

**Phase II Attainment Plan  
for the Baltimore Region  
and Cecil County**

## TABLE OF CONTENTS



### Executive Summary

#### Chapter 1: Plain English Guide to the Attainment Plan

#### Chapter 2: Introduction and Background

- A. The Problem: Ground-Level Ozone
  - i. General Description
  - ii. Ozone in the Baltimore Area and Cecil County
- B. Consequences of the Problem: Health Effects, Environmental Impacts & Costs
  - i. General Description of Health Effects
  - ii. Maryland Specific Health Effects
  - iii. Environmental Impacts of Ozone
  - iv. Costs of Ozone Air Pollution
- C. The Cause of the Problem: VOCs, NO<sub>x</sub>, Weather Conditions and Transport
  - i. Sources of VOCs and NO<sub>x</sub>
  - ii. Trends in Emissions of VOCs and NO<sub>x</sub>
  - iii. Weather Conditions Conducive to Ozone Formation
  - iv. Long-range Transport of Ozone and Ozone Precursors
- D. Solving the Problem: Legal, Administrative and Technical Solutions
  - i. Legal Solutions: The Clean Air Act
  - ii. 1990 Clean Air Act Amendments
  - iii. The State Implementation Plan (SIP) Process
  - iv. Meeting the CAAA Requirements: The 15% Plan
  - v. March 2, 1995 Memo from Mary Nichols
  - vi. Baltimore Phase I SIP
  - vii. Ozone Transport Assessment Group
  - viii. Current Requirements for Phase II SIP (Attainment Plan)
- E. Purpose and Organization of this Document

#### Chapter 3: Traditional and Non-Traditional Pollution Control Efforts and Their Use in Achieving Rate of Progress Reductions

- A. Regulatory Initiatives
  - i. Federally Mandated Measures
  - ii. Pending Federal Measures
  - iii. State and Local Initiatives
  - iv. Regional Measures
- B. Non-Traditional Approaches to Ozone Control
  - i. Ozone Forecasting, the Ozone Map and Ozone Action Days
  - ii. Smart Growth
  - iii. Cash-for-Clippers
- C. Other Measures Under Consideration
  - i. Background

- ii. Measures Affecting Stationary Sources
- iii. Measures Affecting Area Sources
- iv. Measures Affecting Mobile Sources Both Highway and Off-Highway Sources
- D. Meeting the 3% Per Year Rate-of-Progress Requirement
  - i. Background
  - ii. Inventories Used in the ROP Plan
  - iii. Calculation of Emission Target Levels to Meet ROP Requirements
  - iv. 2005 Control Measures to Meet the ROP Requirements
  - v. Comparison of Target Levels Required to Target Levels Obtained
  - vi. Meeting the 3% per Year ROP Requirement in Baltimore Using Statewide Emissions Reductions
  - vii. Comment on New Methodology Mobile Source Estimates for Cecil County

Chapter 4: Reducing Ozone Levels: Using Trends Analysis to Chart Progress to Date

- A. Introduction
- B. Emission Trends 1970 – 2005
  - i. Background
  - ii. Methodologies and Inventory Source Types
  - iii. Analysis of Trends
- C. Air Quality Analysis
  - i. Introduction
  - ii. Background
  - iii. Air Quality Trends – An Overview
  - iv. Ozone Exceedance Days
  - v. PPB Exceedance Hours
  - vi. Normalizing with Respect to Weather
  - vii. Baltimore and Washington Design Values
  - viii. Conclusions

Chapter 5: The Significant Role of Ozone Transport

- A. Introduction
- B. The Ozone Transport Assessment Group
  - i. The OTAG Process
  - ii. Air Quality Analysis Workgroup
  - iii. Regional and Urban Scale Modeling Workgroup
  - iv. Conclusion
- C. Air Quality Analysis
  - i. Meteorology of High O<sub>3</sub> Episodes
  - ii. Regional Scale O<sub>3</sub> Observations
  - iii. Sources of Regional O<sub>3</sub>
  - iv. Implications of the July, 1997 Episode
  - v. Regional and Local Events

- vi. Control Strategy Implications of Regional O<sub>3</sub>
- D. NARSTO – Setting a Baseline for OTAG Results
- E. OTAG Modeling Implications on the Baltimore Washington Region
  - i. Introduction
  - ii. Background
  - iii. Overview of OTAG Modeling Results
  - iv. OTAG Episode Summary
  - v. OTAG Modeling Results
  - vi. Conclusions

Chapter 6: Transportation Conformity

- A. Background
- B. Consultation
- C. Conformity Tests
- D. Emissions Budgets
- E. Establishing Mobile Emissions Budget Levels
- F. Recommended Approach to Conformity
- G. The Trading Mechanism

Chapter 7: The Critical Role of Federal Control Measures

- A. Introduction
- B. Critical Federal Measures

Chapter 8 : Ozone Air Quality in 2005

- A. The Ozone Modeling Requirements
- B. EPA Modeling Requirements
  - i. How Models Operate
  - ii. Urban Airshed Model
  - iii. Regional Modeling
  - iv. Urban Nonattainment Modeling Requirements
- C. Using the Model to Perform “Sensitivity” Analyses
  - i. Background
  - ii. Sensitivity Analysis: Meteorology
  - iii. Sensitivity Analysis: Boundary Conditions
  - iv. Sensitivity Analysis: Biogenic Emissions
  - v. Emission Control Runs
- D. Using the Models to Estimate Ozone Levels in 2005
  - i. Introduction
  - ii. Strategies Analyzed
  - iii. Historical Base-Case
  - iv. 2005 CAAA Controls with No New Reductions in Transport
  - v. 2005 CAAA Controls with Aggressive Controls to Reduce Transport
  - vi. 2005 CAAA Controls with Aggressive Controls to Reduce Transport and Local Behavior Modifications Leading to Lower Emissions Growth

MDE-98 SIP

- vii. 2005 CAAA Controls with Aggressive Controls to Reduce Transport and Full Implementation of Federal Control Measures and Additional Local Controls
- viii. Using Modeling to Select Additional Control
- ix. More Detailed Comparison and Analysis of Strategies
- E. Using Ambient Data and Models to Evaluate Attainment
- F. Conclusions

Appendix A. EPA Guidance

Appendix B. Detailed Description of Control Programs

Appendix C. Detailed Analysis of Non-Traditional Control Programs

Appendix D. Modeling Technical Support Document

Appendix E. Rate-of-Progress Demonstration

Appendix F. Supplemental Evidence Supporting Attainment of the 1-Hour Ozone Standard