



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Biennial Report: 2008-2009

**Massachusetts Enhanced Emissions and Safety Test
Inspection and Maintenance Program**

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**BIENNIAL REPORT
MASSACHUSETTS ENHANCED EMISSIONS AND SAFETY TEST
INSPECTION AND MAINTENANCE PROGRAM
2008-2009**

1. Introduction

This report has been prepared for the U.S. Environmental Protection Agency (U.S. EPA), in compliance with the requirements of 40 CFR 51.366 (e). The information in this report covers the reporting period of calendar years 2008-2009, and supplements the program information that is contained in the 2008 and 2009 Annual Reports (these reports are available on the Mass Vehicle Check Program web site: http://massvehiclecheck.state.ma.us/about_publications.html).

The Massachusetts Inspection and Maintenance Program is an important tool for improving air quality in the Commonwealth. The program also ensures that Massachusetts cars are safe to drive. The program was established in M.G.L. c. 111, §§142J and 142M, and G.L. c.21A, §§2(28) and 16. Implementing regulations were adopted initially in January 1999 by the Massachusetts Department of Environmental Protection (“MassDEP”, at 310 CMR 60.02) and the Registry of Motor Vehicles (“RMV”, at 540 CMR 4.00-4.09).

From October 1999 through September 2008, MassDEP and RMV ran the Program through a contract executed in January 1999 with Keating Technologies, Inc. (now known as Applus Technologies, Inc.)¹. In January 2008, the Agencies signed a new contract with Parsons Commercial Technologies, Inc (Parsons). On October 1, 2008, Parsons started to operate a new program, which is described below.

The Massachusetts Inspection and Maintenance Programs have been designed to balance three goals:

- *Pollution reductions* - Vehicles with high emission levels (or in unsafe operating condition) must be identified and repaired using test equipment appropriate for today’s high-tech vehicles.
- *Motorist convenience* – The test must be as convenient as possible for Massachusetts motorists.
- *Fitting in with the automotive service industry* – Attractive business opportunities must be provided to the program’s private sector partners: the inspection stations and repair shops that test and fix vehicles.

Since October 1999, emissions and safety inspections have been performed through a decentralized network of inspection stations. Both the inspection stations and individual inspectors are licensed by RMV. This network is supplemented by inspectors who are specially licensed to conduct inspections for vehicle fleets.

From the program’s start until June 2004, most model year 1984 and newer gasoline-fueled vehicles were tested on a dynamometer, which measured emissions during driving conditions

¹ In July 2001, Keating changed its name to Agbar Technologies, Inc. (due to a change in corporate ownership). In February 2005, the firm changed its name again to Applus Technologies, Inc. This report refers to this contractor as “Applus”, the corporate name used during the period covered by this report..

simulated over a 31-second “drive trace².” The measured emissions were compared to regulatory standards for nitrogen oxides, hydrocarbons, and carbon monoxide to determine whether the vehicle passed or failed. Since June 15, 2004, most model year 1996 and newer vehicles have been tested through the vehicle’s On-Board Diagnostic (OBD) computer systems to determine whether emission control systems or related vehicle components are operating properly. Vehicles that were not equipped with modern OBD systems continued to receive transient emissions tests through July 31, 2008.

The new program that started operation on October 1, 2008, eliminated transient testing and employs only OBD testing for all vehicles required to receive an emissions test, with the exception of heavy duty diesel vehicles that are not equipped with OBD. Since 2001, heavy duty diesel fueled vehicles have received an opacity test (OBD testing is being phased in for these vehicles as model years become equipped). Opacity testing was suspended from October 2008 through September 2009 as new test equipment was being phased in.

Both the old (pre-October 1, 2008) and new (post-October 1, 2008) program provided waivers of emission standards if some repairs are made and certain other conditions are met. To help motorists who need emissions repairs, the old program established a network of registered repair technicians who are specially trained to diagnose emissions problems and repair modern vehicles effectively. This network of trained emissions repairers has been continued into the new program.

Table 1 below provides statistics describing the Massachusetts Inspection and Maintenance Program “at a glance” in 2008 and 2009.

² If a gasoline-fueled vehicle could not be given a dynamometer or “transient” test (e.g., vehicles with all-wheel drive and vehicles weighing more than 10,000 pounds), it was given a “two-speed idle or “TSI” test, which measures emissions while the engine is operating at 2500 revolutions per minute with the transmission in neutral, and while the vehicle is idling.

