | 0.59<br><br>0.04<br><br>0.003 in 2002 | | | | Most emissions were for gasoline terminals, which have a specification of 0.09 lb per 1000 gallons. Emissions that could be reduced by this change were 0.053 tpd in 1999.<br><br>Emissions from new counties were 0.04 tpd in 1999 and 0.003 tpd in 2002. |
| **3) Breweries- VOC**<br>Implement practices to minimize spillage in filling operations, keg cleaning and waste beer processing. Wastewater streams and components could be covered at all times and routed to a treatment system capable of a VOC reduction efficiency equivalent to that obtained from the use of properly operated biotreatment unit. Emissions from the fermentation tanks could be reduced by the use of a condenser. Coding of bottles, cans, cases, and kegs could incorporate the use of low VOC containing inks or an ink-free laser coding process. | 0.407 | 0.506[1] | | | One brewery in Tarrant county.<br><br>(1999 and 2000 inventories) |

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| **4) Bakeries – VOC**<br>Implement contingency measure to require reductions from bakery ovens at sites with total VOC 25> tpy but < 50 tpy.<br><br>Extend requirements for control of bakery oven emissions to 5 new counties. | 0.748 | | | | §115.122 (a)(3)(B) requires 80% control from ovens at sites with uncontrolled emissions >50 tpy. A contingency measure would require 30% reduction at sites with emissions >25 tpy but < 50 tpy. Total VOC emissions in 1999 do not reflect the required control, since rule had a compliance date of Dec. 31, 2000. There do not appear to be any sources with emissions > 25 tpy but < 50 tpy.<br><br>There do not appear to be any sources in 5 new counties. |
| **5) Stationary External Combustion - VOC**<br>Optimized combustion practices. External combustion sources are typically fired with natural gas or fuel oil. VOC emissions are produced from unburned organics present in the fuel, and result from poor combustion conditions such as inefficient fuel-air mixing, low temperatures, and short residence time. Since these same conditions cause CO emissions to increase, continuous monitoring of CO may be used as a surrogate for VOC emissions. CO CEMS is already required for large boilers and process heaters under the NOx RACT rule. Combustion modifications for NOx control can result in CO and VOC increases. | | | | | Devices such as $O_2$ analyzers and CO or $O_2$ trim, which optimize fuel combustion efficiency, are readily available. However, these systems cannot be considered as VOC controls, since they give only a qualitative indication of VOCs produced during combustion. |

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| **6) Pulp & Paper – VOC**<br>MACT standards require the control of hazardous air pollutant (HAP) emissions. VOC emissions are not specifically targeted by the MACT, but the control technologies upon which the standards are based will similarly reduce VOC emissions. | 0.19 | 0.29[1] | | | Federal rule - Compliance date for most requirements was in 2001. Additional reductions are not expected |
| **7) Additional storage tank controls-VOC**<br>Extending existing 115-storage tank rule from 4 counties to 5 new counties.<br><br>Additional or more stringent requirements in existing storage tank rules. | 0.13<br>5-county<br><br>1.2<br>4-county | 0.17[1]<br><br>1.3[1] | | | |
| **8) Primary Metal Production – VOC**<br>Implement work practice standards to minimize the amount of organics in furnace charge materials or require use of gas-fired preheater where the flame directly contacts the scrap charged.<br>VOC emission specifications for cupola melting furnaces and mold/core production processes; capture and collection systems, thermal incinerators (afterburners). | 2.55 | | | | MACT EEEEE adopted April 22, 2004 (Volatile Organic HAPs) |

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| **9) Secondary Metal Production - VOC**<br>Implement work practice standards to minimize the amount of organics in furnace charge materials or require use of gas-fired preheater where the flame directly contacts the scrap charged.<br>VOC emission specifications for cupola melting furnaces and mold/core production processes; capture and collection systems, thermal incinerators (afterburners). | 1.3 VOC | 1.4[1] | | | 5 new counties: 0 sources reported in 1999;<br>4 counties: 12 accounts |
| **10) i) Fugitive Leaks – VOC**<br>- Expand current Chapter 115 rules to 5 counties<br>- Lower Leak definitions<br>- Institute audit provisions to improve actual reductions.<br><br>**ii) Control emissions from valves and flanges**<br>- Set a maximum leak limit for components<br>- Target minimization and repair periods (reduce repair time)<br>- If equipment leaks frequently, replace equipment.<br>- Require inaccessible equipment to be replaced by superior technologies<br>- Quantify mass emissions and impose emission caps<br>- Increase inspections<br>- Use remote sensing technologies to identify the largest leaking components | 0.04 in 5-county<br><br>0.15 total 9-county | 0.1[1] in 5-county<br><br>0.39[1] total in 9-county | 0.07 | 70 | |

