APPENDIX T

November 30, 2000 Updates to the ROP and Attainment Demonstration SIP for the HGA Ozone Nonattainment Area: On-road Mobile Source Inventories

Houston/Galveston Attainment Demonstration and
Post-1999 Rate-of-Progress SIP

December 2000

This appendix documents the procedures used for the November 30, 2000 updates to the on-road mobile source inventories and control strategy reductions for the HGA Ozone Nonattainment Area. Comments on the 1999 HGA SIP submittal included a request by EPA to include milestone analysis for ROP. Developing the inventories in support of ROP and attainment demonstration provided an opportunity to update the inventories using the latest available transportation information and control strategy designs.

The development of the updated ROP inventories was done by HGAC at the request and under the direction of TNRCC. Updates to the on-road mobile source emission inventories and reduction estimates reflect changes made to HGA transportation network and changes to the emission factor development based upon updated control program design. The inventory development includes both VOC and NO_x emissions and the impact of the control strategies. The methodologies used to calculate emissions estimates, the final inventory numbers and the changes made to the inputs since the previous SIP submittal are documented in Attachment 3, the report produced by HGAC, Supplemental Rate-of-Progress State Implementation Plan, On-road Mobile Source Emissions Inventories: 2002, 2005, and 2007 Current Control and 2002, 2005, and 2007 Control Strategy for the HGA Ozone Nonattainment Area. The final emission estimates are summarized in Tables 1, 2 and 3. The modeling input and output files and the post processing spreadsheets used to develop the inventories are available upon request in electronic format, but are not included in this appendix. Please contact the TNRCC Technical Analysis Division if a copy of the electronic information is needed.

Control strategy emission reduction estimates include effects of the federal Tier 1 exhaust emissions standards, the Houston vehicle inspection and maintenance program, reformulated gasoline phase 1 and phase 2, federal Tier 2 exhaust emissions standards and new heavy duty diesel emission certification standards for 2004. The HGAC estimates did not include the emission reduction effect for RFG Phase 2 on NO_x or on VOC for the Houston urban county group. The impact of these effects were calculated after the HGAC report had been finalized. The method used to estimate the effects of RFG Phase 2 is outlined in MOBILE5 Information sheet #7.

The MOBILE modeling inputs require coordination of MOBILE modelers, photo-chemical modelers, policy developers and policy implementors. I n order to assure concurrence of the major stakeholders to the inputs used in the development of the ROP inventories, a modeling information sheet, Attachment 1, and a concurrence sign-off sheet, Attachment 2, were provided to HGAC by TNRCC.

Table 1

2002 ROP Mobile Source Emission Inventories Houston-Galveston Ozone Nonattainment Area November 30, 2000						
County	VOC tons per ozone season day			NOx tons per ozone season day		
	Control Strategy	Current Control	Adjusted Base Year	Control Strategy	Current Control	Adjusted Base Year
Harris	66.73	133.38	102.26	172.72	244.22	165.91
Brazoria	5.01	7.03	6.45	12.75	14.93	14.08
Fort Bend	7.80	10.93	6.55	18.71	21.9	11.82
Waller	1.56	2.15	1.39	4.76	5.29	3.65
Montgomery	8.78	12.27	7.35	24.46	28.57	18.23
Liberty	2.30	3.18	2.36	6.61	7.37	5.64
Chambers	2.83	3.90	2.24	8.93	9.92	6.41
Galveston	5.06	7.1	5.42	11.89	13.92	9.04
Total	100.06	179.95	134.02	260.83	346.14	234.80

Source: Houston-Galveston Area Council, November 2000

Table 2

2005 ROP Mobile Source Emission Inventories Houston-Galveston Ozone Nonattainment Area November 30, 2000						
County	VOC tons per ozone season day			NOx tons per ozone season day		
	Control Strategy	Current Control	Adjusted Base Year	Control Strategy	Current Control	Adjusted Base Year
Harris	50.13	119.38	101.20	126.86	222.50	163.67
Brazoria	2.64	6.40	6.36	8.01	13.55	13.61
Fort Bend	4.32	10.40	6.53	12.70	21.41	11.63
Waller	0.92	2.17	1.37	3.26	5.51	3.52
Montgomery	4.96	11.97	7.23	16.88	28.16	17.56
Liberty	1.26	2.97	2.33	4.16	7.12	5.46
Chambers	1.79	4.24	2.20	6.61	11.10	6.16
Galveston	2.51	6.02	5.37	7.00	11.86	8.90
Total	68.55	163.55	132.59	185.49	321.21	230.50

