

ATTACHMENT A Revised

TECHNICAL SUPPLEMENT

INSPECTION/MAINTENANCE (I/M) PERFORMANCE STANDARDS  
FOR LOW-ENHANCED PROGRAM AREAS  
(EPA Flexibility Amendments)

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## TECHNICAL SUPPLEMENT

### INSPECTION/MAINTENANCE (I/M) PERFORMANCE STANDARDS FOR LOW-ENHANCED PROGRAM AREAS (EPA Flexibility Amendments)

#### (A) Overview

The Texas Commission on Environmental Quality (TCEQ or commission) commits to implementing an I/M program which meets or exceeds the minimum emission reductions required in the low-enhanced performance standard (EPA Flexibility Amendments) promulgated on September 18, 1995. A performance standard is expressed as emission levels in area-wide average grams per mile (g/mi) achieved from highway mobile sources as a result of a model program comprised of EPA-specified elements. The most recent computer modeling performed for the commission indicates that the proposed I/M program meets or exceeds the required I/M performance standard for the applicable air pollutants. This version of the Technical Supplement includes modeling inputs, procedures, and results based on updated information regarding the I/M programs in the three ozone nonattainment areas and the one carbon monoxide (CO) nonattainment area. This technical supplement revises the information provided in an earlier document dated April 19, 2000.

The emission levels achieved by a state's program design must meet or exceed the applicable performance standard for any I/M nonattainment area. The Dallas/Fort Worth (DFW), Houston/Galveston (HGA), and El Paso nonattainment areas are required to implement low-enhanced I/M programs. The low-enhanced performance standards are less stringent than the enhanced performance standard and, thus, provide greater I/M program parameter flexibility. However, if one input parameter for a proposed I/M program design is more lax than the applicable performance standard parameter, the proposed I/M program design must compensate by being more restrictive in another input parameter in order to meet the performance standard. The Texas I/M Program design is an equilibrium of the applicable performance standard parameters and compensations.

The I/M program areas have been modeled using EPA's MOBILE5a\_H emissions factor model. For each program area, we have provided the emissions factor for the EPA low-enhanced performance standard and the emissions factor for the area's I/M program commitment for each pollutant and applicable evaluation year.

Local parameters used in the MOBILE5a\_H input include data collected on a county-wide basis. Modeling for all program areas included use of class B volatility gasoline. No refueling emissions were modeled for I/M program purposes because they are considered to be area source (stationary source, not mobile source) emissions in the TCEQ inventory. Modeling for the program areas also included a technician training component. Waiver-qualified repairs must be performed by Recognized Emission Repair Technicians whose qualifications are provided in the I/M program description preceding this

section. January evaluation dates have been used to approximate milestones or deadlines occurring the previous November.

I/M programs subject to the low-enhanced I/M performance standard will be shown to obtain the same or lower emission levels as the model program described in the low-enhanced I/M performance standard by 2000 for ozone nonattainment areas and 2001 for CO nonattainment areas, and for severe and extreme nonattainment areas, on each applicable milestone and attainment deadline, thereafter. Because El Paso is serious nonattainment for ozone and moderate nonattainment for CO, the earlier evaluation date requirement of 2000 has been used. Evaluation dates of 2000, 2003, 2006, and 2008 have been used for Harris County in the HGA area because it is a severe ozone nonattainment area. Evaluation dates of 2006, and 2008 have been modeled to further demonstrate that the HGA urban area (Galveston, Brazoria, Montgomery, and Fort Bend Counties) continues to meet the performance standard after the I/M program implements acceleration simulated mode (ASM-2) testing on May 1, 2003. In addition, evaluation dates of 2006 and 2008 have been modeled to further demonstrate that the HGA rural area (Chambers, Liberty, and Waller Counties) continues to meet the performance standard after the I/M program implements ASM-2 testing on May 1, 2005 ~~2004~~. DFW is a serious ozone nonattainment area; therefore, the required evaluation date of 2000 has been modeled. In addition, evaluation dates of 2003, 2006, and 2008 have been modeled to further demonstrate that the DFW area continues to meet the performance standard after the I/M program switches to an ASM-2 test in the DFW program area on May 1, 2002. The modeling analysis explanations below will have three sets of I/M program parameters: HGA program area, DFW program area, and El Paso program area (one specific to each nonattainment area).