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| **11) Cooling Towers – VOC**<br>Cooling water monitoring of cooling tower heat exchange systems for flow rate and VOC to detect leaks and quantify emissions (similar to HRVOC rules from HGB).<br><br>VOC controls: Specific point source limit, repair requirements, or cap & trade approach. | 0.02 | | | | |
| **12) Industrial Wastewater- VOC**<br>30 TAC §§115.140-115.149 could be extended to 5 counties in DFW | 0.03 | | | | |
| **13) Flares – VOC**<br>Require continuous monitoring of flow rate, net heating value, and composition on flares (similar to HRVOC rules from HGB).<br><br>VOC controls: Specific point source limit or cap & trade approach. | 0.0063 VOC | | | | Flares are already required to comply with 60.18 or 63.11 via applicable regulation or permit. |
| **14) Incinerators – NOx**<br>- Apply HGB emission specifications to 9 counties. | 0.54 | | | | There are various types of incinerators and all will need to be individually evaluated for control technologies. |

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| **15) General process vent gas control - VOC**<br>Expand existing general vent gas rule to 5 new counties.<br><br>The proposed measure raises the control efficiency for non-SOCMI processes from 90% to 98%.<br><br>Incinerators - emission testing to establish demonstrated compliance parameter levels (such as inlet and exhaust temperatures, flow rates, etc.) | 0.09 in 5-county<br><br>1.26 | 0.1[1] in 5- county<br><br>1.1[1] | | | |
| **16) Gas-fired Engines - NOx**<br><br>- Apply HGB emission specification to the 9 counties and remove the exemption for engines less than 300 hp. | 4.68 | 0.82[2] | 3.86 | 82 | Reductions from Natural Gas Engines (Rich Burn and Lean Burn)-Reduce NOx emissions from:<br>1) 4-cycle rich burn engines (in the range of 800 - 2,000 hp) by retrofitting with a three-way catalyst system. Use of this technology requires an air-fuel ratio controller in addition to the catalyst.<br>2) 4-cycle lean burn engines - the only commercially available technology for reducing NOx from lean burn engines is Selective Catalytic Reduction (SCR). SCR is more cost-effective for larger units since the capital, installation, and operating costs for these units can be quite high. |
| **17) Electricity Surcharge – NOx**<br>Peak usage surcharge on energy use. This will encourage non-peak use, and will provide funding for local energy efficiency programs. | | | | | Energy Efficiency |

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| **18) Storage Tank Inspections – VOC**<br>The proposed control measure utilizes advanced/enhanced inspection devices/techniques to inspect storage tanks. Gas imaging cameras, internal remote inspection (robot), etc.<br><br>These inspections would eliminate the necessity to empty a tank during the inspection process. Tank inspection and maintenance emissions would be reduced to a negligible amount. | | | | | Enhanced inspection techniques such as gas imaging cameras and robotic inspection are still experimental or don't have established methodologies or performance specifications<br><br>Inventory research necessary to better quantify emission reduction. |
| **19) Diesel and Dual-fuel Engines – NOx**<br>- Apply HGB emission specifications to 9 counties<br>- Apply HGB specifications to 9 counties and East Texas (defined by SB7)<br>- Apply HGB emission specifications to 9 counties and East Texas (defined by SB7) to major sources. | | | | | An inventory study to quantify the number of engines and emission factors is ongoing. |
| **20) DERC and ERC Environmental Contribution – VOC and NOx**<br>- Increase the environmental contributions for ERCs and DERCs from 10% to 20% | 37 in 2005 | | 2.7 | | This would involve changes to chapter 101 |
| **21) Electric Generating Facilities - NOx**<br>- Apply HGB emission specifications to 9 counties<br>- Apply HGB emission specifications to East Texas (defined by SB7).<br>- Expand existing 4 county DFW NOx controls to 5 new counties. | 30<br>664<br><br>0 | 8<br>88.5[2]<br><br>0 | 22<br>576<br><br>0 | 73<br>87<br><br>0 | Low NOx burners, over-fired air, induced flue gas recirculation, Selective Non-Catalytic Reduction (SNCR), Selective Catalytic Reduction (SCR) etc.<br><br>Further inventory research necessary. |
| **22) Primary Metal Production - NOx**<br>- SNCR for metallurgical furnaces | 1.05 | | | | Further inventory research necessary. |

