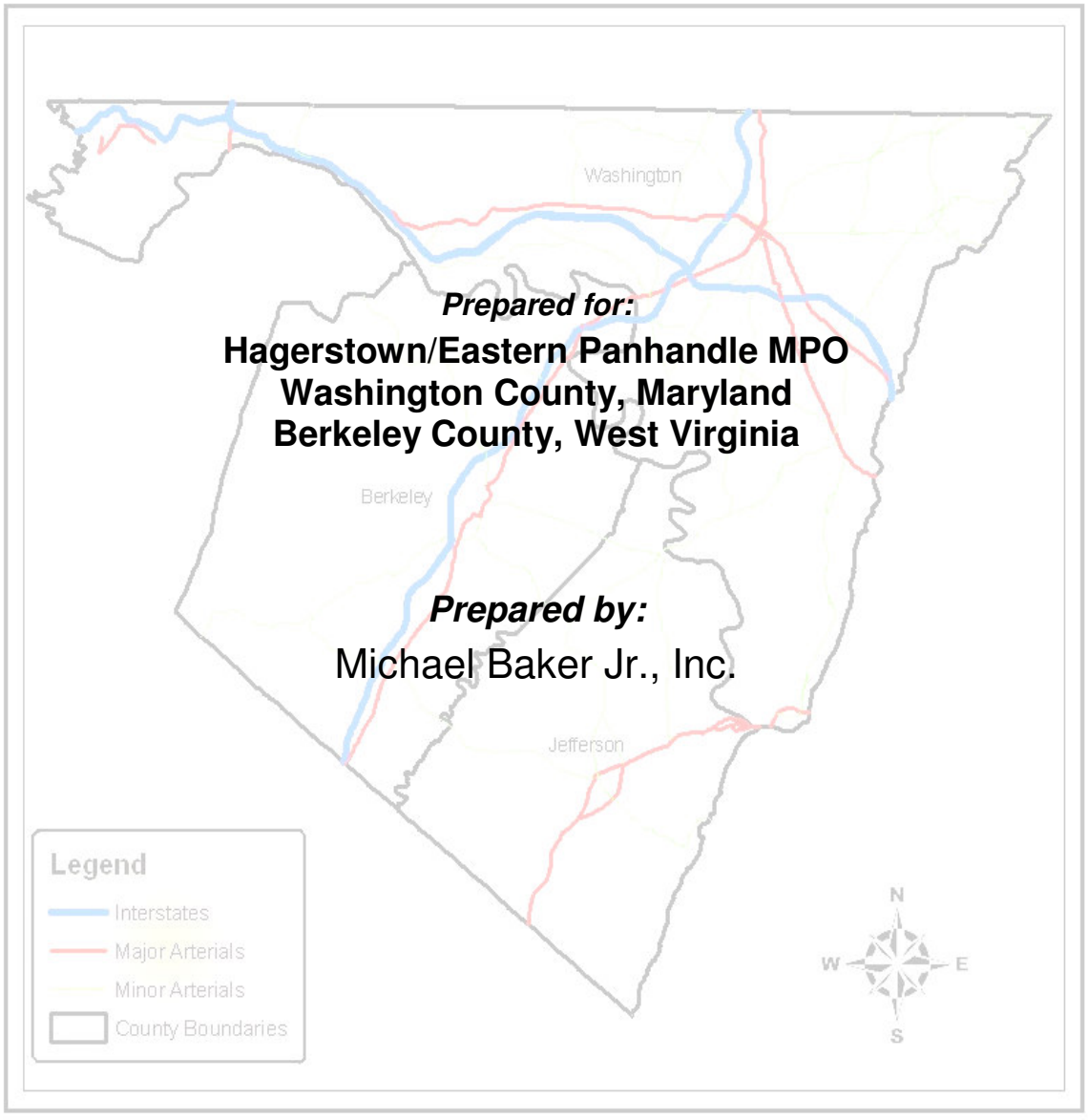
Air Quality Conformity Analysis For Fine Particulates ($PM_{2.5}$) NAAQS

For the Hagerstown/Eastern Panhandle MPO Area FY2008–2011 Transportation Improvement Program and Long-Range Multimodal Transportation Plan

Draft for Public Review



Prepared for:

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December 2007

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Air Quality Conformity Analysis
For the FY 2008 – 2011 TIP and 2030 LRP
Hagerstown/Eastern Panhandle MPO
Washington County, MD & Berkeley, WV

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Introduction

This report demonstrates transportation conformity of the Fiscal Year (FY) 2008-2011 Transportation Improvement Program (TIP) and the 2030 Long-Range Multimodal Transportation Plan (LRP) for the Hagerstown/Eastern Panhandle $PM_{2.5}$ nonattainment area. The Hagerstown/ Eastern Panhandle Metropolitan Planning Organization (HEPMPO) is the federally designated Metropolitan Planning Organization (MPO) for the metropolitan area that consists of the urbanized portions of Washington County, Maryland; Berkeley and Jefferson Counties, West Virginia; and a small portion of Franklin County, Pennsylvania. Significant cities and towns within the federally defined urbanized area include Hagerstown, Williamsport, and Boonsboro in Maryland, and Martinsburg, Charles Town, Ranson, and Shepherdstown in West Virginia. MPOs such as the HEPMPO represent areas with urbanized area populations of 50,000 or more persons. The MPO's mission is to provide a forum for cooperative decision-making for short-term and long-term solutions to transportation and transportation-related concerns such as air quality. While HEPMPO includes all of the counties mentioned above, it is important to note that a conformity determination was only performed for Washington County, Maryland and Berkeley County, West Virginia, as they were the only counties designated by EPA as nonattainment for the annual $PM_{2.5}$ National Ambient Air Quality Standard.

$PM_{2.5}$ Background

Particle pollution consists of a mixture of microscopic solids as well as liquid droplets suspended in air. Fine particle pollution, or $PM_{2.5}$, is defined as particulate matter that is less than or equal to 2.5 micrometers in diameter, which is approximately $1/30^{th}$ the diameter of a human hair. Fine particle pollution can be emitted both directly into the atmosphere as well as formed in the atmosphere. For example, sulfates and nitrates are two types of secondary particles. The former is a result of power plant and industry emissions, while the later results from automobiles, power plants and other combustion emissions sources.

The health effects, based on scientific studies, have found a significant association between the exposure to fine particulates and such severe health issues as heart disease, lung disease and premature death. These effects can result in increased absences from school or work, hospital admissions, and emergency room visits. Individuals with heart or lung disease, children and the elderly may be especially sensitive to fine particulate exposure.

$PM_{2.5}$ National Ambient Air Quality Standards

In 1997, EPA issued the $PM_{2.5}$ fine particulate National Ambient Air Quality Standards (NAAQS) in order to protect public health. The annual standard is set at 15 micrograms per cubic meter and is based on a 3-year average of annual mean $PM_{2.5}$ concentrations. The 24-hour standard is currently set at a level of 65 micrograms per cubic meter, and is determined by the 3-year average of annual 98^{th} percentile concentrations.

Areas that have failed to meet the standards outlined above have been designated as nonattainment areas and are now subject to transportation conformity. Transportation

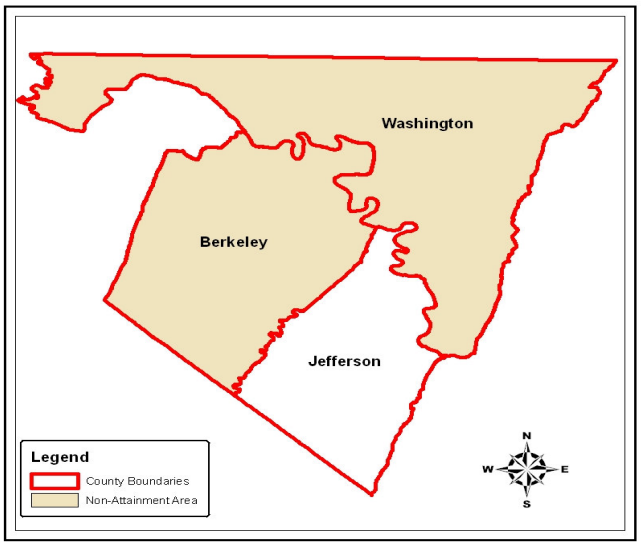
conformity requires nonattainment areas to demonstrate that all future transportation projects will not hinder the area from reaching its attainment goals.

EPA originally designated nonattainment areas on December 17, 2004. Following modifications, the designations became final on April 5, 2005. The Maryland Department of Environment petitioned EPA on February 22, 2005, asking that EPA reconsider the nonattainment designation for Washington County, MD. EPA upheld the nonattainment designation on December 5, 2005. All nonattainment areas were required to demonstrate transportation conformity on or before April 5, 2006, one year following the original designations. HEPMPO met that requirement and received EPA and FHWA approval in March of 2006. States that contain $PM_{2.5}$ nonattainment areas must submit a State Implementation Plan or SIP by April 2008, outlining how attainment will be reached by 2010.

Hagerstown/Eastern Panhandle $PM_{2.5}$ Nonattainment Area

The HEP nonattainment area is made up of two counties: Washington County, Maryland and Berkeley County, West Virginia. Figure 1 illustrates the entire MPO as well as the nonattainment counties.