## (B) Modeling Analysis for Low-Enhanced I/M Programs for Nonattainment Areas

### (1) Network Type

#### (a) Performance Standard

A state must model the performance standard for each low-enhanced I/M program area using a test-only (centralized) I/M network design.

#### (b) HGA Program Area

The I/M program is a decentralized program composed of test-only and test-and-repair facilities. On August 20, 1999, EPA published Additional Flexibility Amendments to Vehicle Inspection Maintenance Program Requirements; Proposed Amendment to the Final Rule. In this proposed rule, 40 CFR §51.353(b), pertaining to an automatic effectiveness credit discount for decentralized test-and-repair networks, was deleted. For this reason, we have modeled the I/M program with the assumption of a “centralized network” so that the automatic discount would not be applied by the model and 100% effectiveness credit would be given.

(c) DFW Program Area

The I/M program is a decentralized program composed of test-only and test-and-repair facilities. On August 20, 1999, EPA published *Additional Flexibility Amendments to Vehicle Inspection Maintenance Program Requirements; Proposed Amendment to the Final Rule*. In this proposed rule, 40 CFR §51.353(b), pertaining to an automatic effectiveness credit discount for decentralized test-and-repair networks, was deleted. For this reason, we have modeled the I/M program with the assumption of a “centralized network” so that the automatic discount would not be applied by the model and 100% effectiveness credit would be given.

(d) El Paso Program Area

The I/M program is a decentralized program composed of test-only and test-and-repair facilities. On August 20, 1999, EPA published *Additional Flexibility Amendments to Vehicle Inspection Maintenance Program Requirements; Proposed Amendment to the Final Rule*. In this proposed rule, 40 CFR §51.353(b), pertaining to an automatic effectiveness credit discount for decentralized test-and-repair networks, was deleted. For this reason, we have modeled the I/M program with the assumption of a “centralized network” so that the automatic discount would not be applied by the model and 100% effectiveness credit would be given.

(2) Start Date

(a) Performance Standard

A state must model the performance standard for each low-enhanced I/M program area with a start date of 1983 for any nonattainment area having an existing I/M program; otherwise, a start date of 1995 applies toward any nonattainment area with a newly subject I/M program. The performance standard for the HGA area was modeled with an I/M program start date of 1995 and an anti-tampering program (ATP) start date of 1983. For the performance standard in the DFW area, Dallas and Tarrant Counties were modeled with an I/M program and ATP start date of 1983, and Denton and Collin were modeled with an I/M program start date of 1995 and an ATP start date of 1983. The performance standard for the El Paso Area was modeled with an I/M program start date and an ATP start date of 1983.

(b) HGA Program Area

The I/M program in Harris County was modeled with a start date of January 1, 1997 and the ATP with a start date of January 1, 1984. Galveston, Brazoria, Montgomery, and Fort Bend Counties were modeled with a start date of May 1, 2003 and the ATP with a start date of May 1, 2003. Chambers, Liberty, and Waller Counties were modeled with a start date of May 1, 2005 ~~2004~~ and the ATP with a start date of May 1, 2005 ~~2004~~. To best approximate a May 1, 2003, I/M program start date for Galveston, Brazoria, Montgomery, and Fort Bend Counties and because MOBILE5 will only model

January start dates, modeling runs were performed with both a January 1, 2003 start date and a January 1, 2004 start date. Because the first 4 months of the year 2003 will not have an I/M program in place while the last 8 months of the year 2003 will have the ASM-2 program in place, a ratio calculation of the rural emission factors was performed as shown in equation below.

