MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

AIR AND RADIATION MANAGEMENT ADMINISTRATION

State Implementation Plan

Projection Year SIP Emissions Inventory Methodologies

Prepared for:

U.S. Environmental Protection Agency

Prepared By:

Maryland Department of the Environment

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1.0 PROJECTION YEAR INVENTORY DEVELOPMENT

This section describes the proposed approach to estimating future year emissions for the State of Maryland nonattainment areas for the purposes of meeting maintenance plan requirements.

In preparing the projection year inventories, the approach should address two components: (1) estimating expected changes in emissions generating activity between the base year (2002) and the projection years; and (2) accounting for changes in emission rates by source category resulting from air pollution regulations or the replacement of equipment with new, lower emitting technologies. For the first component, the best way for estimating activity changes is to pick an indicator for each source category that has available projections data and provides as direct as possible a link to emissions generating activity.

Possible sources of projections data, in order of preference, are: (1) State of Maryland economic/population projections at the State, sub-State level, or facility level, (2) recent regional economic projections, or (3) State-level activity projections from EPA's Economic Growth Analysis System (EGAS). EGAS provides growth factors for the years of interest, which are linked to standard emission inventory Source Classification Codes (SCCs).

Modeling of control effects will focus on the source categories whose emission rates are expected to change between 2002 and 2009 or 2014. These source categories include on-road mobile sources, nonroad mobile sources, and residential wood combustion.

1.1 ON-ROAD MOBILE SOURCES

On-road mobile source emission projections to 2009 and 2014 will be made using MOBILE6.2 emission factors and projections of VMT by vehicle type, roadway functional classification, and associated speed by the BRTB and their staff, BMC and MDE.

BRTB and BMC will supply MDE with input data for projection years. The projection year emission estimates will take into account any fuels strategies that were adopted or planned for the area, and any changes in fuel specifications that change by month/season in order to calculate winter period and annual average emissions.

1.2 NONROAD MOBILE SOURCES

The nonroad mobile source sectors for which emission projections will be needed include aircraft, locomotives, marine vessels, and EPA NONROAD model categories. Aircraft emission projections will use local airport landing-takeoff projections with adjustments (if needed) to aircraft emission factors to account for the effects of emission standards, or technology changes. Similar methods are planned for locomotives emission projections. For NONROAD model categories, emission projections will be based on running the current version of EPA's NONROAD model for the projection years with Maryland-specific inputs used in the base year inventory development. NONROAD model inputs are listed below.

Parameters:	2002 BNAA-MD	2008 Uncontrolled BNAA-MD	2008 Controlled BNAA-MD	2009 Uncontrolled BNAA-MD	2009 Controlled BNAA-MD
Min. Temp.	65.55	65.55	65.55	65.55	65.55
Max. Temp.	87.6	87.6	87.6	87.6	87.6
Avg. Temp.	76.8	76.8	76.8	76.8	76.8
RVP	6.6	6.6	6.6	6.6	6.6
O2 %	2	2	2	2	2
Gas Sulfur %	0.0162	0.0162	0.003	0.0162	0.003
LPG/CNG Sulfur %	0.003	0.003	0.003	0.003	0.003
Diesel Sulfur%	0.2283	0.2283	0.0348	0.2283	0.0348
Marine Diesel Sulfur %	0.2638	0.2638	0.0408	0.2638	0.0408
Stage II Control %	0	0	0	0	0

1.3 POINT SOURCES

Point sources will include those with allowable emissions of 50 or more tons per year of CO. In addition to the actual emissions reported for each facility, allowable or potential to emit emissions for point sources will be included. These allowable emissions are important to consider in projected emission inventories, especially where they are much different than actual emissions. Actual emissions will be forecast to the projection years using EGAS growth surrogates.