Table 1: Summary Statistics: Massachusetts Inspection and Maintenance Program (2008-09)

PROGRAM COMPONENT	2008 Quarters 1-3, (1/1/08-9/30/08)	2008 Quarter 4 (10/1/08-12/31/08)	2008 TOTAL	2009 TOTAL
Number of unique vehicles tested for safety or for safety and emissions (average of 4.63 million vehicles in the MA fleet)	3,475,390	883,761	4,359,151	4,542,544
Number of unique vehicles receiving an initial emissions test	1,590,683	789,655	2,380,338	3,487,313
Types of emissions tests used	OBD: 86.5% Transient: 10.0% Two-speed idle: 1.9% Opacity: 1.6%	OBD: 100%		OBD: 99.4% Opacity: 0.6%
Gasoline-fueled vehicles: --number that received initial emissions tests	1,564,484	787,861	2,352,345	3,457,598
-- number that failed their initial emissions tests	144,371 (9.2%)	70,055 (8.9%)	214,426 (9.1%)	272,363 (7.9%)
Diesel-fueled vehicles: ³ -- number that received initial OBD or opacity tests	26,199	1,794	27,993	29,584
-- number that failed their initial emissions test	197 (0.8%)	212 (11.8%)	409 (1.5%)	1,699 (5.7%)
Number of gasoline-fueled vehicles that were tested, failed emissions and did not pass a subsequent retest or obtain a waiver by March of the following year ("No Known	12,955 (0.8% of vehicles receiving an initial emissions test)	12,974 (1.6%)	25,929 (1.1%)	40,668 (1.2%)

³ Only heavy duty diesel vehicles were tested in 2008 Quarters 1-3 (GVWR >10,000 lbs.), using a snap-idle test. Diesel vehicles tested in 2008 Quarter 4 were light-and medium-duty vehicles only and received an OBD test. Opacity testing for heavy duty diesel vehicles resumed in October 2009; OBD testing of diesel vehicles continued.

⁴ While the "no known outcome" number for Quarters 1-3 (old program) in 2008 is similar to the "no known outcome" number for Quarter 4 (new program), there are some methodological issues to consider in evaluating them. The raw numbers for both periods were adjusted by removing vehicles with expired registrations that had not been renewed by

PROGRAM COMPONENT	2008 Quarters 1-3, (1/1/08-9/30/08)	2008 Quarter 4 (10/1/08-12/31/08)	2008 TOTAL	2009 TOTAL
Outcome ⁴				
Number of inspection sticker motor vehicle violations issued by state/local police	68,258	20,629	88,887	82,628
Number of transient-tested vehicles that had failed their emissions test in 2008 were successfully repaired and passed a subsequent transient test.	12,373	N/A	N/A	N/A
Emissions reduced from these vehicles	HC: 73% CO: 79% NOx: 61%	N/A	N/A	N/A
Number of waivers issued	123	8	131	7
Number of Economic Hardship Extensions Issued	(N/A)	2	2	93
Number of stations inspecting vehicles throughout the period	1,397	1,491 (as of 12/31/08)		1,383
Number of inspection stations receiving RMV site audits	4,098 (some stations were audited multiple times)	2,555		7,602 (some stations were audited multiple times)
Number of RMV enforcement actions (license revoked or suspended)	199	46	245	254
Number of licensed inspectors that performed at least one test during the period	5,561	4,517		6,306
Number of RMV enforcement actions (license suspended or revoked)	227	40	267	154

3/31/09 (presuming that these vehicles had been scrapped, wrecked, sold out-of-state or otherwise taken off the road in Massachusetts). In addition, the raw number for Quarters 1-3 was further adjusted by removing “no known outcome” vehicles that had failed a tailpipe test before August 1, 2008 (when tailpipe testing was halted) because after October 1, 2008 these vehicles could not obtain a re-test since the new program does not use this test method. The “no known outcome” number for Quarter 4 is higher than for similar periods in past years because the new program switched from a biennial to an annual testing frequency.

2. Program Changes Implemented in 2008-2009

Program Design: In 2006-07, MassDEP and RMV developed a conceptual framework for a new I&M program and procured a new contract for a program operator, as noted in the Biennial Report that covered this period. The new contract with Parsons Commercial Technology, Inc. was executed in January 2008, and work started immediately to develop the new program in preparation for its successful launch on October 1, 2008.

The program that started inspecting vehicles on October 1, 2008 maintains many significant features of the previous program. The three primary goals described above are unchanged, and the program continues to deliver a combined safety and emissions test at a decentralized network of inspection stations.