Source: Houston-Galveston Area Council, November 2000

Table 3

2007 ROP Mobile Source Emission Inventories
Houston-Galveston Ozone Nonattainment Area
November 30, 2000

County	VOC tons per ozone season day			NOx tons per ozone season day		
	Control Strategy	Current Control	Adjusted Base Year	Control Strategy	Current Control	Adjusted Base Year
Harris	53.12	141.21	100.62	132.97	264.48	162.93
Brazoria	2.67	7.00	6.26	7.74	14.77	13.43
Fort Bend	4.47	11.66	6.45	12.25	23.32	11.56
Waller	0.84	2.19	1.34	2.90	5.51	3.47
Montgomery	5.17	13.54	7.13	16.57	31.13	17.29
Liberty	1.28	3.32	2.29	4.07	7.85	5.39
Chambers	1.48	3.83	2.17	5.28	9.95	6.05
Galveston	2.81	7.36	5.34	7.40	14.17	8.85
Total	71.85	190.11	131.62	189.18	371.18	228.97

Source: Houston-Galveston Area Council, November 2000

Attachment 1

TAD Modeling Information Sheet Number Six

TAD Modeling Information Sheet Number 6
MOBILE Modeling Description for
2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
Update to Final - 4 August 2000

Note: This is a technical document intended to provide experienced MOBILE modelers the recommended choices for the MOBILE input fields. It is beyond the scope of this description to describe how to use the model or to provide guidance on how to use the inputs for any particular analysis.

This document gives an overview of the activity inputs and detailed description of MOBILE inputs consistent with the 2002, 2005 and 2007 Houston-Galveston Rate-of-Progress(ROP) Inventories and the control strategy contingency estimates developed for use in the Phase 1 Houston-Galveston Attainment Demonstration SIP. To complete ROP calculations four separate inventories are needed for each year: the 1990 base year(BY), an adjusted base year(ABY), a current control(CC) and a control strategy(CS). To complete contingency estimate calculations, two inventories are needed: a current control(CC) and a control strategy(CS).

In this document the Urban County Group includes: Brazoria, Fort Bend, Galveston, and Montgomery Counties. And the Rural County Group includes: Chambers, Liberty, and Waller Counties.

MOBILE Input Description

The model version and required MOBILE data files are described in Table 2. The MOBILE flag settings are described in Table 3. The local area parameter record input values and documentation of the value selection process are documented in Table 4. The scenario description, record one of the scenario input, parameter values and documentation of the value selection process are documented in Table 5. The MOBILE input parameter values and documentation of the value selection process for the NLEV program, record two of the scenario input, are documented in Table 6. The inputs required to model the alternative standards for HDDVs are described and documented in Table 7. The I/M record input values and documentation of the value selection process are documented in Tables 8 and 9. The ATP record input values and documentation of the value selection process are documented in Table 10. The pressure test record input values and documentation of the value selection process are documented in Table 11. An example nlev.d file with inputs consistent with the current plan for LEV standards phase-in for Texas in documented in Table 12.

Transportation Inputs

For all the inventories the average annual daily vehicle miles traveled(VMT) should be seasonally and daily adjusted to summer, weekday VMT to correspond to ozone season day. Two adjustments will be required: 1) seasonally adjust the annual VMT to summer levels, and, 2) adjust from average daily to weekday VMT.

As with a 1990 base year inventory for the ABY inventories, 1990 transportation inputs should be used.

For the CC and CS inventories ROP milestone year transportation inputs should be used. If a 2002 or 2005 transportation model does not exist it is appropriate to interpolate between existing models

Control Strategy Description

The controls included in the development of emission factors for 2002, 2005 and 2007 ROP scenarios are described in Table 1.

Table 1

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories Description of Emission Control Mechanisms Used for Developing Emission Factors		
Control Description	Start Date	Scenario description
Pre-1990 CAAA FMVCP(Tier 0)	Pre-1990	BY, ABY, both CC and both CS
1992 RVP summer control	1992	BY, ABY, both CC and both CS
Tier 1 FMVCP	1994	2002, 2005 and 2007 CS
Reformulated Gasoline Phase 1	1994	2002, 2005 and 2007 CS
Inspection & Maintenance Phase 1 2 speed idle, Harris only	Jan 1997	I/M Phase 2 and 3 modeled for 2002, 2005 and 2007
Reformulated Gasoline Phase 2	2000	2002, 2005 and 2007 CS
NLEV	2001	2002, 2005 and 2007 CS
Inspection & Maintenance Phase 2 ASM, OBD2, Harris County	Jan 2002	2002, 2005 and 2007 CS, Harris County only
Inspection & Maintenance Phase 3 ASM, OBD2, add urban counties	Jan 2003	2005 and 2007 CS, Urban Counties only
Inspection & Maintenance Phase 4 ASM, OBD2, add 3 rural counties	Jan 2004	2005 and 2007 CS, Rural counties only
FMVCP for HDDV	2004	2005 and 2007 CS
Tier 2 FMVCP	2004	2005 and 2007 CS