Figure 1: HEPMPO and Nonattainment Area



Status of the FY 2008-2011 TIP & 2030 Long-Range Multimodal Transportation Plan

As the regional transportation-planning agency for Berkeley County, West Virginia and Washington County, Maryland, HEPMPO is charged with authoring a long-range transportation plan with at least a 20 year planning horizon. The Plan presents recommendations for enhanced transportation efficiency and functionality, including the construction of new facilities, improved connectivity to multiple travel modes, and the enhancement of existing highway, transit, and bicycle/pedestrian facilities. The long-range multimodal Transportation Plan was developed by member agencies in March 2005. The Interstate Council Committee adopted the plan in late 2005.

HEPMPO adopted the FY 2008-2011 TIP on DATE. The Maryland STIP was submitted to the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) for approval on DATE. HEPMPO is still awaiting approval from FTA/FHWA. The West Virginia STIP was submitted to FTA/FHWA on DATE and approved on DATE.

Interagency Consultation

The HEPMPO is a relatively new MPO, having been officially designated as an MPO following the 1990 U.S. Census by the governors of Maryland, Pennsylvania, and West Virginia. The HEPMPO works in coordination with the state departments of transportation (DOT) in Maryland, Pennsylvania, and West Virginia and the various local governments to plan and coordinate the development of transportation projects in the region. The *Interstate Council (ISC)* is the governing Policy Board for the HEPMPO. The committee includes voting members who represent the following organizations:

- City of Hagerstown, Maryland
- City of Martinsburg, West Virginia
- The Towns of Charles Town, Harpers Ferry, Ranson, and Shepherdstown, West Virginia (Jefferson County)
- Berkeley County Commission, West Virginia
- Jefferson County Commission, West Virginia
- Washington County Commissioners, Maryland
- Eastern Panhandle Regional Planning and Development Council
- Maryland DOT
- West Virginia DOT

As required by the federal transportation conformity rule, the conformity process includes a significant level of cooperative interaction among the federal state and local agencies. Interagency consultation requirements include coordination with the HEPMPO staff, the ISC members and representatives from the state environmental agencies and federal representatives including:

- Maryland MDE
- West Virginia DEP
- FHWA
- EPA
- FTA

The HEPMPO structure also includes a Technical Advisory Committee (TAC) comprised of transportation officials from Maryland and West Virginia and community representatives from other related organizations who work to provide assistance to the ISC on project development and technical issues.

As part of the interagency consultation, the interagency consultation group collaborated in order to achieve the following goals related to the transportation conformity process:

- Determine timing and triggers of conformity analysis
- Determine which interim emissions test would be used
- Determine analysis years
- Develop regional emissions analysis procedures
- Determine applicable pollutants and precursors
- Determine planning assumptions and models to be used
- Develop a format for presenting determination
- Develop and standardize the public participation process

$PM_{2.5}$ Regional Emissions Test

As discussed above, states designated as nonattainment for $PM_{2.5}$ must submit SIPs no later than April 5, 2008. Once a state has submitted its SIP and the motor vehicle emissions budgets have been ruled adequate or are approved by EPA, the state will have established budgets for $PM_{2.5}$ emissions. Future transportation projects and plans will be compared to those budgets in order to determine conformity. Prior to 2008, states are required to choose one of two interim emissions tests in order to demonstrate $PM_{2.5}$ conformity, the baseline year test or the build/no-build test. The baseline year test compares the emissions projected for each future year to the 2002 baseline emissions. This test requires that all future year emissions estimates be less than or equal to the 2002 baseline emissions. The build/no-build test requires that all future year emissions estimates for the build scenario be no greater than the future year emissions estimates for the no-build scenario. Because the test chosen must be uniform across the $PM_{2.5}$ nonattainment area, the interagency consultation process was used by HEPMPO to choose the baseline year test as the interim emissions test.

Analysis Years

EPA regulations, as outlined in Section 93.119(g) of the Final Transportation Conformity Rule, require that emissions analyses be conducted for specific analysis years as follows:

- A near-term year, one to five years in the future
- The last year of the Long-Range Multimodal Transportation Plan's forecast period
- An intermediate year or years such that analysis years are no more than ten years apart.

All analysis years were determined through the interagency consultation process. 2010 has been selected as the near term year. The $PM_{2.5}$ nonattainment area falls under one MPO, and has one Long-Range Multimodal Transportation Plan. The last year of the plan is 2030. 2020 has been chosen as the intermediate year so that the analysis years are no more than ten years apart, making the analysis years 2010, 2020 and 2030.

Components of the Regional Emissions Analysis

$PM_{2.5}$ can be the result of either direct or indirect emissions. Direct transportation emissions can be the result of brake or tire-wear, particulates in exhaust emissions, or dust kicked up by on-road vehicles or construction equipment. Possible indirect transportation related emissions of $PM_{2.5}$ include: ammonia (NH_3), nitrogen oxides (NOx) sulfur oxides (SOx) and volatile organic compounds (VOC).

The EPA has ruled that regional analysis of direct $PM_{2.5}$ emissions must include both exhaust and brake/tire-wear emissions. EPA has specified that road dust should be included in the regional analysis of direct $PM_{2.5}$ emissions only if the EPA or the state air agency have found it to be a significant contributor to the region's nonattainment. Neither the EPA nor the state air agency have determined road dust to be a significant contributor in the HEP $PM_{2.5}$ nonattainment area for this conformity determination. Upon developing SIP budgets, EPA or the state air agency may find road dust significant. In this case, road dust would become a required component of future conformity determinations. Construction related fugitive dust has not been considered, as it is not required to be included in any $PM_{2.5}$ conformity determination before a SIP is submitted.

Until a SIP is established, EPA has ruled that indirect $PM_{2.5}$ emissions must be analyzed for NOx unless the EPA or the state can prove that NOx is insignificant. Conversely, VOC, SOx and NH_3 must be analyzed only if the state or the EPA determines one or more of these pollutants significant. Therefore, NOx is the only indirect $PM_{2.5}$ component analyzed for the HEP nonattainment area for this conformity determination.

Annual Inventories

MOBILE6.2 is currently EPA's approved emission factor model for estimating direct $PM_{2.5}$ emissions from on-road vehicle exhaust and brake/tire wear, and for $PM_{2.5}$ precursor emissions from vehicle exhaust and evaporative emissions. Guidance issued by the EPA in August 2005 outlined four approaches to developing an annual $PM_{2.5}$ inventory prior to SIP development: a single-run approach, a two-season approach, a four-season approach and a monthly approach. Through the interagency consultation process, a two-season approach was chosen as tests comparing the two-season approach and the monthly approach revealed a nominal difference, unworthy of the additional effort.

Analysis Results

The results of the interim emissions tests are presented below in Tables 1 and 2. Table 1 presents the results of the baseline year test (no greater than 2002) for direct $PM_{2.5}$ emissions. Table 2 outlines the results of the baseline year test for the indirect, $PM_{2.5}$ precursor, NOx. The results show that all analysis years are below the 2002 Baseline and therefore show a positive conformity determination and will not cause or contribute to any new violation of the air quality standard.

Table 1: Direct $PM_{2.5}$ Interim Emissions Test Results – Baseline Year Test

	2002 (tons/yr)	2010 (tons/yr)	2020 (tons/yr)	2030 (tons/yr)
Washington County, MD	92.0	68.9	44.9	42.6
Berkeley County, WV	56.6	32.2	21.7	20.3
Total	148.6	101.1	66.6	62.9
Conformity Result		**Pass**	**Pass**	**Pass**

Table 2: NOx ($PM_{2.5}$ Precursor) Interim Emissions Test Results – Baseline Year Test

	2002 (tons/yr)	2010 (tons/yr)	2020 (tons/yr)	2030 (tons/yr)
Washington County, MD	6,155.3	4,164.9	1,395.2	796.8
Berkeley County, WV	3,617.2	1,977.0	957.1	643.1
Total	9,772.5	6,141.9	2,352.3	1,439.9
Conformity Result		**Pass**	**Pass**	**Pass**

Travel Demand Modeling Methodology

A travel demand model has been used to estimate future roadway traffic volumes and diversions related to significant transportation improvement projects. The travel model was finalized in the spring of 2005 for the Hagerstown/Eastern Panhandle Metropolitan Planning Organization.

The Hagerstown/Eastern Panhandle (HEP) model uses the QRS-II version 7.1 software platform, and encompasses Washington County in Maryland, as well as Jefferson and Berkley Counties in West Virginia. This model is a traditional three-step model incorporating trip generation, trip distribution, and traffic assignment. The regional travel model does not contain a formal mode choice or transit assignment module. As a result, the model produces vehicle trips for 491 traffic analysis zones and assigns them to highway networks consisting of key regional roadway segments. The base year model is validated against survey data and traffic counts collected for the year 2000. A summary of the model components and validation are presented in a final report available from the Hagerstown/Eastern Panhandle Metropolitan Planning Organization.