However, some changes in the program's basic design were made:

- Transient (i.e., tailpipe) testing was discontinued as of August 1, 2008, since the more than 70% of the Massachusetts vehicle fleet that was then equipped with On-Board Diagnostic II computers and this percentage is expected to reach 94% by 2012. As of October 1, 2008, the program relies exclusively on OBDII testing (except for heavy duty diesel vehicles that are not equipped with OBD systems);
- The program exempts vehicles that are 15 years old and older from OBD testing, but maintains a requirement that any vehicle emitting visible smoke must fail its safety inspection;
- The program continues to use opacity testing for emissions from diesel vehicles with a GVWR of more than 10,000 pounds, and is phasing in OBDII testing of other diesel vehicles as the fleet becomes equipped with OBDII systems: emissions testing of light duty diesel vehicles (weighing less than 8,500 pounds GVWR) started with model year 1997 and emission testing of medium duty diesel vehicles (weighing between 8,501 and 14,000 pounds GVWR) started with model year 2007;
- Requirements of U.S. Department of Transportation commercial vehicle safety inspections have been incorporated into Massachusetts safety inspections of commercial vehicles, so that these vehicles receive only one inspection that satisfies both federal and state requirements; and
- The program's data systems have been improved and their connection to RMV's primary data base has been strengthened, so that "off-line" inspections have been prohibited.

MassDEP submitted a proposed revision to the State Implementation Plan for Vehicle Inspection and Maintenance (based on modeling using EPA's prescribed MOBILE 6 model) to EPA on June 1, 2009. The submittal demonstrated that the new program will be at least as effective in achieving emission reductions as the old one, with the possible exception of the new program's first year (in which an expected increase in NOx emissions was deemed to be insignificant, since the model did not account for emission reductions from vehicle repairs carried over from the previous program).

Funding: Changes in the structure of program funding were made in October 2008 to correspond with the change in Network Contractors. The \$29 fee for each vehicle inspection (which was established in regulation in 1999 and covers safety as well as emissions tests) remained in place. From January 1, 2008 to September 30, 2008, inspection stations continued to retain \$20.50 of the fee. The remaining \$8.50 was deposited into the Commonwealth's

“Inspection and Maintenance” Trust Account, which is managed by RMV. From this account, Applus Technologies, Inc. was paid \$5.803 for each “paid” inspection.

Beginning October 1, 2008, inspection stations retained \$22.50 of the fee (a \$2 increase from the previous program) and the remaining \$6.50 was deposited into the Trust Account. From this account, Parsons Commercial Technology Group, Inc. was paid \$1.74 for each of the first 4.4 million “paid” inspections, and \$0.60 for each additional “paid” inspection thereafter. MassDEP and RMV used the remaining funds to oversee the program (e.g., auditing testing equipment at inspection stations and ensuring that inspectors are conducting tests properly). MassDEP was provided with funds from the Trust Account through an Inter-Agency Service Agreement with RMV, which has been updated annually.

Funding levels from the Inspection and Maintenance Trust Fund for the program were generally stable in 2008-09. Applus Technologies, Inc. was paid \$5,682,540 in FY 2009 for inspections performed from July 1, 2008 through September 30, 2008. Parsons Commercial Technology Group, Inc. was paid \$5,750,905 in FY 2009 for inspections performed from October 1, 2008 through June 30, 2009. RMV’s expenditures totaled \$30,980,866 in FY 2009. MassDEP’s expenditures totaled \$2,368,650 in FY 2009.

Personnel Levels: Staffing levels for the Massachusetts Inspection and Maintenance Program have been generally stable since the program’s inception. In FY 2009, RMV assigned 57.5 staff (full time equivalents) to the Program, and MassDEP had 15 staff assigned during the fiscal year

Procedures: Between January-September 2008, the program was operated in accordance with procedures that were established in previous years (and described in previous Biennial Reports). During this period, work focused on developing the new program and preparing to start implementation on October 1, 2008. To this end, opacity testing of heavy duty diesel vehicles was halted on August 1, 2008 to allow the program contractor to allow the program contractor to design, test, and install new test equipment and software. Opacity testing resumed on October 1, 2009. After October 1, 2008, work focused on dealing with implementation bugs that were identified after the new program started operations (described below).

Program Authority (Legislation and Regulations): The Program’s authorizing legislation was not amended in 2008 or 2009. However, amendments to the program’s regulations (310 CMR 60.02 and 310 CMR 60.02) were promulgated on September 5, 2008 to implement the new program’s conceptual framework described above.

3. Program Issues Identified and Corrected

In 2008-09, work focused on developing and starting implementation of the new program, and on working out early implementation issues. Between January 1 and September 30, 2008, the program operated as designed in 1999 and improved through contract amendments in 2004 and 2006 (described in previous Biennial Reports), without significant issues. Once the new program started to operate on October 1, 2008, a number of “early implementation” issues were identified and corrected. These included:

- *Workstation Delivery and Setup:* some stations ordered their workstation much later than the July 21 deadline and could not be assured of delivery by October 1. In some cases, the leasing company requested additional information needed for financing, and the stations did not provide a timely response, delaying approval of the financing and purchase of the

workstation. Many stations also waited to the last minute to try to initialize their workstations, and ran into problems, which were usually related to improper Internet connections or improper equipment setup. These issues were resolved by the contractor, providing start up advice through the Technical Support Hotline or a site visit by a Field Service Representative.

