

APPENDIX F

Vehicle-related Emissions Calculations

Memo

To: Air Quality Files

From: Erin Morrow

Date: December 13, 2007

Re: Vehicle Related Emissions: Diurnal and Resting Loss - 2007 CLRP & FY2008-FY2013 TIP

This memo illustrates the calculation of Diurnal and Resting Loss emissions associated with the 2007 CLRP & FY2008-2013 TIP. A detailed description of work regarding emissions factor updates using Mobile6 is contained in a report by Maureen Mullen of E.H. Pechan & Associates, dated January 27, 2003. Adopting the approach developed by E.H. Pechan & Associates emissions rates were developed using version 6.2 of mobile model.

There were no updates to either the vehicle forecast component or the procedure used to calculate these emissions. Vehicle ownership forecasts reflect trends through time for each jurisdiction; using the 2005 vehicle registration data, the slope of the forecast trend line in each jurisdiction was maintained but revised to 'intercept' 2005 conditions. This approach is illustrated on the attached graph for Prince George's County. Table 1 shows summary of vehicle registration forecasts. Also included is a copy of a spreadsheet displaying the calculation of diurnals and resting loss emissions for year 2010 (Table 2). Diurnal and Resting Loss emissions for other milestone years 2002, 2008, 2009, 2020, and 2030 are available in the Air Quality Conformity files.

The calculation of these emissions is an off-line process utilizing a spreadsheet format with a very basic calculation:

Number of vehicles by jurisdiction X jurisdiction emissions factor = Emissions

Attachments (3)

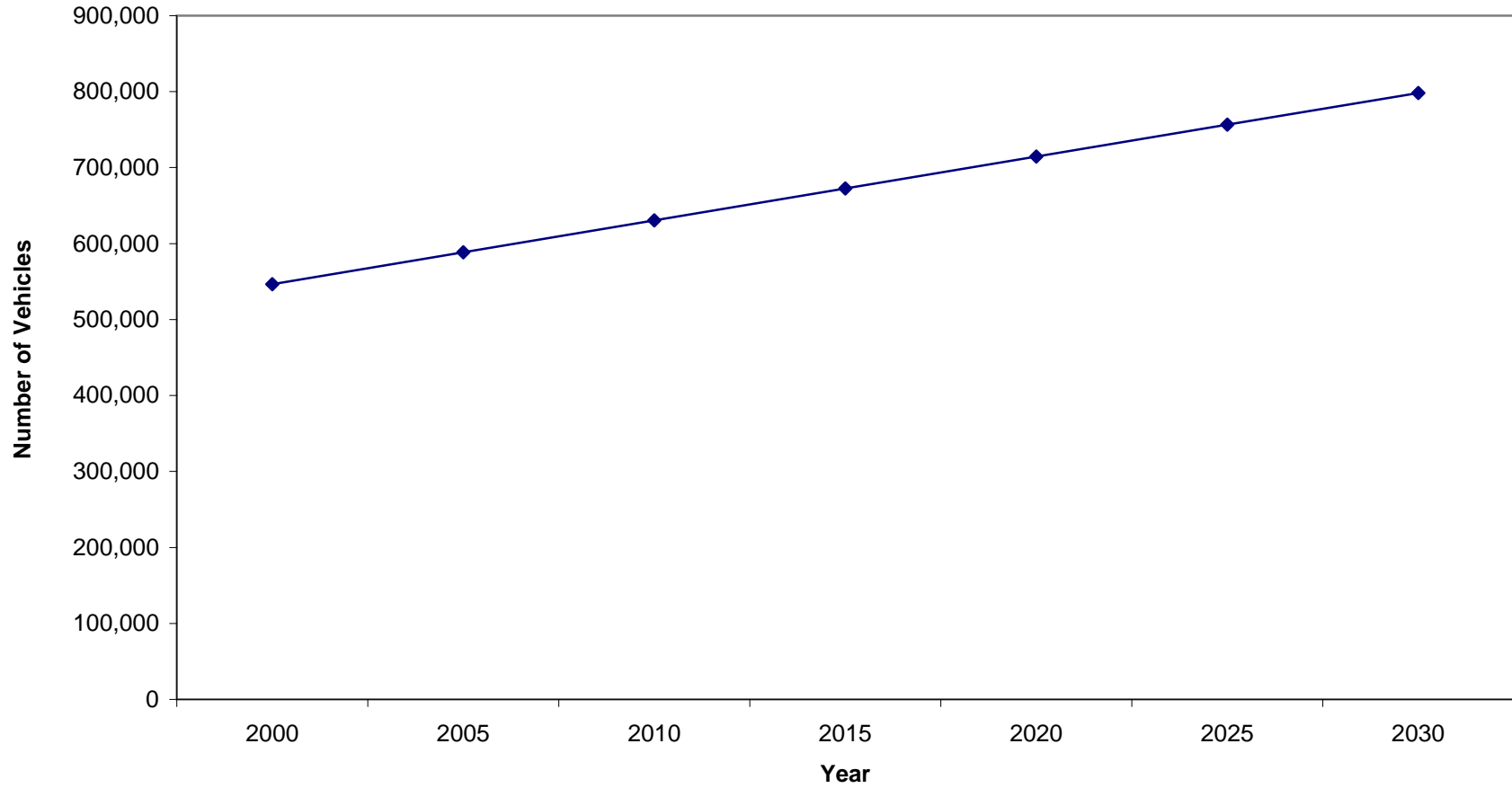
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TABLE 1
VEHICLE REGISTRATION FORECASTS BY JURISDICTION (USING OLD GROWTH RATES & 2005 VIN)
REGISTRATION ADJUSTED TO YEAR 2005