$$EF_{\text{final}} = \{12 \times (N-1) + 8\} \times \{EF_{\text{I/M start date 2003}}\} + \{(4 \times EF_{\text{I/M start date 2004}}) \div (12 \times N)\} \text{ where,}$$

N = Evaluation Year-I/M Start Year

$EF_{\text{I/M start date 2003}}$  = the Jan. 1, 2003, I/M start date emission factor after post processing

$EF_{\text{I/M start date 2004}}$  = the Jan. 1, 2004, I/M start date emission factor after post processing

$EF_{\text{final}}$  = the final emission factor that approximates a May 1, 2003 I/M start date

The same formula was used for Chambers, Liberty, and Waller Counties except with a May 1, 2005 2004, I/M start date.

#### (c) DFW Program Area

For Dallas and Tarrant Counties, the I/M program was modeled with a start date of 1990 and the ATP with a start date of 1986. For Denton and Collin Counties, the ATP program was modeled with a start date of 1990. To best approximate a May 1, 2002 I/M program start date for Denton and Collin Counties and because MOBILE5 will only model January start dates, modeling runs were performed with both a January 1, 2002 start date and a January 1, 2003 start date. Because the first 4 months of the year 2002 will not have an I/M program in place while the last 8 months of the year 2002 will have the ASM program in place, a ratio calculation of the rural emission factors was performed as shown in equation below.

$$EF_{\text{final}} = \{(8 \times EF_{\text{I/M start date 2002}}) + (4 \times EF_{\text{I/M start date 2003}})\} \div 12 \text{ where,}$$

$EF_{\text{I/M start date 2002}}$  = the Jan. 1, 2002, I/M start date emission factor after post processing

$EF_{\text{I/M start date 2003}}$  = the Jan. 1, 2003, I/M start date emission factor after post processing

$EF_{\text{final}}$  = the final emission factor that approximates a May 1, 2002 I/M start date

#### (d) El Paso Program Area

The I/M program for El Paso county was modeled with a start date of 1987 and the ATP with a start date of 1986.

### (3) Test Frequency

#### (a) Performance Standard

A state must model the performance standard for each low-enhanced I/M program area with an annual emission inspection frequency.

(b) HGA Program Area

The I/M program will be an annual emissions inspection.

(c) DFW Program Area

The I/M program will be an annual emissions inspection.

(d) El Paso Program Area

The I/M program will be an annual emissions inspection.

(4) Model Year Coverage

(a) Performance Standard

A state must model the performance standard for each low-enhanced I/M program area with an emissions inspection of 1968 and newer model year vehicles.

(b) HGA Program Area

Vehicle coverage for the I/M program is based upon a 24-year rolling window from the year in which the test is being performed with an exemption from testing for the 2 newest model years.

(c) DFW Program Area

Vehicle coverage for the I/M program is based upon a 24-year rolling window from the year in which the test is being performed with an exemption from testing for the 2 newest model years.

(d) El Paso Program Area

Vehicle coverage for the I/M program is based upon a 24-year rolling window from the year in which the test is being performed with an exemption from testing for the 2 newest model years.

(5) Vehicle Type Coverage

(a) Performance Standard

A state must model the performance standard for each low-enhanced I/M program area for light-duty vehicles and light-duty trucks (types 1 and 2).

(b) HGA Program Area

The I/M program includes gasoline powered light-duty vehicles, light-duty trucks (types 1 and 2), and heavy-duty gasoline vehicles. Motorcycles are excluded from emissions inspection requirements.

(c) DFW Program Area

The I/M program includes gasoline powered light-duty vehicles, light-duty trucks (types 1 and 2), and heavy-duty gasoline vehicles. Motorcycles are excluded from emissions inspection requirements.

(d) El Paso Program Area

The I/M program includes gasoline powered light-duty vehicles, light-duty trucks (types 1 and 2), and heavy-duty gasoline vehicles. Motorcycles are excluded from emissions inspection requirements.