Table 2

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories		
Model version and Data file Description		
Description	File size	Explanation
MOBILE5A or, MOB5A_H (needed for TTC) MOBILE5B (use for RFG correction)	889632 895216 920868	These represent the most recent versions of the model acceptable for use in preparing modeling information for EPA submittal. MOBILE5a_h is required to model the TMC I/M due to the technician training program component. MOBILE5b has a correction for the RFG NOx bug which is in both 5a and 5a_h. EPA's modeling information sheet #7 documents a modeling fix for the RFG NOx bug when using MOBILE5a or MOBILE5a_h using output from MOBILE5b.
IMDATA.d IMDATA3.d HYBRID.IMC imdata4.d (use this credit file renamed imdata.d) Imdata4h.d	584814(standard file for MOBILE5A) 661537(standard file with new ASM test type available) 617373(hybrid programs only) 753713(MOBILE 5B version, new ASM test data) 705493(MOBILE 5B hybrid credits)	The modeled program does not include hybrid components: do not use hybrid.imc, or, imdata4h.d. In order to access I/M credits for ASM based on Phoenix and California data: Use: imdata4.d, With: test type = "3" for MOBILE5a_h test type = "5" for MOBILE5b and Cutpoints: HC = 25. , CO = 50. , NOx = 2. See read me file, IMDATA4.txt, for IMDATA4.d for documentation of modeling methodology.
PPEFF.D	298(non hybrid programs, ppeffm5.d renamed to ppeff.d)) 293(hybrid programs only)	PPEFF.D is not needed when using MOBILE5A, Two pressure credit files were issued with MOBILE5A_H , one file for non-hybrid I/M programs, and one for hybrid. When using the MOB5A_H executable care should be exercised in selecting the correct file. Use the non-hybrid

TECH12.D	62558	same file for all current model versions
nlev.d	3622	Data file describing the phase in schedule for NLEV compliant vehicles.

Table 3

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories		
Flag Settings Page 1 of 2		
Model Parameter Description	Assigned Value	Methodology Description
PROMPT	1 Adjusted base year 1 Current control 5 Control strategy	1: is the standard input when using the MOBILE models in batch run mode 5: is used to indicate that NLEV input parameters will be used and is appropriate for the control strategy runs for both 2002, 2005 and 2007 for HGA. Additional input requirements for the modeling the NLEV Program are documented in Table 6. The required external data file with the alternative vehicle technology phase-in schedule is documented in Table 12.
PROJID	modeler's choice	no effect on results
TAMFLG	1	Use MOBILE default tampering rates
SPDFLG	4	one speed for all vehicle types, and, use locality specific trip length distributions An additional input line is required for the TLDs The TLD values are determined by HGAC using transportation model output information. The development of these values is documented in the EI report
VMFLAG	3	MOBILE input VMT mix does not affect vehicle type emission factors, only the composite emission factor. To have locality specific composite emission factors use 3 to input one VMT mix for all scenarios.
MYMRFG	3	Use MOBILE default AMARs as there are currently no Houston specific AMARs available, Use county or county group specific registration distributions

NEWFLG	5 (2002, 2005 and 2007 adjusted base year) 5 (2002, 2005 and 2007 current control) 1 (2002 control strategy) 2 (2005 & 2007 control strategy)	5: pre-1990 controls only, Tier 1 is turned OFF; and, use MOBILE default BERs 1: Tier 1 FMVCP is turned ON; and, use MOBILE default BERs. 2: Tier 1 FMVCP is turned ON; and, use user specified BERs for diesel vehicles consistent with the new diesel standards going into effect in 2004. Additional input is required as described in Table 6.

