



2007 Annual Report
Ohio Vehicle Emissions Testing Program

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ATTACHMENTS

Attachment A: Index of Report Pages Relevant to EPA Regulation Sections

Attachment B: Detailed 2007 Emission Reduction Test Data

1 Executive Summary

This document is the 2007 Annual Report for the United States Environmental Protection Agency (U.S. EPA) on the Ohio Enhanced Inspection and Maintenance Program (I/M Program) known as E-Check. This report covers January 1 to December 31, 2007.

This annual report is required by U.S. EPA under 40 CFR 51.366. U.S. EPA requires this report to cover four categories of information:

- emissions test data;
- quality assurance information;
- quality control information; and
- compliance and enforcement actions.

1.1 Major Findings

Emissions Tests Conducted

In 2007, there were approximately 2.26 million vehicles registered in northeastern Ohio. A biennial vehicle emission test is required for the majority of the fleet; exemptions exist for vehicles four years old and newer and pre-1983 model year vehicles. In 2007, 882,832 vehicle emission tests were performed, including initial tests, retests, and off-cycle tests due to change of ownership/registration. Only 3,831 of the emission tests performed were opacity tests on diesel-fueled vehicles.

Compliance and Enforcement

If a vehicle fails a retest and has had repair work performed on the emission control system, the vehicle may be eligible for a waiver. Of the 68,558 vehicles that initially failed the E-Check test in 2007, 9,230 vehicles, or 7.4 percent subsequently received a waiver. Some of the vehicles that initially failed E-Check did not obtain a passing test or waiver. While it is difficult to track what happened to these vehicles, some are taken out of service entirely and some are sold to new owners residing in non-E-Check counties where ground-level ozone has been less of a problem. Some owners may attempt to illegally register a failing vehicle in a non-E-Check county, but Ohio EPA and Ohio Bureau of Motor Vehicles (BMV) work together to stop these illegal registrations. In 2007, all 65 investigations by Ohio BMV Special Investigations Unit for E-Check related vehicle registration violations determined motorists were attempting to bypass the vehicle emission testing requirement in the county of residence. In all 65 cases motorists either corrected the registration and had the vehicle tested or the registration was cancelled on the vehicle.

Emissions Reductions from Transient Tested Vehicles

U.S. EPA requires states to calculate emission reductions from vehicles that are repaired after failing a “transient” emissions test. More than 25,800 transient tested vehicles that failed the first test and passed at a later date following repairs have an average emission improvement of 68 percent for hydrocarbon, 87 percent for carbon monoxide, and 47 percent for oxides of nitrogen.

Quality Assurance

In 2007, Ohio EPA performed 2,465 site audits to determine if stations are correctly performing all emissions tests and if the station's physical conditions meet all state requirements. All 23 stations operating throughout the year received a minimum of 21 on-site audits. As a result of these audits, there were no performance issues identified that warranted a shut down of a station. Ohio EPA, however, found 19 instances that could be considered a violation of the technical aspects of the contract. As a result of these items being identified, Envirotech Systems took actions with its employees that ranged from retraining to disciplinary reporting actions.

2 The Ohio I/M Program

2.1 Purpose and Statistics of the Ohio E-Check Program?

Northeast Ohio is designated "moderate" nonattainment for the federal standards for ground-level ozone. To comply with the federal Clean Air Act Amendments of 1990 and EPA regulations, northeast Ohio must maintain an I/M Program¹. The U.S. EPA sets minimum standards for I/M Programs².

Ohio EPA administers the vehicle emissions testing program, or E-Check, as authorized by Ohio Revised Code (ORC) 3704.14. The goals of the E-Check program are to identify gross-polluting vehicles for repair, and provide a fair and accurate test with minimum inconvenience to Ohio's motorists. In 1996, Ohio contracted with Envirotech Systems to operate the Ohio I/M Program in the Dayton-Springfield, Cincinnati, and Akron-Cleveland areas. In 2005, the contract was extended for an additional two years in northeast Ohio with Envirotech Systems.