(6) Exhaust Emissions Test Type

(a) Performance Standard

A state must model the exhaust emissions test type in the performance standard for each low-enhanced I/M program as an idle exhaust emissions test (as described in Appendix B of Subpart S of EPA's final I/M rule.)

(b) HGA Program Area

The exhaust emissions test type for the HGA area I/M program consists of a steady-state preconditioned two-speed idle (TSI) exhaust emissions test in Harris county until April 30, 2002. Beginning on May 1, 2002, the I/M program in Harris county will consist of an ASM-2 test in conjunction with an OBD test on 1996 and newer model year vehicles in Harris county. ASM-2 testing in conjunction with OBD testing on 1996 and newer model year vehicles will be expanded beginning May 1, 2003 to include Galveston, Montgomery, Brazoria, and Fort Bend Counties and beginning May 1, 2005 ~~2004~~ in Chambers, Liberty, and Waller Counties.

(c) DFW Program Area

The exhaust emissions test type for the DFW area I/M program consists of a steady-state preconditioned TSI exhaust emissions test in Dallas and Tarrant Counties until April 30, 2002. Beginning May 1, 2002, the I/M program consists of an ASM-2 test in conjunction with an OBD test

on 1996 and newer model year vehicles in Dallas, Tarrant, Denton, and Collin Counties.

(d) El Paso Program Area

The exhaust emissions test type for the I/M program in El Paso county is a steady-state preconditioned TSI exhaust emissions test. In the event that the commission publishes notification in the *Texas Register* of a determination that contingency measures are necessary in order to maintain attainment of the national ambient air quality standards in the El Paso area, the following contingency measures will become effective 12 months after the notice is published:

(i) All 1996 and newer model year vehicles equipped with OBD systems will be tested using EPA-approved OBD test procedures; and

(ii) All pre-1996 model year vehicles will be tested using a TSI test.

(7) Emission Standards

(a) Performance Standard

Modeling the performance standard for emission standards requires cutpoints no weaker than specified in 40 CFR Part 85, Subpart W (steady-state exhaust emission testing) for 1981 and newer model year light-duty vehicles and light-duty trucks.

(b) HGA Program Area

The emission standards in the I/M Program for steady-state exhaust emission testing are 220 parts per million (ppm) of hydrocarbon (HC) and 1.2% CO in accordance with 40 CFR Part 85, Subpart W. The emission standards in the I/M program for the ASM-2 test are EPA's start-up cutpoints for the two mode 25/25-50/15 ASM test.

(c) DFW Program Area

The emission standards in the I/M Program for steady-state exhaust emission testing are 220 ppm of HC and 1.2% CO in accordance with 40 CFR Part 85, Subpart W. The emission standards in the I/M program for the ASM-2 test are EPA's start-up cutpoints for the two mode 25/25-50/15 ASM test.

(d) El Paso Program Area

The emission standards in the I/M Program for steady-state exhaust emission testing are 220 ppm of HC and 1.2% CO in accordance with 40 CFR Part 85, Subpart W.

## (8) Emissions Control Device Inspections

### (a) Performance Standard

Modeling of the low-enhanced performance standard requires a visual inspection of the positive crankcase ventilation (PCV) system on all 1968 through 1971 model year vehicles, inclusive, and of the exhaust gas recirculation (EGR) valve on all 1972 and newer model year vehicles.

### (b) HGA Program Area

The emissions control device inspection for the HGA program area includes a visual inspection of the EGR system, evaporative emission control system, gas cap, PCV system, thermostatic air cleaner (TAC), and the air injection system (AIS) (also known as the smog pump) for all model year vehicles. A visual inspection of the catalyst will be performed for model year vehicles 1984 and newer.

### (c) DFW Program Area

The emissions control device inspection for the I/M program includes a visual inspection of the EGR system, evaporative emission control system, gas cap, PCV system, TAC, and the AIS for all model year vehicles. A visual inspection of the catalyst will be performed for model year vehicles 1984 and newer.