Highway Networks

For the purpose of conformity analysis, model highway networks are created for each analysis year: 2002, 2010, 2020, and 2030. The networks are comprised of link segments representing freeways, principle arterials, minor arterials, and collectors within the nonattainment region. Links in the network are coded with attributes that portray the facilities respective capacities and travel speeds. For the horizon years, projects from the

TIP and LRP are coded onto the networks by adding links for new construction projects and adjusting the link capacities for projects that add lanes to existing roadways. A list of regionally significant highway projects (as defined in section 93.101 of the Final Transportation Conformity Rule) is shown in Table 3. The primary products of the model used in the air quality analysis are estimated volumes, link distances, free-flow speeds, and link capacities. The impacts of transit on regional vehicle trips are accounted for in the validation count data. Future changes to transit service (as reflected in regionally significant transit projects) can be accounted for using off-model analysis techniques. However, there are no significant transit service projects contained on the project lists.

Table 3: HEP MPO Area Regionally Significant Highway Projects

Year	State County	Location	Project Description
2010	MD Washington	Eastern Blvd	Widen to 4-lanes plus auxilliary lane - MD 64 to US 40
	WV Jefferson	WV 9	New 4-lane construction - Kearneysville to Charles Town
	WV Both	WV 9	New 4-lane construction - Martinsburg to Kearneysville
	WV Jefferson	WV 480	Reconstruction of WV 480 in conjuction with replacement of James Rumsey Bridge - CR 4 to Shepherdtown
2020	MD Washington	Eastern Blvd	Widen to 4-lanes plus auxilliary lane - US 40 to Mt Aetna & MD 60 to MD 64
	MD Washington	I-81	Widen to 6-lanes plus collector/distributor - I-70 to US 40
	MD Washington	MD 60	Eastern Blvd extension north to MD 60 - Northern Avenue to Marsh Pike
	WV Berkeley	CR 1 Grade Road	Reconstruct to 4-lanes plus auxilliary lanes - WV 9 to WV 901
	WV Berkeley	I-81	Widen to 6-lanes from existing 6-lane section north of Martinsburg to Falling Waters
	WV Berkeley	I-81 to US 11	Tabler Station Road connector; New 4-lane construction (1.6m)
	WV Berkeley	WV 9	Construct 4-lane Martinsburg bypass
	WV Jefferson	WV 9	4-lane upgrade / new construction - Charles Town to VA line
	WV Both	WV 9	Widen to 6-lanes plus auxilliary lane to industrial park access - CR 1 to I-81
	WV Berkeley	WV 45	Widen to 6-lanes plus auxilliary lane - I-81 to WV 9
	WV Jefferson	WV 51	Enhanced collector routes, Ranson; New alignment connecting to WV 115
	WV Berkeley	WV 51	Widen to 4-lanes plus auxilliary (center turning) lane at Inwood - I-81 to US 11
	WV Berkeley	WV 51	New WV 51 alignment to eliminate offset - US 11 to Tarico Heights
	WV Berkeley	US 11	Tabler Station I-81 interchange to WV 45/9; Widen to 4-lanes plus auxilliaty lane (1 mile only)
	WV Berkeley	US 11	Raleigh Street extension in Martinsburg; WV 45/ WV 9 to WV 9/US 11
	WV Jefferson	US 340	4-lane upgrade / new construction - Charles Town SW to VA line
2030	WV Berkeley	WV 9	Construct new 4-lane highway on new alignment - CR 7 (near Morgan Co. lines) to CR 1

Land Use Forecast Methodology

Land use estimates for the base and future year models for the Hagerstown\Eastern Panhandle Metropolitan area were developed from information initially compiled in preparation of the local long range plan. The methodology for developing the forecasts is documented in the final report for that effort *Long Range Multi-modal Transportation Plan – For the Hagerstown/Eastern Panhandle Area (March 2005).*

As described in that report, base year data was developed using U.S. Census Bureau population data and base year economic data purchased as part of the original study from Woods and Poole economics. Local officials were contacted to identify major regional traffic generators and attractors for the region. Analysis on growth trends from 1970 to the year 2000 were compiled to compare to projected growth rates for the region. Analysis was also performed to determine suburbanization growth rates from the Washington D.C. metropolitan area as the study area has been recently growing due to housing needs as they radiate out from the urban core.

Future year data was developed for population and employment data by TAZ through comparative averaging for projections estimated for the region at the jurisdiction level. Projections on population and employment for the region were made by Woods and Poole Economics, the West Virginia University Regional Research Institute, and the Maryland Department of Planning for the forecast years of 2010, 2020 and 2030. As part of the process for developing the long-range plan these forecasts, as well as input from local planning staff, were used to determine control totals for land use by county for the study area. The study team used these control totals to create disaggregated totals for each TAZ within the study area.

For the purposes of the analysis required for the transportation conformity it was necessary to determine the 2002 baseline land use data. The land use data for this year was determined based on growth rates shown for each TAZ between 2000 and 2010. It was assumed for the purposes of this analysis that the growth rate for each TAZ would be fairly consistent across the ten years for which data was projected. Average annual growth rates were used to determine estimates for the year 2002 land use data.

The land use data used for the traffic modeling is summarized by county in Table 5 for analysis years 2002, 2010, 2020 and 2030.

Table 4: Summary of Land Use Data Used for Modeling Runs

COUNTY	HOUSEHOLDS				
ANALYSIS YEAR	1-PERSON	2-PERSON	3-PERSON	>3-PERSON	TOTAL
Berkeley County, WV					
2002	7,501	10,639	5,706	7,088	30,935
2010	9,495	13,328	7,204	8,761	38,788
2020	11,834	16,488	8,961	10,729	48,013
2030	12,723	17,585	9,520	11,367	51,207
Washington County, MD					
2002	13,534	18,133	8,714	11,072	51,454
2010	16,895	21,367	10,234	13,044	61,540
2020	20,819	25,155	12,013	15,353	73,340
2030	22,384	26,828	12,762	16,265	78,220

COUNTY	JOBS			
ANALYSIS YEAR	RETAIL	SERVICE	OTHER	TOTAL
Berkeley County, WV				
2002	6,602	11,638	17,059	35,298
2010	7,724	14,042	20,008	41,774
2020	9,049	16,336	23,248	48,633
2030	10,375	18,630	26,488	55,492
Washington County, MD				
2002	14,387	30,418	34,898	79,703
2010	16,051	35,110	40,506	91,666
2020	18,805	40,845	47,064	106,714
2030	21,559	46,580	53,624	121,763

Estimation Process for Mobile Source Emissions

This conformity analysis uses a set of computer programs and databases to estimate vehicle miles of travel (VMT) and operating speeds, and to subsequently calculate emission factors and annual emissions. The regional travel demand model (as described above) is used to estimate the regional VMT. Post processing software is used to calculate roadway speeds, adjust VMT to annual conditions, and to apply emission factors to produce total emissions. The emission factors were generated using MOBILE6.2, a program developed and required by the Environmental Protection Agency (EPA) to calculate mobile source emissions.

Traffic Data

The emission calculation process uses key traffic data from the regional travel demand model to estimate regional VMT and speeds. This data includes individual roadway traffic volumes and physical roadway descriptive characteristics including area type, functional class, lanes, distances, capacity, and free-flow speeds. Travel demand model

runs are produced for future analysis years and include the impact of regionally significant transportation projects. The model provides a key resource for estimating the impact of population and employment growth on roadway volumes and calculating the diversions due to transportation projects.

