Preliminary Control Strategy Report for the 8-hour Ozone Standard

** DRAFT **

FOR THE
WASHINGTON DC-MD-VA
OZONE NONATTAINMENT AREA

Prepared by:

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1. Background

EPA released phase I of its guidance for attainment of the 8-hour ozone standard in April 2004. Phase II of EPA implementation guidance which is expected to address reduction requirements has not yet been released. Until EPA releases the phase II guidance, it is unclear whether there will be Rate of Progress (ROP) or Reasonable Further Progress (RFP) requirements. In addition, while attainment modeling efforts are underway, preliminary results will not be available until December 2005 or later. Without guidance or the results of attainment modeling, the region does not know what the emission reduction requirements will be between now and the 2009 attainment season.

MWAQC and COG have worked with the state air agencies to develop a State Implementation Plan (SIP) schedule and begin planning activities. The SIP is due in 2007, however, MWAQC is planning to complete the SIP 9 months before the due date, mid-2006, to ensure sufficient time to implement control programs so that the standard is attained by June 2009. To date, the primary planning activities include:

- Preliminary Emission Inventory for 2002 and 2009. A preliminary emission inventory was developed for the purposes of developing a preliminary control strategy. The inventory is for the base year (2002) as well as the attainment year (2009). Controls implemented before and after 2003 were identified and included in the estimates.

- Attainment Goal or Emission Reduction Requirements. In the absence of guidance, potential emission reduction scenarios were developed. The first step involves estimating the reductions that are expected to occur from implementation of programs that began in 2003 (existing controls). The second step is to develop potential emission reduction or attainment goal scenarios. The goal is to determine if emissions reductions expected from existing control programs will meet or exceed reduction requirements.

- Control Measure Development. The region may need to implement new or expand existing control measures to meet attainment goals in 2009. A control measures workgroup was formed in October 2004 to begin process of identifying and evaluating options. Control measures will need to be implemented by the beginning of the 2009 ozone season. The control measure development process, including regulatory development and public participation, should occur through Fall/Winter 2005.

The analysis presented in this report is preliminary. Emissions estimates will be revised and improved when episode modeling is completed. IAQC and MWAQC have not made recommendations on control measures for further development. This preliminary control strategy provides a framework for assessing what attainment scenarios the region may face, and begins to outline what options could be pursued to reach those goals. After EPA releases the phase II guidance, control strategies will be developed to address specific SIP requirements.

2. Preliminary Emission Inventory (DRAFT)

Preliminary emission inventories for 2002 and 2009 were developed by the state air agencies and the MWAQC TAC Emission Inventory Subcommittee staff for use as a starting point in estimating emission reduction goals and developing a preliminary control strategy. The 2009 controlled inventory was developed by applying growth factors to the 2002 base year inventory and then subtracting out emission reductions from controls being implemented starting in 2003.

Control programs considered in estimating the emission inventories for 2002 and 2009 are listed in Attachment 1.

Table 1 presents preliminary draft emission inventory estimates for the 2002 base year and the 2009 controlled scenario. As shown, the largest sources of VOC emission are area sources. The largest source of NOx emissions are point sources. Emissions from the mobile sector decline significantly but remain one of the largest sources of both NOx and VOC. Emissions reductions from EPA's Non-road Diesel Engine Rules are expected to increase over time due to fleet turnover.

Table 1. Preliminary Emissions Inventory by Source with Regional Totals (tpd) (DRAFT)

VOC Emissions (DRAFT)	**Base Year (2002)**	**2009 Controlled**
Point	12.0	13.1
Area	193.4	175.3
Non-road	98.8	61.2
On-road	125.5	65.9
Total	429.7	315.4
NOx Emissions (DRAFT)	**Base Year (2002)**	**2009 Controlled**
Point	218.4	234.4
Area	34.5	37.3
Non-road	73.2	61.1
On-road	290.8	134.4
Total	617.0	467.1

Uncertainties

There are several uncertainties with the preliminary emission inventory:

- Point Sources: NOx SIP call and/or CAIR reductions expected to occur after 2002 are not reflected in the 2009 controlled inventories for Maryland and Virginia. State air agencies are determining the impact of controls and are considering how to reflect banking and trading of NOx allowances in the projected 2009 inventory.
- Area Sources: For area sources, growth rates were based on draft Round 7 Cooperative Forecasts (i.e., household and employment projections developed by the Planning Directors and the Metropolitan Development Policy Committee), such factors may change once Round 7 forecasts are finalized (expected in late July 2005). In addition, EPA is expected to propose a methodology to estimate VOC emissions from portable fuel containers.
- On-Road Sources: The mobile source emission estimates for 2002 and 2009 need to be revised using the latest inputs, including updated network, seasonal adjustment factors, and 2005 automobile registration data.
- Other: Emissions for airports and military installations are currently included in appropriate source category. The state air agencies are working with representatives from military installations and airports authorities to provide more comprehensive inventories for these sources. State air agencies are considering presenting emissions

from these sources as separate line items within the SIP. This approach may add additional emissions to the appropriate source categories.