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| **23) Secondary Metal Production – NOx**<br>- SNCR for metallurgical furnaces | | | | | Further inventory research necessary. |
| **24) Gas-fired Stationary Internal Combustion Engines – VOC**<br><br>Assign VOC emission specification. | Primary<br>0.112<br><br>Backup/Emergency<br>0.127 | | | | VOC controls may compete with NOx controls. With rich-burn engines, lowering the exhaust gas oxygen concentration below 0.5%, as required to operate SNCR for NOx control, can create a twofold increase in VOC emissions from the engine. This further complicates assigning a VOC baseline value before controls are applied. Also, there is very little test data available to document actual VOC emissions. A study is necessary to evaluate the following:<br>1) Determine actual VOC emissions from IC engines.<br>2) Evaluate VOC control technology that can be applied to IC engines without interfering with NOx controls. |
| **25) Non-Utility Turbines – NOx**<br>- Apply HGB emission specifications to 9 counties | | | | | Survey and emissions inventory data is not sufficient to quantify reductions.<br><br>Further inventory research necessary. |
| **26) Backup Diesel Generators**<br>- Apply HGB emission specifications<br>- Convert to natural gas<br>- Convert to fuel cells | | | | | A study to determine the number of units and the associated emission factors is ongoing. |

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| **27) Cement Kilns – NOx**<br>- LoTOx<br><br>- SNCR<br><br>- SCR | | | | | LoTOx is a selective, low temperature oxidation technology that uses ozone to oxidize NOx to water-soluble nitric pentoxide ($N_2O_5$), which reacts with moisture in flue gas to form nitric acid. This technology has been applied to refineries, lead smelting, pickling units, coal and lignite power plants, pet coke, boilers, chemical processing, cat crackers, lead furnaces, sulfuric acid manufacturing, iron ore, and other applications.<br><br>A study to determine the feasibility of NOx controls for cement kilns in Ellis County is ongoing. |
| **28) Cement Kilns – VOC**<br>- Regenerative thermal oxidization | 3.36 | | | | |
| **29) Aggregate Kilns – NOx**<br>- Apply HGB emission specifications to 9 counties | | | | | Low-NOx burners, Mid-kiln firing and Staged combustion<br><br>Survey and emissions inventory data is not sufficient to quantify reductions.<br><br>Further inventory research necessary. |
| **30) Brick Kilns – NOx** | | | | | Survey and emissions inventory data is not sufficient to quantify reductions.<br><br>Further inventory research necessary. |
| **31) Process Heaters – NOx**<br>- Apply HGB emission specifications to 9 counties | 0.109 | 0.042[2] | 0.068 | 62 | |

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| **32) ICI Boilers – NOx**<br>- Expand existing 4 county DFW NOx controls to 5 new counties.<br>- Apply HGB emission specifications to 9 counties | 0.13<br>2.11 | 0.04[2]<br>0.51[2] | 0.09<br>1.59 | 69<br>75 | |
| **33) Lime Kilns – NOx**<br>- Apply HGB emission specifications to 9 counties | | | | | Low-NOx burners, Mid-kiln firing and Staged combustion |
| **34) Pulping Liquor Furnaces – NOx**<br>- Apply HGB emission specifications to 9 counties | | | | | SNCR |
| **35) Dryers, non-process Heaters and Ovens -NOx** | | | | | Further inventory and control technology research necessary. |

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| **36) Engine Test Cells – NOx and VOC** | NOx - 0.44<br><br>VOC - 0.025 | | | | Availability and feasibility of control technology may be limited. Research study necessary to evaluate control of NOx and VOC from engine test cells and stands. CAA Sec.233(a) requires public notice of whether emission standards for Jet Engine test Cells (JECT) are in accordance with 1994 EPA report *Nitrogen oxide Emissions and Their Control from Uninstalled Aircraft Engines in Enclosed Test Cells* EPA –453/R-94-068.<br><br>1999 Point Source Inventory<br>JECT<br>NOx 0.301 TPD, VOC 0.017 TPD<br>Jet Stands<br>NOX 0.001 TPD, VOC 0.001 TPD<br>Turbine Test Cells<br>NOx 0.108 TPD, VOC 0.005 TPD<br>Vehicle Engine Testing<br>NOx 0.001 TPD, VOC 0.001 TPD<br>Diesel RICE<br>NOx 0.029 TPD, VOC 0.002 TPD<br><br>Some of the minor sources also fall under Area category but further inventory research is necessary. |
| **37) Wastewater from Coke Cutting operations - VOC**<br>Wastewater from coke cutting is not part of the refinery wastewater collection and treatment system. Include it in the existing collection and treatment system | | | | | Further evaluation is necessary to determine if coke cutting operations contains significant quantities of VOC |

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| **38) NOx reductions from Refinery boilers, steam generators, and process heaters**. **– NOx**<br>A 5 ppm NOx limit corrected to 3% $O_2$, or 0.0062 lb/MMBtu standard for large refinery boilers and process heaters (larger than 110 MMBtu) | | | | | Further inventory and control technology research necessary. |
| **39) Reschedule processes at stationary source – VOC and NOx**<br>Limit the following activities on high ozone action days – repair, maintenance, cleaning, and other shutdown of production equipment at industrial facilities.<br>Examples include – prohibiting tank cleaning or process vessel depressurization at refineries. | | | | | |

1. Projected uncontrolled emissions.

2. Projected controlled emissions.