

## **National Capital Region Transportation Planning Board**

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### **Memorandum**

**October 7, 2005**

To: TPB Technical Committee

From: Mike Clifford

Subject: Status of 2005 CLRP / FY2006 TIP Conformity Assessment with Respect to Fine Particles (PM<sub>2.5</sub>)

### **Background**

At last month's Technical Committee meeting staff reported that we were trying to finalize environmental inputs to the Mobile model, and that a meeting / conference call was scheduled for that afternoon with MWAQC's Emissions Inventory Working Group (EIWG) to consider these inputs, e.g., temperature, humidity, Reid vapor pressure (RVP), sulfur content for gas and diesel. The meeting was held that afternoon and we thought we came to closure on all inputs; it was left that COG / DEP staff would send out a summary of the inputs (as documented for the region in EPA's 2002 National Emissions Inventory) for a final review by the air agencies and then, after signoff, TPB staff would proceed with those inputs for conformity.

### **Development of Model Inputs and Overall Approach**

Recall that PM<sub>2.5</sub> emissions are to be inventoried on a yearly total basis, not a daily basis, and that one of the key elements in EPA's August 2005 guidance addressed the level of aggregation or disaggregation of each of the independent variables in the analysis. For example, on the traffic side we planned to convert daily travel demands to annual totals by use of seasonal adjustment factors. The air agencies indicated that emissions factors should be developed for each month, not each season. Further, at least for the SIP, the air agencies planned to go with hourly temperatures, humidity, and barometric pressure, rather than the historical approach of minimum / maximum daily temperature settings, which use a Mobile6 internally-provided set of humidity and barometric pressure values. EPA guidance suggested checking each variable for its sensitivity in affecting overall emissions and then designing an approach accordingly.

These additional hourly and monthly inputs seemed like more detail than was needed for conformity, however, since we were about to configure the Mobile model runs and subsequent post-processor emissions calculation procedures, we thought it would be better to set up such analysis procedures once: for use now in conformity and for subsequent use in the SIP.

In providing a status report to the TPB at its September meeting, we still had not received final environmental inputs to the Mobile model. Review and signoff were not as straightforward as initially believed, but we still thought this single 'conformity / SIP approach' could be managed. Finally, a week later on September 28<sup>th</sup> we learned there were still inconsistencies with the data and that final inputs were not in sight.

Since it is explicitly authorized in EPA's guidance, we decided to pursue use of a 'basic approach' for the PM2.5 assessment for conformity purposes (which is actually consistent with the methods used historically for conformity and the SIP), and we requested minimum / maximum temperatures from DEP staff. (More detailed inputs can still be developed by the air agencies and used in the PM2.5 SIP, as that schedule is not as immediate as the April 2006 conformity lapse date.) Regarding other environmental inputs under discussion as part of this basic approach, these monthly minimum / maximum temperature values would be applied in conjunction with: model default values for humidity / barometric pressure; previously specified values for RVP; diesel sulfur content as per recent Region 3 EPA guidance; and Mobile6 defaults for gasoline sulfur content, as summarized in the attached tables.

### **Modeling Experience to Date**

Following the receipt of the minimum / maximum temperatures, TPB staff applied the data in Mobile6 to develop 'production' emissions factors for direct PM2.5 and for NOx (as a PM2.5 precursor) for each month of the year. Preliminary observations include the following.

1. The programmed procedures successfully developed the emissions rates (executed for year 2010),
2. Machine time for execution of the Mobile6 computations, on a fairly high performance computer, approached 30 hours,
3. Very little differences were seen in emissions rates by month within a season.

Accordingly, we are researching whether monthly rates are worth the additional level of effort; to this end we are preparing some sensitivity runs to compare impacts on emissions of seasonal versus monthly procedures. There is another meeting / conference call of MWAQC's EIWG set for next Thursday to discuss these issues.

### **Next Steps**

In the coming week we hope to finalize the technical approach (either seasonal or monthly) and develop inputs and associated computer programming. We will then proceed with our production runs for emissions factors and prepare mobile source emissions inventories for all years. Our schedule is to prepare draft results for the project for the November Technical Committee meeting and a draft report on the overall PM2.5 conformity assessment for the November TPB meeting.

**Table 1**  
**Particulate Matter Input for Mobile 6 (2002)**

Month	Temperature		RVP			Humidity	Sulfur					
	Min	Max	D.C	MD	VA		Gasoline			Diesel		
							D.C	MD	VA	DC	MD	VA
January	25.3	41.0	13.1	13.4	14.2	Default	Default	Default	Default	324	302	330
February	27.3	45.5	10.4	11.0	12.1	Default	Default	Default	Default	324	302	330
March	36.0	57.1	10.4	11.0	12.1	Default	Default	Default	Default	326	308	344
April	45.6	66.9	6.8	7.8	9.4	Default	Default	Default	Default	326	308	344
May	55.6	74.4	6.8	7.8	9.4	Default	Default	Default	Default	326	308	344
June	63.0	81.5	6.8	7.8	9.4	Default	Default	Default	Default	329	315	357
July	68.8	86.4	6.8	7.8	9.4	Default	Default	Default	Default	329	315	357
August	68.3	86.3	6.8	7.8	9.4	Default	Default	Default	Default	329	315	357
September	60.9	79.1	6.8	7.8	9.4	Default	Default	Default	Default	326	308	344
October	47.6	65.3	6.8	7.8	9.4	Default	Default	Default	Default	326	308	344
November	39.9	58.0	10.4	11.0	12.1	Default	Default	Default	Default	326	308	344
December	28.9	45.7	13.1	13.4	14.2	Default	Default	Default	Default	324	302	330

RVP data based on Sunil Kumar's Email dated 10/4/05

**Table 2****Particulate Matter Input for Mobile 6 (2010 and beyond)**

							Sulfur					
Month	Temperature		RVP			Humidity	Gasoline			Diesel		
	Min	Max	D.C	MD	VA		D.C	MD	VA	DC	MD	VA
January	25.3	41.0	13.1	13.4	14.2	Default	Default	Default	Default	43	43	43
February	27.3	45.5	10.4	11.0	12.1	Default	Default	Default	Default	43	43	43
March	36.0	57.1	10.4	11.0	12.1	Default	Default	Default	Default	43	43	43
April	45.6	66.9	6.8	7.8	9.4	Default	Default	Default	Default	43	43	43
May	55.6	74.4	6.8	7.8	9.4	Default	Default	Default	Default	43	43	43
June	63.0	81.5	6.8	7.8	9.4	Default	Default	Default	Default	11	11	11
July	68.8	86.4	6.8	7.8	9.4	Default	Default	Default	Default	11	11	11
August	68.3	86.3	6.8	7.8	9.4	Default	Default	Default	Default	11	11	11
September	60.9	79.1	6.8	7.8	9.4	Default	Default	Default	Default	11	11	11
October	47.6	65.3	6.8	7.8	9.4	Default	Default	Default	Default	11	11	11
November	39.9	58.0	10.4	11.0	12.1	Default	Default	Default	Default	11	11	11
December	28.9	45.7	13.1	13.4	14.2	Default	Default	Default	Default	11	11	11

RVP data based on Sunil Kumar's Email dated 10/4/05