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories

Flag Settings Continued
Page 2 of 2

Model Parameter Description	Assigned Value	Methodology Description
IMFLAG	ABY & Current Control 1 All counties Control Strategy 2002 1 Urban and Rural 32 Harris County 2005 and 2007 32 All counties	1: No I/M program 32: The 3 sets the input file up for input of two I/M programs. Two programs are needed because the OBD credit is applicable only to 1996 and newer vehicles. Note: A setting of 4 or 5 is not appropriate as it signals the model to include assumptions about the I/M program not needed for this analysis, and, The second flag set to 2 indicates to the model to calculate I/M emission reductions consistent with the existence of a technician training program Values determined based upon I/M program design information from TNRCC Mobile Source Section
ALHFLG	1	No load corrections done in modeling calculations; the load factor calculations for the current versions of MOBILE are not reliable enough to use for ROP inventories

ATPFLG	ABY and CC 1: All counties except Harris 2: Harris County Control Strategy* 2002 2 & 5 Harris County 1 Urban and Rural counties 2005 & 2007 2 & 5 All counties	1: No ATP, no pressure test, no purge test 2: include input to model an ATP Values for the ATP are determined based upon the existing ATP in Harris County. 5: include input to model an ATP and a pressure test Values for the ATP and pressure test are based upon TMC program design information from the TNRCC Mobile Source Section. * Note: the TMC pressure test is assigned to get only 40% of the MOBILE pressure test credit , so model runs with and without the pressure test are required to determine the emission factors
RLFLAG	5	No refueling emissions calculated, refueling emissions are calculated as part of the area source inventory
LOCFLG	modeler's discretion	no effect on results
TEMFLG	1	MOBILE will calculate temperature corrections from minimum and maximum temperature
OUTFMT	modeler's discretion	no effect on results
PRTFLG	modeler's discretion	no effect on results
IDLFLG	1	No idle emissions calculated
NMHFLG	3	Hydrocarbon emission factors should be for VOC
HCFLAG	modeler's discretion	Diurnal runs will need to have appropriate flag setting. Otherwise use the value appropriate for obtaining output in the format needed for emissions calculation models.

Table 4

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories Local Area Parameter Record		
General comments: None.		
Model Parameter Description	Assigned Value	Methodology Description
Scenario name	modeler's discretion	Does not effect emission factor results, but may be used as a convenience to the modeler to indicate selected scenario information on output.
ASTM Class	B	ASTM regional map
Minimum daily temperature	Use values consistent with time-of-day and 24-hour average temperatures from 1990 Base year, 1996 ROP and 1999 ROP	Ozone season standard day minimum, maximum and ambient temperatures for HGA were developed for the 1990 Base Year EI, It is appropriate to use consistent values for future inventory modeling
Maximum daily temperature	Use values consistent with time-of-day and 24-hour average temperatures from 1990 Base year, 1996 ROP and 1999 ROP	Ozone season standard day minimum, maximum and ambient temperatures for HGA were developed for the 1990 Base Year EI, It is appropriate to use consistent values for future inventory modeling
Period 1 RVP	8.0	Regulated value minus .3, as per MOBILE guidance
Period 2 RVP	7.8	Regulated value, as per MOBILE guidance, value will not affect results when RFG flag is on
Period 2 start year	92	92 RVP regulation
Oxygenated fuel flag	1	No oxygenated fuels program in Houston
Diesel sales fraction flag	1	No alternate diesel sales fractions will be used
Reformulated gasoline flag	1 Adjusted base year 1 Current control 2 Control strategy	1: No RFG 2: Turn ON RFG RFG is part of the HGA emissions control strategy and should be turned on only for CS

Table 5

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories Scenario Input - Record #1 Scenario Description		
General comments: None.		
Model Parameter Description	Assigned Value	Methodology Description
Region	1 Base year 1 Adjusted base year 1 Current control 4 Control strategy	1: standard input for low altitude areas 4: used when the input file will contain LEV or NLEV information
Calendar Year of Evaluation	Link-based/Time-of-Day 2002, 2005 & 2007 For November 15 projection: Facility-type/24-hour 2002, 2003 2005, 2006 2007, 2008 For contingency estimates: CC and CS scenarios only Facility-type/24-hour 2004 2007 2009	Inventory definition The Link-based/Time-of-day inventories are for July of 2002, 2005 & 2007 As only July or January scenarios are available with MOBILE the facility-type/24-hour inventory values are used to project the inventories to November 15 of 2002, 2005 & 2007 with ratios determined using linear interpolation between July year 1and July year 2 Linear interpolation is also used to calculate estimated November 15 2003, 2006 & 2008 CC and CS inventories in order to estimate control strategy reductions for contingency measures in the Attainment Demonstration SIP
Average speed	XXXX	set to XXXX when creating an emission factor file for POLFAC
Ambient temperature	Use values consistent with time-of-day and 24-hour average temperatures from 1990 Base year, 1996 ROP and 1999 ROP	Ozone season standard day minimum, maximum and ambient temperatures for HGA were developed for the 1990 Base Year EI, It is appropriate to use consistent values for future inventory modeling
Operating mode fractions	Use values consistent with time-of-day and 24-hour operating mode fractions from 1990 Base year, 1996 ROP and 1999 ROP	Locality specific operating mode fractions for HGA were developed for the 1990 Base Year EI, It is appropriate to use consistent values for future inventory modeling