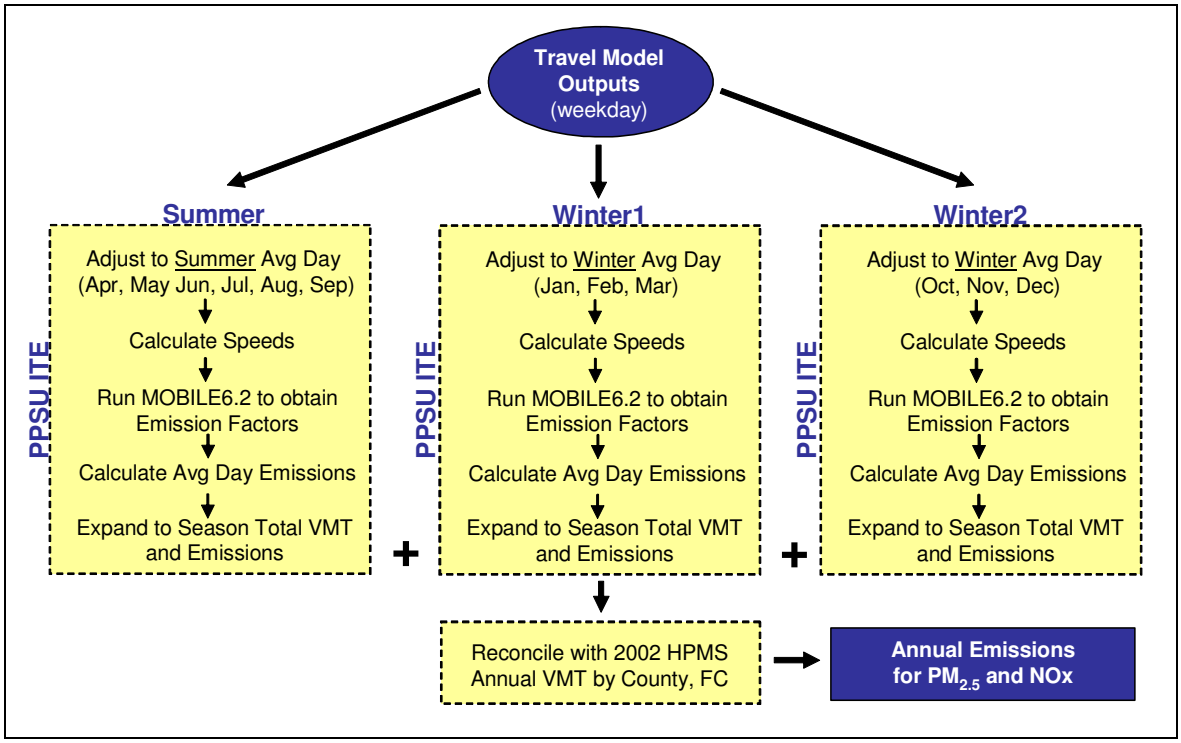
Post Processing of Traffic Data

Post processing methodologies and software play a key role in the emission calculation process. The regional travel model outputs have been integrated with the PPSUITE and MOBILE6.2 software to produce an automated system to estimate annual $PM_{2.5}$ and NOx emissions. The PPSUITE system has been used for previous inventory and conformity submissions in Maryland and in other states including Pennsylvania, Virginia, New Jersey, and New York. The software has gone through a significant revision to ensure consistency with the MOBILE6.2 emissions model. PPSUITE is used to process the outputs from the regional travel demand model runs for 2002, 2010, 2020, and 2030 including the development of roadway speed estimates, which are supplied as input to the MOBILE6.2 model. The software is also used to prepare and run the MOBILE6.2 input files and to process the MOBILE6.2 outputs. A summary of the PPSUITE functions includes:

- Analyzes highway operating conditions
- Calculates highway speeds
- Compiles vehicle miles of travel (VMT) and vehicle type mix data
- Prepares MOBILE6 runs
- Calculates emission quantities from output MOBILE6 emission rates and accumulated highway VMT.
- Produces summary reports

To produce annual estimates of $PM_{2.5}$ and NOx emissions, a "Two-Season" approach was used to calculate emission factors. This approach is documented in EPA's August 2005 guidance document, *Guidance for Creating Annual On-Road Mobile Source Emission Inventories for $PM_{2.5}$ Nonattainment Areas for Use in SIPs and Conformity*. Based on recommendations from FHWA resource center staff, the winter season was also divided into two separate analysis scenarios to reflect changes in fleet ages and to reflect the sales of newer model year vehicles at the end of the year. The analysis approach is summarized in Figure 2.

Figure 2: Summary of Annual Emission Calculation Process



VMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments to VMT included: seasonal adjustments to reflect an average day in each season; factoring/aggregation of daily/seasonal estimates to an annual VMT estimate; and adjustments to ensure that annual VMT estimates align with 2002 HPMS reported totals.

Speed data was calculated for each highway segment and hour of the day, based on roadway capacity and traffic volume using the post processing software. Thus, average speeds reflect physical highway conditions and congestion caused by traffic volume. For future conditions, congestion (and thereby speed) is affected by traffic growth and changes in physical conditions due to transportation improvement projects.

Calculating MOBILE6.2 Emission Factors

MOBILE6.2 uses the calculated congested speeds, regional fuel and I/M characteristics, and environmental parameters to estimate emission factors. PPSUITE applies these emission factors to the regional VMT estimates and prepares a summary emission report documenting the annual $PM_{2.5}$ and NOx emission totals. As described above, emission factors are calculated and applied for three separate analysis seasons. Differences between seasonal emission factors are primarily related to:

- Evaluation year and month settings affecting fleet turnover and ages
- Temperatures and humidity inputs
- Fuel characteristics (RVP)

Summary of MOBILE6.2 Input Assumptions

MOBILE6.2 includes a variety of input parameters that characterize the environmental setting, the vehicle fleet, the condition of emission controls, and the volatility of gasoline. Some parameters utilize program defaults while other items make use of available local data assumptions. A description of key local input data is provided below:

- **Calendar Year and Evaluation Month**: These parameters impact fleet ages and emission factors. The following values were used for each of the analysis seasons per EPA and FHWA recommendations. Note, the summer season includes the months April-September, the first winter scenario includes January-March, and the other winter scenario includes October-December.

Table 5: Evaluation Month Relationship with Analysis Season

Analysis Season	Calendar Year	Evaluation Month
Summer	Analysis Year	July (7)
Winter 1	Analysis Year	January (1)
Winter 2	Analysis Year + 1	January (1)

- **Vehicle Inspection & Maintenance Programs:** All future analysis years assume a Vehicle Inspection and Maintenance Program (I/M, named VEIP in Maryland) for Washington County. No I/M program is assumed for Berkeley County. The Maryland VEIP program has the following key elements which are also summarized in the MOBILE6.2 summary input file section:

    - An OBDII computer check for 1996 and newer model year gas vehicles up to 8,500 pounds.
    - An IM240 tail pipe test for 1984 to 1995 gas vehicles and 1996 and newer trucks 8,500 to 10,000 pounds.
    - An Idle test for 1977 to 1983 vehicles up to 10,000 pounds and all gas trucks 10,000 to 26,000 pounds.
    - A gas cap test (voluntary).
    - An anti-tampering program with 3 inspections for all pre-1996 vehicles and all trucks up to 26,000 lbs.

- **Regional Fuel Settings:** The nonattainment area does not include the use of federal reformulated gasoline (RFG). Federal fuel volatility by season was obtained from the current version of EPA's National Mobile Inventory Model (NMIM). Per FHWA resource center recommendations, the summer season utilized a RVP averaged for June, July, and August. Similarly, the two winter scenario RVP values were based on an average of December, January, and February. These values are illustrated in the MOBILE6.2 summary input file section.

- **Weather Data:** Hourly temperatures and relative humidity assumptions were compiled for Washington County based on information from the National Weather

Service's meteorological stations. Daily temperatures and absolute humidity assumptions were compiled for Berkeley County based on information from WVDEP.

- **Diesel Sulfur Content:** Base 2002 and future year diesel sulfur levels by county were determined from EPA's August, 2004 *Technical Guidance on the Use of MOBILE6 for Emissions Inventory Preparation*. The assumed values by analysis year are shown below.

Table 6: Diesel Sulfur Levels by Year

Year	Summer Diesel Sulfur Levels (ppm)		Winter Diesel Sulfur Levels (ppm)	
	Washington County	Berkeley County	Washington County	Berkeley County
2002-2005	315	312	302	322
2006-2009	43	43	43	43
>2009	11	11	11	11

- **Vehicle Age Distributions:** Vehicle age distributions are input to MOBILE6.2 for the region based on registered vehicles that reflect July 1 summer conditions. These distributions reflect the percentage of vehicles in the fleet up to 25 years old and are listed by the 16 MOBILE6.2 vehicle types. For Washington County, the age data used is consistent with previous SIP submissions and represents a 2005 download from the MVA registration database. These age distributions are used for all analysis years. For Berkeley County, MOBILE6.2 default age distributions were used for all analysis years.

- **Federal Programs:** The Low Emission Vehicle (NLEV), Tier 2/Low Sulfur Fuel, and 2004 Heavy Duty Engine (HDE) Rules have been included in all analysis runs for the nonattainment area. The NLEV program had a three-year phase-in starting with 1999 model years. The Tier 2 / Low Sulfur Fuel Programs took effect in 2004 and provide benefits for subsequent years.

- **Vehicle Mix Patterns:** Vehicle mix patterns were developed from a combination of sources. Washington County specific regional vehicle mix patterns, developed by facility type using the 2005 SHA TMS database, were used to split the link travel volumes into 4 categories: auto, truck, bus, and motorcycle. MOBILE6 defaults were then used to split the above 4 vehicle categories into the required 16 MOBILE6.2 vehicle classes. Defaults were used specific to the year being analyzed (2002, 2010, 2020, and 2030). Thus, each year reflects forecasted mix distributions within each category. Berkeley County utilized truck percentage data obtained from WVDOT. This data was used to create mix distributions that were forecasted to future years based on MOBILE6.2 defaults within each category.

- **Hourly Pattern Data:** Hourly distributions are used to divide daily volumes to each hour of the day. They are used by PPSUITE to calculate hourly speeds and are input directly to MOBILE6.2. Hourly patterns by functional class were developed from 2005 Maryland State Highway Administration (SHA) traffic data. The patterns are used for both Washington and Berkeley counties.

- **Speed Distribution Files:** Speeds do not have an impact on $PM_{2.5}$ emission factors; however, they do have a significant impact on NOx emission factors. The PPSUITE software prepares a MOBILE6.2 speed "bin" file that accounts for the speeds on individual roadway segments throughout each county. Speeds are input for each hour of the day.