- *OBD testing issues:* First, an unusual number of vehicles failed the emissions test because their OBD systems were reporting there were no emission control systems in the vehicles. These vehicles were being directed to Motorist Assistance Centers (MACs) for follow-up testing. Second, an unusual number of vehicles failed the emissions test because their vehicles would not communicate with the Parsons/SGS workstation. Third, a very small group of vehicles consistently failed the emissions test because the OBD system was not reporting the engine as running during the test. Work-arounds were quickly identified and implemented to minimize any inconvenience for the motorist due to the false failures and to allow vehicles referred to MACs to be retested successfully within 15 minutes. Revised software that dealt with most of these issues was distributed to inspection stations on October 6, 2008.
- *Volume of calls to the Technical Support Hotline during the new program's start-up period:* the number of calls placed by inspectors and inspection station owners to the Technical Support Hotline overwhelmed the contractor's staff for this service during the initial startup period. The contractor responded very quickly by adding staff from other Parsons' units, and was able to respond to most calls within a reasonable period of time. This problem subsided by the end of October 2008, as more stations got their testing equipment installed and as inspectors grew more accustomed to the new equipment and procedures.
- *Transition to single inspections for commercial vehicles:* only a small number of commercial vehicle inspectors were licensed and could start performing inspections on October 1, 2008. Training and licensing continued, and the number of inspectors soon grew to meet the demand for this service.
- *Stickers and Sticker Printing:* Stations voided a large number of stickers early in the new program, as they ran into problems with printing (pulling more than one at a time through the printer), sticker pack quality (stickers skipped numbers in the sticker packs), defective equipment causing multiple stickers to print, and inspectors not paying attention to the prompts at the end of the test. This contributed to a larger number of stickers being used than anticipated, straining supplies. The sticker supplier addressed the quality problems with the sticker packs, which were more prevalent in an early production run. Inspection stations were guided to become more familiar with the steps needed to resolve sticker sequencing problems, and with prompts about sticker printing on the workstation at the end of each test.

While these issues identified all required attention from the program contractor and Agencies to resolve expeditiously, they only affected a very small portion of the tests that were administered in the first quarter of the new program's operation. By the end of the first day of the new program, 972 stations had performed nearly 21,000 inspections. By the end of the second day, there were 1,070 stations, and another 20,000 inspections were performed. By the end of the first week, there were 1,231 stations performing inspections, and 131,000 inspections had been performed. By December 31, 2008, 1,491 inspection stations had performed a total of 789,655 inspections since the new program started.

In addition, we note that Massachusetts did not start a state-wide registration enforcement program in 2008-09. Responsibility for enforcement against motorists who fail to get their vehicles inspected or fail to pass their inspection is shared by the Registry of Motor Vehicles, and local and state police. Since the program's inception, RMV's enforcement efforts have focused primarily on ensuring that inspectors and inspection stations properly administer the test, while local and state police have issued citations to motorists found to be driving vehicles without proper inspection stickers.

While state and local police continue to issue tickets for vehicles they find on the road without proper inspection stickers, the RMV's registration enforcement program, originally scheduled to begin in late 2004, had not been implemented by the end of 2009.

RMV recognizes the need to have a registration enforcement program to enhance its efforts to ensure that motorists comply with the requirements of the Massachusetts I&M program. However, in today's era of unprecedented state resource limitations, the Agency's aging information technology infrastructure cannot support a registration enforcement program while also meeting the data requirements of the other federal programs that the Agency works under (which are increasing at unparalleled levels). The RMV is continually exploring more cost-effective ways to get this job done in a proficient manner, and is working to replace its primary database. The replacement is expected to provide significantly more efficient data processing, which would allow the Agency to move forward with the development and implementation of a successful registration enforcement program.

The RMV continues to be committed to the registration enforcement requirement and is anxious to see it implemented. At the same time, the Agency observes that Massachusetts enjoys a compliance rate that exceeds 90% in database surveys and 95% in actual parking lot surveys, which is similar to the rates found in many other states.

4. Reports Referenced

- Annual Reports to the U.S. Environmental Protection Agency describing the implementation of the Massachusetts Enhanced Emissions and Safety Test Program for 2000 (which includes the program operations between October 1, 1999 and December 31, 2000) –2009 can be found at the program's web site: www.mass.gov/vehiclecheck.
- Biennial Reports to the U.S. Environmental Protection Agency describing the program in 2000-01-02, 2002-03, 2004-05, and 2006-07 can also be found at the same web site.