Month of evaluation	7	Ozone season is being modeled so July is the appropriate month for all inventories

Table 6

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
Scenario Input - Record #2
LEV Program Parameter Record

General comments: 1) Used only for the control strategy inventory.
2) PROMPT must be set to 5.
3) Region in the Scenario record must be set to 4
4) Enter the LEV parameter record as detailed below
5) User must provide an alternative LEV phase-in schedule using an external data file, nlev.d. Any non-OTC state not opting into California Low Emission Vehicle Program(includes Texas) will use a standard phase-in schedule of 100% LEVs for passenger cars and for all light duty trucks less than 6,000 pounds Gross Vehicle Weight (GVW) beginning in the 2001 model year. Table 12 contains an example nlev.d file for use when modeling the NLEV program for Texas with the following phase-in schedule for LDGVs and LDGTs:

For LDGVs and LDGTs Less Than 6000 lbs. GVW

Model Year	Phase-in Scedule		
1999	100% Tier 1,	0% TLEV,	0% LEV
2000	100% Tier 1,	0% TLEV,	0% LEV
2001+	0% Tier 1,	0% TLEV,	100% LEV

For LDGTs Greater Than 6000 lbs. GVW

Model Year	Phase-in Scedule		
1999	100% Tier 1,	0% TLEV,	0% LEV
2000	100% Tier 1,	0% TLEV,	0% LEV
2000+	100% Tier 1,	0% TLEV,	0% LEV

6) For additional information concerning how to model the effects of the NLEV program, see document titled, “MOBILE5, Information Sheet #6, Effect of the New National Low Emission Vehicle Standard for Light-Duty Gasoline Fueled Vehicles, EPA420-F-98-027, July 1998.”

Model Parameter Description	Assigned Value	Methodology Description
LEV start year	01	NLEV program will start in 2001
I/M Flag	1	I/M program for the NLEV vehicles same as for other vehicles

Table 7

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories New 2004 Heavy Duty Diesel NOx Standards Record description					
General comments: Use only for the 2007 control strategy inventory. NEWFLAG must be set to 2.					
Model Parameter Description	Assigned Value				Methodology Description
Record 1	004				Program start year is 2004
Model Parameter Description	Record 2	Record 3	Record 4	Record 5	Methodology Description
Altitude 1 = low altitude	1	1	1	1	Heavy duty diesel standards phase in definition. These inputs are documented in EPA's MOBILE Information Sheet #5. The information sheet is available at the EPA web site.
Vehicle type 7 = HDDV	7	7	7	7	
Pollutant 3 = NOx	3	3	3	3	
Starting model year	90	91	98	04	
Ending model year	90	97	03	20	
New zero-mile value	05.639	04.598	03.679	01.840	
New deterioration rate	00.000	00.000	00.000	00.000	

Table 8

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories First I/M Program Descriptive Input Record		
General comments: Harris County began a 2-speed idle I/M program in 1997 as part of the TMC program. In 2002 the Harris County test type was changed to ASM. In 2003 the ASM program was geographically expanded to include the four urban non-attainment counties. In 2004 the ASM program was geographically expanded again to include the three rural non-attainment counties. For vehicles equipped with OBD, 1996 and newer vehicles, the ASM test is modeled as an IM 240 program. This modeling protocol is based upon discussion between TNRCC Mobile Source Section and EPA.		
Model Parameter Description	Assigned Value	Methodology Description
Program start year	97 Harris County 03 Urban Counties 04 Rural Counties	Harris County program began January 1997, the program was geographically expanded in 2002 and 2003
Stringency level	20	I/M program audit report
First model year	2002 78 2005 81 2007 83	program definition, 24 year rolling window
Last model year	2002 95 2005 95 2007 95	1996 and newer vehicles have OBD and will be modeled with IM 240 program
Waiver rate, pre-1981 my vehicles	03	I/M program definition
Waiver rate, my 1981 and later	03	I/M program definition
Compliance rate	96	I/M program definition
Program type	1	even though the I/M in Texas is a decentralized test and repair it is modeled as a centralized program when using MOBILE5a_h to prevent the program from assigning an automatic 50% rule effectiveness discount
Inspection frequency	1	annual testing, program definition
Vehicle types subject to inspection	2222	all gasoline vehicles tested
Test type	3 MOBILE5a_h 5 MOBILE5b	ASM test based upon Houston program design, user must input cut points
non-default cut points flag	2	user input cut points
alternative I/M credit flags	11	use the IMDATA.d credit file as received from EPA
HC cut point	25.	Houston program design, Two Mode 2525/5015 ASM with start up cutpoints