2030 LRP Conformity Determination

Financial Constraint

The planning regulations, Sections 450.322(b)(11) and 450.324(e) require the transportation plan to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds are reasonably expected to be available are included. The HEPMPO in conjunction with WVDOT and MDOT, has developed an estimate of the cost to maintain and operate existing roads and bridges in the MPO area and has compared that with the estimated revenues and maintenance needs of the new roads.

Public Participation

The TIP/LRP conformity document has undergone the public participation requirements set forth in the Final Conformity Rule, and Final Statewide / Metropolitan Planning Rule. The draft document was made available for 30-days public review and comment beginning on DATE. The 30-day public review and comment period was announced using the following outlets:

- *The Herald-Mail* (Hagerstown and Washington County, MD)
- *The Journal* (Martinsburg and Berkeley County, WV)
- Washington County, MD Website: http://www.washco-md.net/
- Berkeley County, WV Website: http://www.berkeleycountycomm.org/

The documentation of the observed 30-day public comment period, comments and the responses to comments can be found in Appendix E.

Conformity Statement

The conformity rule requires the TIP/LRP to conform to the SIP and be adopted by the MPO before any federal agency may approve, accept, or fund projects. Conformity is determined by applying criteria outlined in the conformity rules to the analysis. Appendix A provides a matrix that provides responses to all of EPA's criteria.

The HEPMPO $PM_{2.5}$ nonattainment area has demonstrated conformity with the PM2.5 transportation conformity rule using the baseline (emissions less than 2002) interim emissions test. The region is working towards fully attaining the air quality standard. This finding reflects positively to carrying the vision of the MPO and its partners to meeting the regional goals for an effective transportation system.

References

Companion Guidance for the July 1, 2004, Final Transportation Conformity Rule, Conformity Implementation in Multi-Jurisdictional Nonattainment and Maintenance Areas for Existing and New Air Quality Standards; EPA420-B-04-012, July 2004.

Complete Transportation Conformity Regulations that Incorporate Recent July 1, 2004, Final Rule, Reference Document for State and Local Agencies; EPA420-B-04-013, July 2004.

Federal Register Notice of Final Rule: *Transportation Conformity Rule Amendments for the New 8-hour Ozone and $PM_{2.5}$ National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas; Transportation Conformity Rule Amendments: Response to Court Decision and Additional Rule Changes;* 40 CFR Part 93, Environmental Protection Agency, Federal Register, July 1, 2004.

Federal Register Notice of Final Rule: *Transportation Conformity Rule Amendments for the New $PM_{2.5}$ National Ambient Air Quality Standard: $PM_{2.5}$ Precursors;* 40 CFR Part 93, Environmental Protection Agency, Federal Register, May 6, 2005.

FHWA, 23 CFR PART 450 – Planning Assistance and Standards, Subpart C -- Metropolitan Transportation Planning and Programming; http://www.fhwa.dot.gov/hep/23cfr450.htm

Guidance for Creating Annual On-Road Mobile Source Emission Inventories for $PM_{2.5}$ Nonattainment Areas for Use in SIPs and Conformity; EPA420-B-05-008, August 2005.

Long-Range Multimodal Transportation Plan for the Hagerstown/Eastern Panhandle Metropolitan Area, Final Report; Prepared by Cambridge Systematics, Inc, March 2005.

Technical Guidance on the Use of MOBILE6.2 for Emissions Inventory Preparation; EPA420-R-04-013, August 2004.

US Environmental Protection Agency Fine Particle ($PM_{2.5}$) Designations, Basic Information; http://www.epa.gov/pmdesignations/basicinfo.htm.

Users Manual: *EPA's National Mobile Inventory Model (NMIM), A Consolidated Emissions Modeling System for MOBILE6 and NONROAD;* EPA420-R-05-024, December 2005.

Appendix A

Conformity Question Checklist

Table A-1: Conformity Questions Matrix

Section	Requirement	Y/N	Response
40 CFR 93.110	Is the conformity determination based on the latest planning assumptions?	Y	See below.
	(a) Is the conformity determination, with respect to all other applicable criteria in §§93.111 - 93.119, based upon the most recent planning assumptions in force at the time of the conformity determination?	Y	The conformity analysis uses HEPMPO's QRS II travel demand model for the region that is validated to 2000 conditions. In addition, 2002 model runs have been reconciled with reported 2002 HPMS VMT to ensure consistency. Other assumptions regarding vehicle mix, hourly patterns, monthly/seasonal factors, and vehicle fleet registration data are based on the latest available (2005) information from MDOT & WVDOT.
	(b) Are the assumptions derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO or other designated agency? Is the conformity determination based upon the latest assumptions about current and future background concentrations?	Y	Baseline developed from 2000 Census data by the MPO. Projections on population and employment for the region were made by Woods and Poole Economics, the West Virginia University Regional Research Institute, and the Maryland Department of Planning
	(c) Are any changes in the transit operating policies (including fares and service levels) and assumed transit ridership discussed in the determination?	Y	Future changes to transit service (as reflected in regionally significant transit projects) can be accounted for using off-model analysis techniques. However, there are no significant transit service projects contained on the Plan or TIP project lists.
	(d) The conformity determination must include reasonable assumptions about transit service and increases in transit fares and road and bridge tolls over time.	Y	Transit operating changes are reflected using off-model techniques (MAQONE).
	(e) The conformity determination must use the latest existing information regarding the effectiveness of the TCMs and other implementation plan measures which have already been implemented.	Y	The $PM_{2.5}$ SIP is due to EPA April 2008.
	(f) Key assumptions shall be specified and included in the draft documents and supporting materials used for the interagency and public consultation required by §93.105.	Y	Summary provided in Interagency Consultation Section with supporting documents in Appendices D & E.

Section	Requirement	Y/N	Response
40 CFR 93.111	Is the conformity determination based on the latest emissions model?	Y	MOBILE6.2 modeled emission factors were used in this conformity determination. This is the latest emissions model.
40 CFR 93.112	Did the MPO make the conformity determination according to the consultation procedures of the conformity rule or the state conformity SIP?	Y	Consultation procedures were followed in accordance with the Federal Transportation Conformity Rule. HEPMPO has consulted with all appropriate agencies including: MDOT, MDE, WVDOT, WVDEP, FHWA, EPA and FTA. This document was provided for public comment and review. The document was released for public review on DATE and the comment period closed on DATE.
40 CFR 93.106 (a)(1)	Are the horizon years correct?	Y	The horizon years chosen: 2010, 2020 and 2030 represent the appropriate horizon years needed for the $PM_{2.5}$ NAAQS conformity determinations.
93.106(a) (2)(i)	Does the plan quantify and document the demographic and employment factors influencing transportation demand?	Y	Summary provided in the Land Use Forecast Methodology section and Table 5.
93.106(a) (2)(ii)	Is the highway and transit system adequately described in terms of the regionally significant additions or modifications to the existing transportation network that the transportation plan envisions to be operational in the horizon years?	Y	Table 3 summarizes the regionally significant projects. There are currently no regionally significant transit projects in the TIP/LRP.
93.108	Is the Transportation Plan Fiscally Constrained?	Y	See Financial Constraint Section.
93.113(b)	Are TCM's being implemented in a timely manner?	N/A	A SIP will not be established for the $PM_{2.5}$ nonattainment area until 2008
40 CFR 93.118	Is the Transportation Plan consistent with the motor vehicle emissions budget in the applicable SIP?	Y	A SIP will not be established for the $PM_{2.5}$ nonattainment area until 2008. The conformity determination was performed using the interim test of emissions less than baseline year of 2002.

Appendix B

Conformity Results
Detailed VMT and Emissions
By County
By Functional Class
By Analysis Year

Table B-1: 2002 Baseline VMT and Emission Results

2002 Baseline					
County	**Functional Class**	**VMT (million)**	**Speed (mph)**	**PM2.5 (tons/yr)**	**NOX (tons/yr)**
Washington	*Interstate*	939.00	62.5	52.9	3,838.5
	Major Arterial	211.01	39.8	8.2	539.1
	Minor Arterial	302.99	38.7	13.5	774.3
	Collector	261.00	31.6	10.4	608.2
	Local	172.00	22.7	7.0	395.2
	Subtotal	***1,886.00***	***42.9***	***92.0***	***6,155.3***
Berkeley	*Interstate*	468.49	59.1	37.2	2,478.6
	Major Arterial	122.28	42.5	5.5	345.0
	Minor Arterial	63.79	43.1	2.8	164.1
	Collector	175.12	33.8	7.4	426.7
	Local	83.68	26.9	3.8	202.9
	Subtotal	***913.36***	***44.4***	***56.6***	***3,617.2***
	Non-Attainment Area Total	***2,799.36***	***-***	***148.6***	***9,772.5***