3. Attainment or Emission Reduction Goal Scenarios (DRAFT)

In the absence of EPA guidance or the results of attainment modeling, emission reduction requirements for the Washington, DC region can only be estimated. To facilitate development of a preliminary control strategy, three preliminary attainment goal scenarios were evaluated:

- Existing Controls. The first step is to estimate the reductions that are expected to occur from implementation of programs that began in 2003. Reductions from existing controls were estimated by subtracting the 2009 controlled inventory from the base year inventory.

- Scenario 1. Assume Rate of Progress (ROP) of 3 percent per year from 2003 to 2009. This scenario involves estimating emission reduction requirements assuming that EPA may require traditional Rate of Progress of 3% per year, for a total reduction requirement of 21 percent off the 2002 base.

- Scenario 2. Assume additional 10 percent reduction beyond ROP goals. This scenario involves adding a 10 percent reduction in emissions above the traditional Rate of Progress requirements, for a total reduction requirement of 31 percent off the 2002 base.

Table 2 provides the preliminary results of the attainment goal scenario calculations. As shown:

- Scenario 1 (21%, ROP Scenario). Rate of Progress 3 percent per year from 2003 to 2009 for a total reduction of 21 percent. Emission reductions from existing controls exceed the emission reduction requirements. There is a potential surplus of 20.3 tpd NOx and 24.1 tpd VOC.

- Scenario 2 (31% Scenario). Additional 10 percent reduction above ROP goals. Emission reductions from existing controls do not exceed the emission reduction requirements. There is a potential shortfall of 41.4 tpd NOx and 18.9 tpd VOC.

Reductions from existing controls may enable the region to meet potential ROP requirements, EPA's modeling results for the Clean Air Interstate Rule (CAIR) indicate that the region will still not attain the 8-hour ozone standard even after the first phase of CAIR reductions in 2009/2010 (see Attachment 2). This suggests that additional control measures and emission reduction beyond those needed for ROP will likely be required.

Table 2. Preliminary Attainment Goal Scenarios (DRAFT)

	NOx (tpd)	VOC (tpd)
DRAFT Emissions Estimates[(a)]		
Base Case Inventory (2002) DRAFT	617.0	429.7
Controlled Inventory (2009) DRAFT	467.1	315.4
Scenario 1 (Rate of Progress Scenario)		
Attainment Reduction Goal[(b)]		
Assumed 21% Reduction from 2002 Base	129.6	90.2
On-the Books Reductions DRAFT[(c)]		
Estimated Reduction from Existing Controls (2009) DRAFT	149.8	114.4
Percent Reduction	24%	27%
Potential Surplus (No New Measures/Rate of Progress Scenario)		
2009 Control Measure Surplus DRAFT	20.3	24.1
Scenario 2 (31% Scenario)		
Attainment Reduction Goal[(b)]		
Assumed 21% Reduction from 2002 Base + Additional 10%	191.3	133.2
On-the Books Reductions DRAFT[(c)]		
Estimated Reduction from Existing Controls (2009) DRAFT	149.8	114.4
Percent Reduction	24%	27%
Potential Shortfall (No New Measures/31% Scenario)		
2009 Control Measure Shortfall DRAFT	(41.4)	(18.9)

Notes:
(a) Draft emission inventory estimates are subject to revision. Assumes no new controls on Electrical Generating Units (EGUs).
(b) Assumes 3%/year demonstration of traditional Rate of Progress. May not be required by EPA for the 8-hour ozone SIP. Scenario 2 assumes an additional 10% reduction may be required to demonstrate attainment.
(c) Includes reductions from measures with reductions beginning or phasing-in after 2002.