### (d) El Paso Program Area

The emissions control device inspection for the I/M program includes a visual inspection of the EGR system, evaporative emission control system, gas cap, PCV system, TAC, and the AIS for all model year vehicles. A visual inspection of the catalyst will be performed for model year vehicles 1984 and newer.

## (9) Evaporative System Function Checks

### (a) Performance Standard

No evaporative system function checks are required when modeling the performance standard for low-enhanced I/M programs.

### (b) HGA Program Area

The evaporative system function check performed in the HGA program area is a gas cap system integrity test for all model year vehicles two years old and older. Forty percent of the pressure test credit is taken for this check per EPA guidance.

(c) DFW Program Area

The evaporative system function check included in the I/M program is a gas cap system integrity test for all model year vehicles two years old and older. Forty percent (40%) of the pressure test credit is taken for this check per EPA guidance.

(d) El Paso Program Area

The evaporative system function check included in the I/M program is a gas cap system integrity test for all model year vehicles two years old and older. Forty percent (40%) of the pressure test credit is taken for this check per EPA guidance.

(10) Stringency

(a) Performance Standard

Modeling of the low-enhanced I/M performance standard requires a 20% emissions test failure rate among pre-1981 model year vehicles.

(b) HGA Program Area

Modeling of the I/M program includes a 20% emissions test failure rate among pre-1981 model year vehicles.

(c) DFW Program Area

Modeling of the I/M program includes a 20% emissions test failure rate among pre-1981 model year vehicles.

(d) El Paso Program Area

Modeling of the I/M program includes a 20% emissions test failure rate among pre-1981 model year vehicles.

(11) Waiver Rate

(a) Performance Standard

The low-enhanced performance standard includes a 3% waiver rate provision for modeling purposes.

(b) HGA Program Area

The waiver rate for the I/M program provides a 3% waiver rate.

(c) DFW Program Area

The waiver rate for the I/M program provides a 3% waiver rate.

(d) El Paso Program Area

The waiver rate for the I/M program provides a 3% waiver rate.

(12) Compliance Rate

(a) Performance Standard

Modeling the performance standard requires a 96% compliance rate of the covered vehicles in an I/M program.

(b) HGA Program Area

The I/M program is modeled with a compliance rate of 96%.

(c) DFW Program Area

The I/M program is modeled with a compliance rate of 96%.

(d) El Paso Program Area

The I/M program area is modeled with a compliance rate of 96%.

(13) Evaluation Date

(a) Performance Standard

Modeling the performance standard for a low-enhanced I/M program requires an evaluation date of 2000 for ozone nonattainment areas and 2001 for CO nonattainment areas. For severe ozone nonattainment areas, an evaluation date of 2000 and each applicable milestone and attainment deadline thereafter is required.

(b) HGA Program Area

The I/M program in Harris county is modeled with evaluation dates of 2000, 2003, 2006, and 2008

since the HGA area is severe nonattainment for ozone. The test type will be switched from a TSI test to an ASM-2 test for Harris County on May 1, 2002. An I/M program will begin on May 1, 2003 for Galveston, Brazoria, Montgomery, and Fort Bend Counties using an ASM-2 test and these counties were modeled with evaluation dates of 2003, 2006, and 2008 to demonstrate that the area continues to meet the performance standard after the program change. In addition, ASM-2 testing will begin for Chamber, Liberty, and Waller Counties on May 1, 2005 ~~2004~~, and evaluation dates of 2006, and 2008 were used to demonstrate that the area continues to meet the performance standard.

(c) DFW Program Area

The I/M program for Dallas and Tarrant Counties is modeled with the required evaluation date of 2000 because the DFW area is serious nonattainment for ozone. However, since the test type will be switched from a TSI test to an ASM-2 test on May 1, 2002, we also modeled evaluation dates 2003, 2006, and 2008 for Dallas, Tarrant, Denton, and Collin Counties to demonstrate that the area continues to meet the performance standard after the program change in 2002.

(d) El Paso Program Area

Because El Paso is serious nonattainment for ozone and moderate nonattainment for CO, the I/M program is modeled with the earlier required evaluation date of 2000.