CO cut point	50.	Houston program design, Two Mode 2525/5015 ASM with start up cutpoints
NOx cut point	2.	Houston program design, Two Mode 2525/5015 ASM with start up cutpoints

Table 9

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories Second I/M Program Descriptive Input Record		
General comments: Harris County began a 2-speed idle I/M program in 1997 as part of the TMC program. In 2002 the Harris County test type was changed to ASM. In 2003 the ASM program was geographically expanded to include the four urban non-attainment counties. In 2004 the ASM program was geographically expanded again to include the three rural non-attainment counties. For vehicles equipped with OBD, 1996 and newer vehicles, the ASM test is modeled as an IM 240 program. This modeling protocol is based upon discussion between TNRCC Mobile Source Section and EPA.		
Model Parameter Description	Assigned Value	Methodology Description
Program start year	97 Harris County 03 Urban Counties 04 Rural Counties	Harris County program began January 1997, the program was geographically expanded in 2002 and 2003
Stringency level	20	I/M program audit report
First model year	2002 96 2005 96 2007 96	1995 and older vehicles do not have OBD and are modeled with the ASM program designed by TNRCC Mobile Source Section
Last model year	2002 00 2005 03 2007 05	program definition, two year new vehicle exemption
Waiver rate, pre-1981 my vehicles	03	I/M program definition
Waiver rate, my 1981 and later	03	I/M program definition
Compliance rate	96	I/M program definition
Program type	1	even though the I/M in Texas is a decentralized test and repair it is modeled as a centralized program when using MOBILE5a_h to prevent the program from assigning an automatic 50% rule effectiveness discount
Inspection frequency	1	annual testing, program definition
Vehicle types subject to inspection	2222	all gasoline vehicles tested
Test type	4	I/M 240 test is used to calculate credit for ASM with OBD, user must input cut points
non-default cut points flag	2	user input cut points

alternative I/M credit flags	11	use the IMDATA.d credit file as received from EPA
HC cut point	0.80	I/M 240 test is used to calculate credit for ASM with OBD, use phase-in cutpoints
CO cut point	15.0	I/M 240 test is used to calculate credit for ASM with OBD, use phase-in cutpoints
NOx cut point	2.00	I/M 240 test is used to calculate credit for ASM with OBD, use phase-in cutpoints

Table 10

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
ATP Descriptive Input Record
page 1 of 2

General comments:
1) Since 1984 Harris County has had an ATP. The Harris County ATP was modified in 1997 as part of the TMC I/M program. The TMC was geographically expanded in 2002 to include the four urban non-attainment counties and again in 2003 to include the three rural non-attainment counties.
2) The current control inventory ABY and current control inventories are modeled using parameters consistent with the pre-1990 existing program. The CS inventories are modeled using parameters consistent with the TMC program design. Where inputs are different both values are indicated.
3)Two ATP records are needed to fully describe the ATP program because equipment checks are different for newer model year vehicles. The methodology for calculating emission factors for fleets effected by multiple anti-tampering programs was determined during development of the 1990 base year inventories. The method requires multiple model runs with post processing to estimate the combined effect of the ATPs. For a fleet with two ATPs the method is summarized by the formula:

$$EF_{Combined} = EF_{No\ ATP} - [(EF_{No\ ATP} - EF_{ATP\#1}) + (EF_{No\ ATP} - EF_{ATP\#2})]$$

where,

$EF_{Combined}$ = Final Emission Factor,
$EF_{No\ ATP}$ = Emission factor for No ATP,
$EF_{ATP\#1}$ = Emission factor for ATP program #1, and
$EF_{ATP\#2}$ = Emission factors for ATP program #2.