1.4 QUASI-POINT SOURCES

Quasi-point sources will include all emissions at the facility regardless of whether they are classified as point, area, nonroad, or mobile source emissions. These emissions are actual emissions reported for the facilities. Actual emissions will be forecast to the projection years using surrogates specific to each quasi-point source. The growth factor indicators and their sources are listed below by facility:

Quasi-Point Source	Surrogate Growth Indicator
Baltimore Washington International Airport (BWI)	
Aircraft LTOs	FAA Aircraft Operations Forecasts
Mobile Source Emissions	FAA Enplanement Forecasts
Aberdeen Proving Grounds	BRAC Population Estimates

1.5 AREA SOURCES

Area source projections are typically made using local information and/or growth surrogates. The effects of any control measures to be implemented between the base and projection years are then applied (e.g., using an estimate of control efficiency, rule penetration, and rule effectiveness). Projection methods are described below.

For all sources except residential wood combustion and agricultural burning (including orchard tear-out burning), emissions will be projected by multiplying the base year emission rates by the

surrogate activity indicator growth factors. Details on the woodstove projection method are described in Section D. Pechan will work with SCAPCA, the Washington State University Cooperative Extension Service and other local agricultural contacts to estimate future agricultural burning activity levels. Surrogate activity indicators for each area source category are shown in the table below.

Source Category	Surrogate Growth Indicator
Petroleum Distribution Losses	
Aircraft Refueling	EMP
Petroleum Vessel Unloading	EMP
Stage II Refueling	GAS
Tank Breathing	GAS
Tank Transit	GAS
Tank Unloading	GAS
Portable Fuel Containers	POP
Catastrophic/Accidental Releases	
Oil Spills	NA
Soil Remediation	NA
Fire Sources	
Automobile Fires	POP
Forest Fires	NA
Slash Burning	NA
Prescribed Burning	NA
Structure Fires	POP
Stationary Area	
Dry Cleaners	POP
Architectural Surface Coatings - Water Based	POP
Architectural Surface Coatings - Solvent Based	POP
Cold Cleaning/Degreasing	EMP
Auto Refinishing	EMP
Traffic Paints - Total	POP
Commercial - Consumer Solvents	POP
Emulsified Asphalt	POP
Graphic Arts	POP
Industrial Surface Coatings	EMP
Industrial Adhesives	EMP
Pesticides	NA
Small Stationary Source Fuel Combustion	
Commercial/Institutional Coal Combustion	EMP
Commercial/Institutional Kerosene Combustion	EMP
Commercial/Institutional Distillate Oil Combustion	EMP
Commercial/Institutional Residual Oil Combustion	EMP
Commercial/Institutional LPG Combustion	EMP
Commercial/Institutional Natural Gas Combustion	EMP
Residential Coal Combustion	NA
Residential Kerosene Combustion	HSE
Residential Distillate Oil Combustion	HSE

Source Category	Surrogate Growth Indicator
Residential Natural Gas Combustion	HSE
Residential LPG Combustion	HSE
Residential Wood Combustion	POP
Industrial Distillate Oil Combustion	EMP
Industrial Residual Oil Combustion	EMP
Bioprocess Emission Sources	
Bakeries	POP
Brewpubs	POP
Wineries	POP
Distilleries	NA
Miscellaneous Area Sources	
Agricultural Land Preparation	NA
Construction – Residential	POP
Construction – Heavy	POP
Construction – Road	POP
Solid Waste Treatment, Disposal, and Recovery	
Incinerators	NA
Open Burning – Land Clearing Debris	POP
Open Burning – Residential Municipal Solid Waste	POP
Open Burning – Residential Brush Debris	POP
Open Burning – Residential Leaf Debris	POP
Landfills	POP
POTWs	HSE
Nonroad Sources (Outside NONROAD Model)	
Military Aircraft	EGAS
General Aviation Aircraft	EGAS
Air Taxi Aviation Aircraft	EGAS
Marine Vessels	EMP
Railroad Engines	EMP

Future year emission projections for RWC will incorporate expected changes in activity and emission factors that account for the anticipated mix of wood stove types, and their expected CO emission rates for each projection year. The technology mixes in 2010 and 2015 are especially important because wood stoves have had to meet a set of increasingly more stringent new source performance standards. An important assumption in estimating the technology mix in future years is the expected lifetime/replacement rate for wood stoves. The faster the replacement rate, the lower the average emission rate in future years for the wood stove population. Pechan will use contacts with government agencies and industry to develop an estimate of lifetime/replacement. RWC emission estimates for the projection years will also account for any local programs to curtail wood stove/fireplace use, etc.