Jurisdiction	2002	2005	2008	2009	2010	2020	2030
District of Columbia	254,645	258,089	261,533	262,681	263,829	275,309	286,788
Calvert	73,179	82,957	92,735	95,994	99,254	131,847	164,441
Charles	114,048	124,127	134,206	137,565	140,925	174,520	208,116
Frederick	190,883	207,247	223,611	229,065	234,520	289,065	343,611
Montgomery	638,573	681,537	724,501	738,822	753,144	896,357	1,039,571
Prince George's	560,595	588,643	616,691	626,040	635,390	728,883	822,376
Alexandria	130,371	132,130	133,889	134,476	135,062	140,927	146,792
Arlington	126,600	128,304	130,008	130,576	131,144	136,823	142,502
Fairfax	745,721	787,210	828,699	842,529	856,359	994,656	1,132,953
Loudoun	184,988	203,133	221,278	227,326	233,375	293,858	354,341
Prince William	299,706	323,356	347,006	354,889	362,773	441,606	520,440
Stafford	82,415	91,656	100,897	103,978	107,058	137,863	168,668
Total	3,401,724	3,608,389	3,815,054	3,883,942	3,952,831	4,641,714	5,330,598

The above forecasts are based on 2005 vehicle registration data decoded from raw VIN numbers provided by District of Columbia DMV, Maryland MVA, and Virginia DMV. 2002 registration data were adjusted based on the 2005 numbers.

Vehicle Registration for Prince George's County by Year



MVA 2005 Vehicle Registration data

Table 2
 DIURNAL AND RESTING LOSS EMISSIONS
 VOC
 YEAR 2010

JURISDICTION	TOTAL VEHICLES	FACTORS		EMISSIONS	
		DIURNAL (gm/day/veh)	RESTGL (gm/hr/veh)	DIURNAL (Tons/day)	RESTGL (Tons/day)
District of Columbia	263,829	0.423	2.101	0.121	0.599
Montgomery	753,144	0.384	1.813	0.312	1.475
Prince Georges	635,390	0.465	2.327	0.319	1.597
Frederick	234,520	0.344	1.695	0.087	0.429
Charles	140,925	0.476	2.449	0.072	0.373
Calvert	99,254	0.487	2.500	0.052	0.268
Arlington	131,144	0.378	1.944	0.054	0.275
Alexandria	135,062	0.328	1.636	0.048	0.239
Fairfax	856,359	0.347	1.793	0.321	1.659
Loudoun	233,375	0.336	1.688	0.085	0.426
Prince William	362,773	0.400	2.037	0.157	0.798
Stafford	107,058	0.455	2.435	0.053	0.282
MSA - SUBTOTAL MODELED AREA	3,952,833			1.680	8.420
TOTAL	3,952,833			1.680	8.420

Note: 98% of vehicles, which are gas operated, are used to compute Diurnal and Resting Loss emissions
 Based on 2005 vehicle registration