The formula may be algebraically simplified to:

$$EF_{Combined} = EF_{ATP\#1} + EF_{ATP\#2} - EF_{No\ ATP}$$

Model Parameter Description	Assigned Value		Methodology Description
	ATP 1	ATP 2	
Program start year	84 Harris County 03 Urban Counties 04 Rural Counties	84 Harris County 03 Urban Counties 04 Rural Counties	operation began in early 1984 in Harris County geographically expanded in 2002 and 2003
First model year	Current Control 68 all eval years Control Strategy 78 for 2002 81 for 2005 83 for 2007	Current Control 80 all eval years Control Strategy 84 for 2002 84 for 2005 84 for 2007	program design: existing Harris County program covered all model years TMC program has a 24 year rolling window and 2 year new vehicle exemption
Last model year	Current Control 79 all eval years Control Strategy 83 for 2002 83 for 2005 83 for 2007	Current Control 20 all eval years Control Strategy 00 for 2002 03 for 2005 05 for 2007	program design: existing Harris County program covered all model years TMC program has a two year new car exemption

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
ATP Descriptive Input Record

Model Parameter Description	Assigned Value		Methodology Description
	Model year vehicles ATP 1	Model year vehicles ATP 2	
Vehicle types subject to inspection	Current control 2221 Control strategy 2222	Current control 2221 Control strategy 2222	Pre-1990 program: no HDGV inspected Houston program: all gasoline vehicles tested
Program type	1	1	even though the I/M in Texas is a decentralized test and repair it is modeled as a centralized program whe using MOBILE5a_h to prevent the program from assigning an automatic 50% rule effectiveness discount
Inspection frequency	1	1	annual inspections required
Compliance rate	Current Control 85 Control Strategy 96	Current Control 85 Control Strategy 96	Current Control: I/M program audit report Control Strategy: Program design
Air pump system check flag	2	2	program design
Catalyst check flag	1	2	program design
Fuel inlet restrictor check flag	1	Current Control 2 Control Strategy 1	program design
Tailpipe lead deposit test flag	1	Current Control 2 Control Strategy 1	program design
EGR system check flag	2	2	program design
Evaporative control system check flag	2	2	program design
PCV system check flag	2	2	program design
Gas cap check flag	2	2	program design

Table 11

2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
Pressure Test Descriptive Input Record

General comments:
1) Harris County began a pressure test in 1997 as part of the TMC program. In 2003 the TMC was geographically expanded to include the four urban non-attainment counties. In 2004 the program was geographically expanded again to include the three rural non-attainment counties.
2) The pressure test used in the TMC program has been determined to get only 40% of the pressure test emission factor reduction in the MOBILE credit file. Therefore, two model runs are required in order to determine the effect of TMC pressure test. The results from two model runs, one with the test and one without the test, are linearly interpolated to 40% of the pressure test emission factor reduction.

Model Parameter Description	Assigned Value	Methodology Description
Program start year	97 Harris County 03 Urban Counties 04 Rural Counties	program began in Harris County in January 1997 program geographically expanded in 2003 and 2004
First model year	2002 78 2005 81 2007 83	program definition, 24 year rolling window
Last model year	2002 00 2005 03 2007 05	program definition, two year new vehicle exemption
Vehicle types subject to inspection	2222	all gasoline vehicles tested
Program type	1	Even though the I/M program in Texas is decentralized, test and repair, it is modeled as a centralized program when using MOBILE5a_h to prevent the program from assigning an automatic 50% rule effectiveness discount
Inspection frequency	1	annual testing, program definition
Compliance rate	96	In/M program audit report

Table 12
2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories
Example Input File for nlev.d for the NLEV Program With 2001 Start

Note: For information concerning column and row definitions, or specific information about formats, see document titled, "MOBILE5, Information Sheet #6, Effect of the New National Low Emission Vehicle Standard for Light-Duty Gasoline Fueled Vehicles, EPA420-F-98-027, July 1998."

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1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  1994LDGV  Tier1/ITLEV,
TLEV, ILEV, LEV, IULEV, ULEV, ZEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    95      FedLEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    96
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    97
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    98
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    99
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  2000
0.000 0.000 0.000 0.000 1.000 0.000 0.000 0.000    01
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0.000 0.000 0.000 0.000 1.000 0.000 0.000 0.000    05
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  1994LDGt1a Tier1/ITLEV,
TLEV, ILEV, LEV, IULEV, ULEV, ZEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    95       FedLEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    96
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TLEV, ILEV, LEV, IULEV, ULEV, ZEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    95       FedLEV
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    96
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TLEV, ILEV, LEV, IULEV, ULEV, ZEV
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1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000    99
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1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 97
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 98
1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 99
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1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 05

Attachment 2

Concurrence Sign-off Sheet

Note: The original sign-off sheet contains all indicated signatures. HGAC has the original. TNRCC has a copy with the signatures included.