Uncertainties

Uncertainties with the draft attainment or emission reduction goal scenario evaluation include:

- The 2009 controlled inventory for point sources does not include controls from the NOx SIP call and/or EPA's Clean Air Interstate Rule. Impacts of banking and trading are also not considered.
- EPA's phase II guidance has not yet been released and attainment modeling results for the region have not been developed. Emission reduction requirements presented here are preliminary estimates.
- The preliminary attainment or emission reduction goals do not represent traditional "target" inventories in that they do not include calculations such as fleet turnover corrections. This analysis did not adjust the creditable reductions to remove the Federal Motor Vehicle Control Program (FMVCP) (pre-1990) and Reid Vapor Pressure (RVP) program.

4. Control Measure Development

The process to develop new control measures for the 8-hour ozone SIP began in 2004. An MWAQC TAC control measures workgroup, convened in October 2004, meets on a monthly basis. The focus of the group is to identify and evaluate candidate measures and develop control strategies to meet the 8-hour ozone standard.

All measures that have been identified as candidates for adoption are contained on a master list, which contains more than 250 measures for further evaluation. The master list contains suggestions from MWAQC, TAC, and AQPAC. The options listed on the master list are ranked based on a set of criteria that includes emission reduction potential, feasibility, and cost-effectiveness. Preliminary efforts to rank measures have been completed. Table 3 presents the criteria used to rank each measure.

Table 3. Criteria for Ranking Control Measures

Emission Reduction Potential	
Low	<1 tpd
Medium	1-5 tpd
High	> 5 tpd
Cost Per Ton	
Low	0-$2,000
Medium	$2,000-$9,000
High	>$10,000

"Feasibility" rankings are based on judgment and include consideration of both technical and political issues.

The workgroup also developed a list of proposed priority measures. Measures from the master list were placed on the proposed priorities list if they offered medium to high emission reduction potential, were considered feasible, and/or are cost effective. Measures on the priorities list involve either controlling sources within the nonattainment area or sources in "upwind" contributing areas. Control measure strategies under consideration are provided in Table 4. The proposed list of priority measures is provided as Attachment 3.

Table 4. Potential Control Strategies Under Consideration for the Washington, DC-MD-VA 8-hour Ozone Nonattainment Area

Options to Address Shortfall (to be determined)		
Potential New Measures(a)	**NOx (tpd)**	**VOC (tpd)**
Strategies within the Nonattainment Area		
Power Plant Strategy Options		
Stationary Source NOx Strategies		
On-and Non-Road Mobile Source Strategies		
Area Source Controls -- VOC		
Airports Strategies		
Additional Local Controls -- Innovative Measures Bundle		
Total Reductions from New Measures in Nonattainment Area		
Strategies in Upwind "Contributing" Areas(b)		
Total Reductions from Potential New Measures DRAFT		

Notes:
(a) See attached priorities list being developed by the Technical Advisory Committee.
(b) The IAQC is considering possible strategies to address emissions in upwind "contributing" areas.

Strategies within the Nonattainment Area. The workgroup has identified several control measures that could be pursued in the region. These include:

- Adopting the Ozone Transport Commission (OTC) Multipollutant Strategy targeting additional reductions beyond the Clean Air Interstate Rule (CAIR) for large NOx sources, including electrical generating units.
- Adopting more stringent controls on smaller NOx sources through adoption of the OTC Small NOx Source model rule.
- Adopting the OTC Corridor Strategy to reduce on-road mobile emissions through programs such as truck/bus stop electrification and idling reduction.
- Negotiating a progressive emission budget with the region's airports involving a voluntary emission reduction program.
- Adopting a suite of local measures that can be placed together in the Innovative Measures Bundle. Such local controls include diesel bus retrofits, wind energy purchases, clean air construction and maintenance initiatives, and idling reduction programs. The proposed innovative measures are listed separately as a bundle, which is provided as Attachment 4.

Strategies in Upwind Contributing Areas. Control programs that have been adopted within the nonattainment area could be expanded to "upwind contributing areas" to reduce emissions and pollution transported into the region. The IAQC is currently considering how to address the potential need for controls on upwind sources. Some of the measures being considered for expansion into upwind areas include:

- Expansion of the OTC VOC measures, including Consumer Products, Solvent Cleaning, Mobile Equipment Repair and Refinishing, Architectural and Industrial Maintenance Coatings, and Portable Fuel Containers rules.
- Expansion of NOx and VOC RACT to upwind stationary sources.
- Negotiating a progressive emission budget with the airports outside the region involving a voluntary emission reduction program.