(C) MOBILE5a\_H Summary Output Tables

TABLES 1 - 6 reflect vehicle emissions reductions of volatile organic compounds (VOC), oxides of nitrogen (NO<sub>x</sub>), and CO (in g/mi) as calculated by EPA's MOBILE5a-H computer model for the I/M program in each of the program areas.

TABLE 1. Aggregated Dallas/Tarrant County  
MOBILE5a\_H Output (g/mi)

January 2000	VOC	NO <sub>x</sub>	CO
Performance Std.	1.569	1.791	10.151
DFW Program	1.372	1.688	8.283

January 2003	VOC	NO <sub>x</sub>	CO
Performance Std.	1.419	1.671	9.399
DFW Program	1.156	1.334	6.648

January 2006	VOC	NO <sub>x</sub>	CO
Performance Std.	1.329	1.615	9.119
DFW Program	1.065	1.275	6.276

January 2008	VOC	NO <sub>x</sub>	CO
Performance Std.	1.286	1.588	9.022
DFW Program	1.020	1.250	6.140

TABLE 2. Aggregated Denton/Collin County  
MOBILE5a\_H Output (g/mi)

January 2003	VOC	NO <sub>x</sub>	CO
Performance Std.	1.329	1.601	8.980
DFW Program	1.183	1.412	7.769

January 2006	VOC	NO <sub>x</sub>	CO
Performance Std.	1.237	1.534	8.598
DFW Program	1.003	1.248	6.069

January 2008	VOC	NO <sub>x</sub>	CO
Performance Std.	1.196	1.504	8.457
DFW Program	0.961	1.217	5.889

TABLE 3. Aggregated El Paso  
MOBILE5a\_H Output (g/mi)

January 2000	VOC	NO <sub>x</sub>	CO
Performance Std.	2.91	2.22	23.28
El Paso Program	2.50	2.06	18.61

TABLE 4. Aggregated Harris County  
MOBILE5a\_H Output (g/mi)

January 2000	VOC	NO <sub>x</sub>	CO
Performance Std.	1.393	1.736	10.992
HGA Program	1.259	1.734	9.202

January 2003	VOC	NO <sub>x</sub>	CO
Performance Std.	1.272	1.604	10.242
HGA Program	1.070	1.341	7.539

January 2006	VOC	NO <sub>x</sub>	CO
Performance Std.	1.194	1.531	9.981
HGA Program	0.981	1.272	7.036

January 2008	VOC	NO <sub>x</sub>	CO
Performance Std.	1.162	1.505	9.921
HGA Program	0.949	1.245	6.939

TABLE 5. Aggregated urban area (Galveston, Brazoria, Fort Bend, and Montgomery Counties)  
MOBILE5a\_H Output (g/mi)

January 2003	VOC	NO <sub>x</sub>	CO
Performance Std.	1.342	1.678	10.670
HGA Program	1.215	1.460	9.234

January 2006	VOC	NO <sub>x</sub>	CO
Performance Std.	1.254	1.595	10.351
HGA Program	0.994	1.257	7.049

January 2008	VOC	NO <sub>x</sub>	CO
Performance Std.	1.219	1.563	10.271
HGA Program	0.961	1.224	6.938

TABLE 6. Aggregated rural area (Chambers, Liberty, and Waller Counties)  
MOBILE5a\_H Output (g/mi)

January 2006	VOC	NO <sub>x</sub>	CO
Performance Std.	<del>1.206</del> 1.205	<del>2.014</del> 1.937	<del>9.200</del> 9.631
HGA Program	<del>1.045</del> 0.982	<del>1.836</del> 1.653	<del>7.036</del> 6.790

January 2008	VOC	NO <sub>x</sub>	CO
Performance Std.	<del>1.176</del> 1.175	<del>1.956</del> 1.884	<del>9.126</del> 9.575
HGA Program	<del>0.918</del> 0.954	<del>1.681</del> 1.598	<del>5.809</del> 6.705