Informal Memorandum

TO: Alan Clark

FROM: Mary McGarryBarber

DATE: 17 August 2000

SUBJECT: Sign-off Sheet for MOBILE Input Information For 2002, 2005 and 2007 Rate-of-Progress Modeling for the Rate-of-Progress and Attainment Demonstration for the Houston/Galveston Ozone Non-attainment Area, Revisions to the State Implementation Plan for the Control of Ozone Air Pollution

The TNRCC provides the following guidance concerning modeling input parameters for 2002, 2005 and 2007 Rate-of-Progress Modeling for the Rate-of-Progress and Attainment Demonstration for the Houston/Galveston Ozone Non-attainment Area. In order to confirm all TNRCC stakeholders concur with the information documented here, a sign-off list of major TNRCC management responsible for, or affected substantially by, the on-road mobile inventory or transportation conformity budget is included.

1) All input information is documented in detail in the document titled, "TAD Modeling Information Sheet Number 6, MOBILE Modeling Description for 2002, 2005 and 2007 Houston-Galveston Rate-of-Progress Inventories, Update to Final - 4 August 2000." This sign-off sheet is an endorsement of both the specific information described below and the information in TAD Modeling Information Sheet Number 6.

2) MOBILE modeling input parameters are consistent with input parameters used when developing and post processing the on-road mobile inventory for the Attainment Demonstration for the Houston/Galveston Ozone Non-attainment Area. Use of any specific input may be affected by EPA guidance, information from technical analysis, and/or policy decisions. Mandated controls, which need to be modeled to determine the amount of emission reductions for each milestone year include: FMVCP Tier 1, RFG, NLEV, HDDV standards, I/M, and FMVCP Tier2/Low Sulfur. Additional controls, representing state and local inititives may be analysed separately from the mandated controls if it is desired to have information concerning the affect of these controls for all three milestone years for the ROP inventories. The affect of these controls has already been analysed for the on-road mobile inventory for the Attainment Demonstration for 2007. The state and local controls include: cleaner deisel fuels, VMEP, deisel emulsion, NOx reductions systems - deisel, NOx reduction systems - gasoline, speed limit restriction, and vehicle idling restriction.

3) The I/M flag in the NLEV record should be set to 1 for all counties.

4) The MOBILE5a_h model version should be used.

5) The I/M credit file released with MOBILE5b, imdata4.d, is the appropriate I/M credit file to use for this modeling.

6) For the I/M record use: ASM test with phase-in cutpoints for model years 1995 and older, I/M 240 with phase-in cutpoints for model years 1996 and newer, a program start year 1997 for Harris County, a program start year of 2003 for the four urban counties, a program start year of 2004 for the three rural counties, a gas cap check modeled to take only 40% of the MOBILE5a_h pressure test credit, a 3% waiver rate, a 96% compliance rate, a 20% stringency rate, a two year new vehicle exemption and a final model year tested reflective of testing only vehicles 24 years old and newer.

The modeling instructions described above and in the document, "TAD Modeling Information Sheet Number 6," are intended only to provide experienced MOBILE modelers with guidance on development of emissions estimates for on-road mobile ROP inventories consistent with the Attainment Demonstration for the Houston/Galveston Ozone Non-attainment Area, Revisions to the State Implementation Plan for the Control of Ozone Air Pollution. As analysis

and policy decisions are always ongoing in order to refine control strategies, and as emission factor development methods and tools change based upon new data or the availability of new models, the on-road mobile modeling input parameters used for any future emissions inventory analysis will need to be evaluated and possibly updated in order to be reflective of control strategy and analysis tool evolution.

_____ _____

Signature *Date*

William Gill, Area and Mobile Emissions Inventory Section Manager

_____ _____

Signature *Date*

Hazel Barbour, Mobile Source Programs Section Manager

_____ _____

Signature *Date*

Candy Garrett, Air Modeling and Data Analysis Section Manager

_____ _____

Signature *Date*

William Jordan, SIP Development Team Leader

cc: William Gill, Hazel Barbour, Candy Garrett, William Jordan, Bob Wierzowiecki, Cathy Stephens, Charlie Rubick, Mary McGarryBarber, Chris Kite, Jim Smith, Chuck Mueller

Attachment 3

HGAC Contract Report On Inventory Development

insert HGAC report here