The control workgroup is developing more detailed information on implementation requirements for the proposed priority measures. Work is focused on estimating expected emission reductions

and more fully evaluating cost effectiveness and feasibility. A decision on which measures to pursue for further development is reserved for MWAQC and IAQC.

5. Summary

Significant emission reductions are expected between 2002 and 2009 as a result of control programs adopted in the region beginning in 2003. Overall, NOx emissions decline at least 24 percent and VOC emissions decline at least 27 percent. The reductions are a result of implementing a variety of new programs listed in Attachment 1, including the OTC VOC model rules, EPA's 2004 and 2007 Heavy Duty Diesel Engine Rules, and Tier 2 vehicle emission standards.

While the region has made progress in reducing emissions and may be able to demonstrate Rate of Progress with reductions from existing "on-the-books" controls, additional emission reductions will likely be required in order to achieve the 8-hour ozone standard by 2009. EPA's own modeling indicates that the region will still not meet the standard even after implementation of the first phase of EPA's Clean Air Interstate Rule (CAIR) beginning in 2009 (see Attachment 2).

Opportunities exist within the nonattainment area to further reduce emissions to levels below the 2009 controlled inventory (see Attachments 3 and 4). One of the most important sources to consider is large stationary sources. One approach in this sector is adoption of the OTC Multipollutant Initiative (CAIR Plus), which would require reductions on stationary sources beyond those currently required under CAIR. Another promising approach to reducing emissions is to develop a variety of local control measures that can be considered collectively as an "Innovative Measures Bundle." This will enable local jurisdictions to take a leadership role in formulating and implementing programs while allowing flexibility in how the total overall reduction commitment is achieved. Finally, sources in upwind contributing areas are being considered as part of an overall control strategy to reduce pollution that is transported into the region. The IAQC is currently considering how to address emissions from upwind sources.

This strategy will evolve as more information becomes available, including EPA guidance, revised inventories, results of attainment modeling, and deliberations of IAQC and MWAQC.

Attachment 1. List of Controls

Controls in Place for 2002 Baseline Inventory

Point

Non-CTG VOC RACT to 50 tpy
NOx OTC Phase II Budget Rules (DC only)
Expanded Non-CTG VOC RACT and State Point Source Regulations to 25 tons/yr
NOx SIP Call (MD)

Area

Stage II Vapor Recovery Nozzles
Phase II Gasoline Volatility Controls
Reformulated Surface Coatings
Reformulated Consumer Products – National Rule
Reformulated Industrial Cleaning Solvents – National Rule
National Standards for Locomotive Engines
Surface Cleaning/Degreasing for Machinery/Automotive Repair
Landfill Regulations
Seasonal Open Burning Restrictions
Stage I Expansion (Tank Truck Unloading)
Graphic Arts Controls
Auto body Refinishing

Nonroad

EPA Non-Road Diesel Engines Rule
EPA Non-Road Small Gasoline Engines Rule, Phase 1 and Phase 2 (handheld and non handheld)
EPA Emissions standards for spark ignition marine engines
EPA Emissions standards for large spark ignition engines
Reformulated Gasoline (off-road)

Onroad

Enhanced Inspection/Maintenance
Reformulated Gasoline (on-road)
Federal "Tier I" Vehicle Standards and New Car Evaporative Standards
National Low Emission Vehicle Program

Attachment 1. List of Controls (continued)

Controls added since 2002 Baseline (Post 2002) and additional reductions

Point

TBD

Area

Additional phase in of reductions from National Locomotives Rule
OTC Mobile Equipment Repair and Refinishing (VA and DC)*
OTC AIM Coatings Rule
OTC Solvent Cleaning, (VA and DC)*
OTC Consumer Products
OTC Portable Fuel Container
On-Board Refueling/vapor recovery for LD Trucks (2004)

Nonroad

Nonroad Heavy Duty Diesel Rule (2004) (negligible benefits by 2009)
Additional phase in of Pre-2003 technology rules

Onroad

Heavy-Duty Diesel Engine Rule (2004)
Heavy-Duty Diesel Engine Rule (2007)
Tier 2 Motor Vehicle Emission Standards
Enhanced I&M Program with Currently In-Practice Cutpoints

Note:
* Maryland Rule in place prior to 2002.

Attachment 2. EPA CAIR Attainment Maps

Attachment 3. List of Proposed Priority Measures

Attachment 4. Proposed Innovative Measures Bundle