Table B-2: 2010 VMT and Emission Results

2010					
County	**Functional Class**	**VMT (million)**	**Speed (mph)**	**PM2.5 (tons/yr)**	**NOX (tons/yr)**
Washington	*Interstate*	1,054.63	62.1	44.4	2,980.1
	Major Arterial	242.68	38.9	5.2	265.2
	Minor Arterial	333.93	38.3	7.8	373.4
	Collector	293.46	31.0	6.7	309.8
	Local	198.63	22.2	4.9	236.4
	Subtotal	***2,123.32***	***42.2***	***68.9***	***4,164.9***
Berkeley	*Interstate*	537.02	59.1	19.9	1,311.3
	Major Arterial	142.71	42.1	3.4	189.0
	Minor Arterial	72.58	41.6	1.7	92.1
	Collector	211.28	33.2	4.8	253.8
	Local	103.10	26.8	2.4	130.8
	Subtotal	***1,066.68***	***43.7***	***32.2***	***1,977.0***
	Non-Attainment Area Total	***3,190.00***	***-***	***101.1***	***6,141.9***
			2002 Baseline	***148.6***	***9,772.5***
			Pass (Y/N)	**YES**	**YES**

Table B-3: 2020 VMT and Emission Results

2020					
County	**Functional Class**	**VMT (million)**	**Speed (mph)**	**PM2.5 (tons/yr)**	**NOX (tons/yr)**
Washington	Interstate	1,398.67	58.6	25.8	942.5
	Major Arterial	303.04	38.4	4.3	104.8
	Minor Arterial	408.83	37.6	6.0	140.9
	Collector	360.57	30.7	5.2	119.4
	Local	245.26	19.6	3.6	87.6
	Subtotal	***2,716.36***	***40.6***	***44.9***	***1,395.2***
Berkeley	Interstate	714.14	59.0	12.4	599.4
	Major Arterial	177.69	42.2	2.6	101.4
	Minor Arterial	89.75	41.2	1.3	50.4
	Collector	249.55	33.0	3.6	135.1
	Local	126.28	26.3	1.8	70.9
	Subtotal	***1,357.42***	***44.0***	***21.7***	***957.1***
	Non-Attainment Area Total	***4,073.78***	***-***	***66.6***	***2,352.3***
			2002 Baseline	***148.6***	***9,772.5***
			Pass (Y/N)	**YES**	**YES**

Table B-4: 2030 VMT and Emission Results

2030					
County	**Functional Class**	**VMT (million)**	**Speed (mph)**	**PM2.5 (tons/yr)**	**NOX (tons/yr)**
Washington	Interstate	1,485.52	57.9	23.7	505.9
	Major Arterial	317.48	38.1	4.3	68.2
	Minor Arterial	427.31	37.3	5.8	90.1
	Collector	382.95	30.4	5.2	78.2
	Local	259.51	19.2	3.6	54.3
	Subtotal	***2,872.77***	***40.1***	***42.6***	***796.8***
Berkeley	Interstate	748.97	58.8	11.3	370.2
	Major Arterial	182.62	41.9	2.5	75.4
	Minor Arterial	96.10	41.1	1.3	39.3
	Collector	262.14	32.9	3.5	104.6
	Local	133.58	26.2	1.8	53.7
	Subtotal	***1,423.41***	***43.8***	***20.3***	***643.1***
	Non-Attainment Area Total	***4,296.18***	***-***	***62.9***	***1,439.9***
			2002 Baseline	***148.6***	***9,772.5***
			Pass (Y/N)	**YES**	**YES**

Appendix C

MOBILE6.2 Input Files and Parameters For Washington County, MD Berkeley County, WV

ANNUAL PM2.5 MOBILE6.2 INPUT FILE SETTINGS (2-*Seasonal Approach*)
Washington and Berkeley Counties

Washington County, 2002

```
MOBILE6 INPUT FILE
REPORT FILE         :  m6output.out       REPLACE
DATABASE OUTPUT     :
WITH FIELDNAMES     :
EMISSIONS TABLE     :  M6OUTPUT_WASH.TB1  REPLACE
POLLUTANTS          :  HC NOX
PARTICULATES        : SO4 OCARBON ECARBON GASPM LEAD BRAKE TIRE SO2 NH3
AGGREGATED OUTPUT   :

RUN DATA            : 0001
94+ LDG IMP         : NLEVNE.D
EXPRESS HC AS VOC   :
EXPAND EXHAUST      :
EXPAND EVAPORATIVE  :
NO REFUELING        :
REG DISTRIBUTION    : Reg2002.Was (2002 ages – see Attachment 1)
ANTI-TAMP PROGRAM   : 89 77 83 22222 22222111 1 12  96. 12211112
MIN/MAX TEMPERATURE:  61.4  84.0 (Temp varies by season – see Attachment 3)
FUEL RVP            : 7.8 (RVP varies by season – see Attachment 3)
I/M DESC FILE       : im2002.d (see Attachment 2 for yearly settings)
```

(Scenarios are Repeated for Each Model Facility Type Grouping – Interstate, Major Arterial, Minor Arterial, Collector, and Local)

```
SCENARIO RECORD     :[01 0001]  1  7
CALENDAR YEAR       :2002 (Year being run – see Attachment 3 for seasonal variations)
EVALUATION MONTH    : 7  (see Attachment 3 for seasonal settings)
SEASON              : 1 (see Attachment 3 for seasonal settings)
ABSOLUTE HUMIDITY   :  72.7 (Humidity varies by season – see Attachment 3)
VMT FRACTIONS       :
0.464428 0.070562 0.234797 0.072400 0.033267 0.037313 0.003712 0.002933
0.002144 0.008203 0.009771 0.010651 0.038103 0.005018 0.002377 0.004321

PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
PARTICLE SIZE       : 2.5
DIESEL SULFUR       : 315.0 (see Attachment 3 for seasonal and yearly settings)
```

(Speed, hourly, and facility distributions prepared by PPSUITE post processor for each Run/Scenario)

```
VMT BY FACILITY     :V000101F.def
VMT BY HOUR         :V000101H.def
SPEED VMT           :V000101S.def
```

Washington County, 2010 and above

```
MOBILE6 INPUT FILE
REPORT FILE         :  m6output.out       REPLACE
DATABASE OUTPUT     :
WITH FIELDNAMES     :
EMISSIONS TABLE     :  M6OUTPUT_WASH.TB1  REPLACE
POLLUTANTS          :  HC CO NOX
PARTICULATES        : SO4 OCARBON ECARBON GASPM LEAD BRAKE TIRE SO2 NH3
AGGREGATED OUTPUT   :
RUN DATA            : 0001

94+ LDG IMP         : NLEVNE.D
EXPRESS HC AS VOC   :
EXPAND EXHAUST      :
EXPAND EVAPORATIVE  :
NO REFUELING        :
REBUILD EFFECTS     : 0.9
REG DISTRIBUTION    : Reg2005.Was (2005 ages – see Attachment 1)
ANTI-TAMP PROGRAM   : 89 77 83 22222 22222111 1 12  96. 12211112
DIESEL FRACTIONS    :
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0007 0.0007
0.0030 0.0019 0.0018 0.0012 0.0028 0.0007 0.0004 0.0000 0.0006 0.0019
0.0007 0.0008 0.0009 0.0056 0.0065
0.0158 0.0158 0.0158 0.0158 0.0158 0.0158 0.0074 0.0051 0.0072 0.0127
0.0157 0.0213 0.0120 0.0249 0.0180 0.0212 0.0113 0.0123 0.0234 0.0148
0.0265 0.0159 0.0279 0.0336 0.0437
0.0158 0.0158 0.0158 0.0158 0.0158 0.0158 0.0074 0.0051 0.0072 0.0127
0.0157 0.0213 0.0120 0.0249 0.0180 0.0212 0.0113 0.0123 0.0234 0.0148
0.0265 0.0159 0.0279 0.0336 0.0437
0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126
0.0126 0.0126 0.0126 0.0126 0.0126 0.0115 0.0111 0.0145 0.0115 0.0129
0.0096 0.0083 0.0072 0.0082 0.0124
0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126
0.0126 0.0126 0.0126 0.0126 0.0126 0.0115 0.0111 0.0145 0.0115 0.0129
0.0096 0.0083 0.0072 0.0082 0.0124
0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998
0.1998 0.1998 0.1998 0.1998 0.1998 0.2578 0.2515 0.3263 0.2784 0.2963
0.2384 0.2058 0.1756 0.1958 0.2726
0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774
0.6774 0.6774 0.6774 0.6774 0.6774 0.7715 0.7910 0.8105 0.8068 0.8280
0.8477 0.7940 0.7488 0.7789 0.7842
0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606
0.8606 0.8606 0.8606 0.8606 0.8606 0.8473 0.8048 0.8331 0.7901 0.7316
0.7275 0.7158 0.5647 0.3178 0.2207
0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647
0.4647 0.4647 0.4647 0.4647 0.4647 0.4384 0.3670 0.4125 0.3462 0.2771
0.2730 0.2616 0.1543 0.0615 0.0383
0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300
0.6300 0.6300 0.6300 0.6300 0.6300 0.6078 0.5246 0.5767 0.5289 0.5788
0.5617 0.4537 0.4216 0.4734 0.4705
0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563
0.8563 0.8563 0.8563 0.8563 0.8563 0.8443 0.7943 0.8266 0.7972 0.8279
0.8177 0.7440 0.7184 0.7588 0.7567
0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992
0.9992 0.9992 0.9992 0.9992 0.9992 0.9989 0.9987 0.9989 0.9977 0.9984
0.9982 0.9979 0.9969 0.9978 0.9980
```

```
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000
0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585
0.9585 0.9585 0.9585 0.9585 0.9585 0.8857 0.8525 0.8795 0.9900 0.9105
0.8760 0.7710 0.7502 0.7345 0.6733

HOURLY TEMPERATURES: 69.53  72.24  74.84  77.36  79.57  81.02  82.27
83.14  83.17  82.74  82.06  80.74  79.09  77.04  75.44  74.16  72.91
71.87  70.84  69.91  69.14  68.40  67.61  67.85  (Temp varies by season – see
Attachment 3)

FUEL RVP            : 8.3 (RVP varies by season – see Attachment 3)
I/M DESC FILE       : MD_IM10.D (see Attachment 2 for yearly settings)


(Scenarios are Repeated for Each Model Facility Type Grouping – Interstate, Major Arterial, Minor
Arterial, Collector, and Local)
SCENARIO RECORD     :[01 0001]  1  7
CALENDAR YEAR       :2010 (Year being run – see Attachment 3 for seasonal variations)
EVALUATION MONTH    : 7  (see Attachment 3 for seasonal settings)
SEASON              : 1  (see Attachment 3 for seasonal settings)
RELATIVE HUMIDITY   : 81.53  75.91  69.64  64.05  59.14  55.52  53.05
51.47  51.49  51.60  53.26  56.40  60.24  65.01  68.64  71.49  73.99
76.28  78.27  79.61  81.48  82.92  84.81  84.68  (Humidity varies by season – see
Attachment 3)
BAROMETRIC PRES     : 29.26
VMT FRACTIONS       :
0.289876 0.072862 0.242516 0.074719 0.034359 0.090227 0.008801 0.007402
0.005566 0.020123 0.023825 0.025908 0.092310 0.004578 0.002289 0.004639

(Speed, hourly, and facility distributions prepared by PPSUITE post processor for each Run/Scenario)
VMT BY FACILITY     :V000101F.def
VMT BY HOUR         :V000101H.def
SPEED VMT           :V000101S.def

PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV
PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE       : 2.5
DIESEL SULFUR       : 11.0 (see Attachment 3 for seasonal and yearly settings)
END OF RUN          :
```

Berkeley County, 2002

```
MOBILE6 INPUT FILE
REPORT FILE        :  m6output.out       REPLACE
DATABASE OUTPUT    :
WITH FIELDNAMES    :
EMISSIONS TABLE    :  M6OUTPUT_BERK.TB1  REPLACE
POLLUTANTS         :  HC NOX
PARTICULATES       : SO4 OCARBON ECARBON GASPM LEAD BRAKE TIRE SO2 NH3
AGGREGATED OUTPUT  :

RUN DATA           : 0002
94+ LDG IMP        : NLEVNE.D
EXPRESS HC AS VOC  :
EXPAND EXHAUST     :
EXPAND EVAPORATIVE :
NO REFUELING       :
MIN/MAX TEMPERATURE:  61.0  85.0 (Temp varies by season – see Attachment 3)
FUEL RVP           : 8.7 (RVP varies by season – see Attachment 3)
```

(Scenarios are Repeated for Each Model Facility Type Grouping – Interstate, Major Arterial, Minor Arterial, Collector, and Local)

```
SCENARIO RECORD    :[01 0002]  1  7
CALENDAR YEAR      :2002 (Year being run – see Attachment 3 for seasonal variations)
EVALUATION MONTH   : 7  (see Attachment 3 for seasonal settings)
SEASON             : 1 (see Attachment 3 for seasonal settings)
ABSOLUTE HUMIDITY  :  73.0 (Humidity varies by season – see Attachment 3)
VMT FRACTIONS      :
0.426216 0.064756 0.215478 0.066443 0.030530 0.060770 0.006046 0.004778
0.003492 0.013359 0.015914 0.017347 0.062056 0.004799 0.002273 0.005743

PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
PARTICLE SIZE      : 2.5
DIESEL SULFUR      : 312.0 (see Attachment 3 for seasonal and yearly settings)
```

(Speed, hourly, and facility distributions prepared by PPSUITE post processor for each Run/Scenario)

```
VMT BY FACILITY    :V000201F.def
VMT BY HOUR        :V000201H.def
SPEED VMT          :V000201S.def
```

Berkeley County, 2010 and above

```
MOBILE6 INPUT FILE

REPORT FILE         :  m6output.out       REPLACE
DATABASE OUTPUT     :
WITH FIELDNAMES     :
EMISSIONS TABLE     :  M6OUTPUT_BERK.TB1  REPLACE
POLLUTANTS          :  HC NOX
PARTICULATES        : SO4 OCARBON ECARBON GASPM LEAD BRAKE TIRE SO2 NH3
AGGREGATED OUTPUT   :
RUN DATA            : 0002

94+ LDG IMP         : NLEVNE.D
EXPRESS HC AS VOC   :
EXPAND EXHAUST      :
EXPAND EVAPORATIVE  :
NO REFUELING        :
FUEL RVP            : 9.0 (RVP varies by season – see Attachment 3)
MIN/MAX TEMPERATURE: 61.0 85.0 (Temp varies by season – see Attachment 3)
ABSOLUTE HUMIDITY   : 73.0 (Humidity varies by season – see Attachment 3)
```

(Scenarios are Repeated for Each Model Facility Type Grouping – Interstate, Major Arterial, Minor Arterial, Collector, and Local)

```
SCENARIO RECORD     :[01 0002]  1  7
CALENDAR YEAR       :2010 (Year being run – see Attachment 3 for seasonal variations)
EVALUATION MONTH    : 7  (see Attachment 3 for seasonal settings)
SEASON              : 1  (see Attachment 3 for seasonal settings)
VMT FRACTIONS       :
0.326540 0.082077 0.273190 0.084170 0.038705 0.060043 0.005857 0.004926
0.003704 0.013391 0.015855 0.017241 0.061430 0.004659 0.002330 0.005882
```

(Speed, hourly, and facility distributions prepared by PPSUITE post processor for each Run/Scenario)

```
VMT BY FACILITY     :V000201F.def
VMT BY HOUR         :V000201H.def
SPEED VMT           :V000201S.def

PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV
PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE       : 2.5
DIESEL SULFUR       : 11.0 (see Attachment 3 for seasonal and yearly settings)
END OF RUN          :
```

ATTACHMENT 1:
Vehicle Age Distributions Input to MOBILE6

Washington County 2002

```
1  0.0405 0.0618 0.0685 0.0655 0.0646 0.0664 0.0623 0.0692 0.0601 0.0556
   0.0477 0.0470 0.0411 0.0402 0.0373 0.0280 0.0230 0.0165 0.0114 0.0065
   0.0045 0.0033 0.0033 0.0038 0.0719
2  0.0616 0.0757 0.0903 0.0889 0.0897 0.0782 0.0732 0.0825 0.0647 0.0503
   0.0386 0.0333 0.0320 0.0324 0.0263 0.0212 0.0155 0.0122 0.0099 0.0047
   0.0027 0.0016 0.0015 0.0034 0.0096
3  0.0616 0.0757 0.0903 0.0889 0.0897 0.0782 0.0732 0.0825 0.0647 0.0503
   0.0386 0.0333 0.0320 0.0324 0.0263 0.0212 0.0155 0.0122 0.0099 0.0047
   0.0027 0.0016 0.0015 0.0034 0.0096
4  0.0413 0.0579 0.0692 0.0587 0.0609 0.0622 0.0507 0.0577 0.0627 0.0434
   0.0375 0.0373 0.0402 0.0485 0.0489 0.0416 0.0400 0.0267 0.0223 0.0126
   0.0090 0.0064 0.0062 0.0131 0.0449
5  0.0413 0.0579 0.0692 0.0587 0.0609 0.0622 0.0507 0.0577 0.0627 0.0434
   0.0375 0.0373 0.0402 0.0485 0.0489 0.0416 0.0400 0.0267 0.0223 0.0126
   0.0090 0.0064 0.0062 0.0131 0.0449
6  0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
7  0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
8  0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
9  0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
10 0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
11 0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
12 0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
13 0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
14 0.0365 0.0631 0.0810 0.0949 0.0583 0.0605 0.0566 0.0633 0.0410 0.0335
   0.0259 0.0283 0.0376 0.0424 0.0383 0.0305 0.0349 0.0235 0.0213 0.0108
   0.0088 0.0087 0.0120 0.0144 0.0739
15 0.0250 0.0627 0.0908 0.1280 0.0844 0.0733 0.0786 0.0669 0.0451 0.0398
   0.0244 0.0255 0.0335 0.0324 0.0324 0.0303 0.0308 0.0228 0.0181 0.0064
   0.0080 0.0085 0.0074 0.0090 0.0159
16 0.0692 0.0893 0.0655 0.0560 0.0520 0.0424 0.0373 0.0282 0.0289 0.0241
   0.0194 0.4877 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
   0.0000 0.0000 0.0000 0.0000 0.0000
```

Washington County 2005

```
1  0.0452 0.0616 0.0676 0.0704 0.0718 0.0739 0.0650 0.0590 0.0580 0.0500
   0.0527 0.0437 0.0392 0.0311 0.0280 0.0233 0.0211 0.0182 0.0124 0.0106
   0.0077 0.0053 0.0028 0.0019 0.0793
2  0.0635 0.0971 0.0914 0.0947 0.0790 0.0889 0.0772 0.0658 0.0560 0.0495
   0.0522 0.0410 0.0290 0.0214 0.0169 0.0162 0.0157 0.0115 0.0096 0.0065
   0.0049 0.0037 0.0020 0.0012 0.0051
3  0.0635 0.0971 0.0914 0.0947 0.0790 0.0889 0.0772 0.0658 0.0560 0.0495
   0.0522 0.0410 0.0290 0.0214 0.0169 0.0162 0.0157 0.0115 0.0096 0.0065
   0.0049 0.0037 0.0020 0.0012 0.0051
4  0.0384 0.0694 0.0669 0.0670 0.0645 0.0708 0.0580 0.0575 0.0575 0.0442
   0.0487 0.0518 0.0359 0.0293 0.0275 0.0303 0.0333 0.0321 0.0249 0.0234
   0.0159 0.0116 0.0072 0.0048 0.0290
5  0.0384 0.0694 0.0669 0.0670 0.0645 0.0708 0.0580 0.0575 0.0575 0.0442
   0.0487 0.0518 0.0359 0.0293 0.0275 0.0303 0.0333 0.0321 0.0249 0.0234
   0.0159 0.0116 0.0072 0.0048 0.0290
6  0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
7  0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
8  0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
9  0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
10 0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
11 0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
12 0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
13 0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
14 0.0716 0.0936 0.0757 0.0603 0.0645 0.0843 0.0744 0.0390 0.0567 0.0442
   0.0445 0.0313 0.0230 0.0157 0.0193 0.0231 0.0282 0.0278 0.0192 0.0206
   0.0136 0.0097 0.0060 0.0058 0.0477
15 0.0557 0.0746 0.0688 0.0465 0.0688 0.1095 0.0901 0.0426 0.0673 0.0581
   0.0441 0.0339 0.0271 0.0155 0.0208 0.0228 0.0257 0.0276 0.0203 0.0189
   0.0145 0.0097 0.0044 0.0063 0.0262
16 0.1018 0.1072 0.1023 0.0768 0.0600 0.0472 0.0413 0.0373 0.0272 0.0252
   0.0225 0.3511 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
   0.0000 0.0000 0.0000 0.0000 0.0000
```

ATTACHMENT 2:
Inspection/Maintenance Program Input to Mobile6

(I/M for Analysis Years 2002)

```
*IM240
I/M PROGRAM        : 3 1984 2050 2 T/O IM240
I/M MODEL YEARS    : 3 1984 2050
I/M VEHICLES       : 3 22222 21111111 1
I/M STRINGENCY     : 3 20.0
I/M COMPLIANCE     : 3 96.0
I/M WAIVER RATES   : 3 11.0 15.0
I/M CUTPOINTS      : 3 Phasein.C2N
I/M GRACE PERIOD   : 3 2
*Idle HDGT2
I/M PROGRAM        : 2 1984 2050 2 T/O Idle
I/M MODEL YEARS    : 2 1977 2050
I/M VEHICLES       : 2 11111 12222111 1
I/M STRINGENCY     : 2 20.0
I/M COMPLIANCE     : 2 96.0
I/M WAIVER RATES   : 2 11.0 15.0
I/M GRACE PERIOD   : 2 2
*Idle older LDGV, LDGT, HDGT1
I/M PROGRAM        : 1 1984 2050 2 T/O Idle
I/M MODEL YEARS    : 1 1977 1983
I/M VEHICLES       : 1 22222 21111111 1
I/M STRINGENCY     : 1 20.0
I/M COMPLIANCE     : 1 96.0
I/M WAIVER RATES   : 1 11.0 15.0
I/M GRACE PERIOD   : 1 2
```

(I/M for Analysis Years 2010, 2020, 2030)

```
*Idle older LDGV, LDGT
I/M PROGRAM        : 1 1984 2050 2 T/O Idle
I/M MODEL YEARS    : 1 1977 1983
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 20.0
I/M COMPLIANCE     : 1 96.0
I/M WAIVER RATES   : 1 13.8 13.8
I/M GRACE PERIOD   : 1 2

*Idle HDGT
I/M PROGRAM        : 2 1984 2050 2 T/O Idle
I/M MODEL YEARS    : 2 1977 2050
I/M VEHICLES       : 2 11111 22222111 1
I/M STRINGENCY     : 2 20.0
I/M COMPLIANCE     : 2 96.0
I/M WAIVER RATES   : 2 13.8 13.8
I/M GRACE PERIOD   : 2 2

*IM240
I/M PROGRAM        : 3 1984 2050 2 T/O IM240
I/M MODEL YEARS    : 3 1984 1995
I/M VEHICLES       : 3 22222 11111111 1
I/M STRINGENCY     : 3 20.0
I/M COMPLIANCE     : 3 96.0
I/M WAIVER RATES   : 3 13.8 13.8
```

```
I/M CUTPOINTS      : 3 Mod75V2.C10
I/M GRACE PERIOD   : 3 2

*OBD
I/M PROGRAM        : 4 1984 2050 2 T/O OBD I/M
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 11111111 1
I/M STRINGENCY     : 4 20.0
I/M COMPLIANCE     : 4 96.0
I/M WAIVER RATES   : 4  5.4  5.4
I/M GRACE PERIOD   : 4 2

*OBD Evap (Actual Start Year: July 2002)
I/M PROGRAM        : 5 2002 2050 2 T/O EVAP OBD
I/M MODEL YEARS    : 5 1996 2050
I/M VEHICLES       : 5 22222 11111111 1
I/M COMPLIANCE     : 5 96.0
I/M WAIVER RATES   : 5  5.4  5.4
I/M GRACE PERIOD   : 5 2
```

ATTACHMENT 3:
Washington County Mobile6 Input Settings

Selecting Mobile6 Inputs for Annual Inventory Calculations							
Month	**Evaluation Month**	**Season (RFG Areas Only)**	**Calendar Year**	**Min/Max Temp or Hourly Temp**	**Absolute/ Relative Humidity**	**RVP**	**Diesel Sulfur**
Summer (Apr, May, Jun, Jul, Aug, Sep)	7	1	Current Year	2002: 61.4/84.0 2010 and above: 69.53 72.24 74.84 77.36 79.57 81.02 82.27 83.14 83.17 82.74 82.06 80.74 79.09 77.04 75.44 74.16 72.91 71.87 70.84 69.91 69.14 68.40 67.61 67.85	2002: 72.7 2010 and above: 81.53 75.91 69.64 64.05 59.14 55.52 53.05 51.47 51.49 51.60 53.26 56.40 60.24 65.01 68.64 71.49 73.99 76.28 78.27 79.61 81.48 82.92 84.81 84.68	2002 – 7.8 >2009 –8.3	2002 – 315 >2009 – 11
Winter1 (Jan, Feb, Mar)	1	2	Current Year	2002: 23.6/41.4 2010 and above: 28.55 28.84 29.97 31.91 33.64 34.85 35.97 37.08 37.50 37.23 36.10 34.90 33.87 33.20 32.67 31.95 31.54 31.31 30.73 30.34 30.10 29.37 29.18 29.00	2002: 31.1 2010 and above: 73.11 72.56 71.77 67.59 64.05 61.09 58.47 56.45 55.67 56.30 57.91 59.85 62.85 64.37 65.80 67.91 69.13 69.35 70.50 70.63 71.07 72.21 72.18 71.81	2002 –13.4 >2009 – 12.4	2002 – 302 >2009 – 11
Winter2 (Oct, Nov, Dec)	1	2	Current Year + 1	2002: 23.6/41.4 2010 and above: 28.55 28.84 29.97 31.91 33.64 34.85 35.97 37.08 37.50 37.23 36.10 34.90 33.87 33.20 32.67 31.95 31.54 31.31 30.73 30.34 30.10 29.37 29.18 29.00	2002: 31.1 2010 and above: 73.11 72.56 71.77 67.59 64.05 61.09 58.47 56.45 55.67 56.30 57.91 59.85 62.85 64.37 65.80 67.91 69.13 69.35 70.50 70.63 71.07 72.21 72.18 71.81	2002 –13.4 >2009 – 12.4	2002 – 302 >2009 – 11

Berkeley County Mobile6 Input Settings

Selecting Mobile6 Inputs for Annual Inventory Calculations							
Month	**Evaluation Month**	**Season (RFG Areas Only)**	**Calendar Year**	**Min/Max Temp**	**Humidity**	**RVP**	**Diesel Sulfur**
Summer (Apr, May, Jun, Jul, Aug, Sep)	7	1	Current Year	61.0/85.0	73.0	2002 – 8.7 >2009 – 9.0	2002 – 312 >2009 – 11
Winter1 (Jan, Feb, Mar)	1	2	Current Year	23.6/42.9	31.8	14.0	2002 – 322 >2009 – 11
Winter2 (Oct, Nov, Dec)	1	2	Current Year + 1	23.6/42.9	31.8	14.0	2002 – 322 >2009 – 11

Appendix D

HEPMPO Council Resolution

Appendix E

Public Participation Materials