2.1.1 Ohio I/M Program Summary

40 CFR 51.366 (d) (1) (i) An estimate of the number of vehicles subject to the inspection program, including the results of analysis of the registration data base;

In 2007, there were approximately 2.23 million vehicles registered in northeast Ohio. The vast majority of these vehicles are tested biennially. In 2007, 773,919 vehicles were expected to undergo emission testing. In 2007, vehicles were exempted from the emissions testing process if they were:

¹ These programs are established in a legally binding and federally enforceable "State Implementation Plans" or "SIPs".

² 40 CFR Part 51 Subpart S (§51.350 et seq.)

- model year 1982 or older;
- model year 2004 or newer;
- greater than 10,000 pounds gross vehicle weight rating;
- motorcycles, recreational vehicles and motor homes; or
- vehicles operating on alternatively fuels, such as propane or natural gas

Vehicles are required to have a valid vehicle emission certificate prior to titling or prior to registration.

2.1.2 Inspection Stations

40 CFR 51.366 (b)(1)(i): The number of inspection stations and lanes operating throughout the year:

All Ohio vehicles receive their inspections at one of the facilities operated by Envirotest Systems. In 2007, 23 stations and 79 lanes conducted emissions test throughout the year.

2.1.3 Inspectors

40 CFR 51.366 (b) (5) The number of inspectors licensed or certified to conduct testing;

Table 1: Number of Inspectors in 2007

	# of Inspectors
Trained and Licensed to conduct testing in 2007	359

2.1.4 Emissions Tests Administered

The Ohio I/M Program uses five different emissions tests. Gasoline-fueled vehicles receive gas cap tests and one of the following tests: On-Board Diagnostic (OBD II), transient (tailpipe), or two-speed idle (tailpipe). Diesel-fueled vehicles receive an OBD II or opacity test. Each type of test is described below. All vehicles also are visually inspected to confirm that a gas cap and catalytic converter are present. If a vehicle fails the visual inspection, it fails the overall test, even if it passed the emissions portion of

the test. Fails for vehicles not having a catalytic converter do not receive an emissions test but do receive the gas cap test.

1. Gas cap tests check the vehicle's gas cap pressure to ensure the cap seals tightly and does not allow fuel vapors to evaporate into the air. If the vehicle fails the gas cap test, it fails the overall emissions test, even if the vehicle passed the exhaust portion of the test.

2. On-Board Diagnostics: On-board diagnostics (OBD II) is a complex computer pack installed on 1996 and newer cars and light trucks and 1997 and newer diesel vehicles. The computer continuously tracks and stores information about a vehicle's performance. The on-board computer turns on the "check engine" light if it finds a problem with a vehicle's emission control system. On January 5, 2004, Ohio began testing vehicles equipped with the OBD II system. During the initial test in a vehicle's test cycle that are 2000 model year or older with 3 or more readiness monitors not set to ready, or vehicles that are 2001 or newer with 2 or more readiness monitors not set, the vehicle may be tested with the transient test. In 2007, 69.1 percent of vehicles receiving emissions tests were tested using the OBD II system.

3. Transient tailpipe tests are used for most gasoline-powered vehicles that are not equipped with the OBD II equipment. For this test, Acceleration Simulation Mode (ASM 2525) standards are used. Vehicles are placed on a dynamometer, a treadmill-like device that puts resistance against the tires to simulate on-road driving. The vehicles are driven at 25 miles per hour for a minimum of 25 seconds and a maximum of 240 seconds. Tailpipe emissions are then measured and recorded. Readings for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) are compared to each pollutant's pass/fail points. The pass/fail points vary by vehicle type (car vs truck), model year, and, for trucks, weight category. In 2007, 30.8 percent of vehicles receiving emissions tests were tested using the transient tailpipe test.

4. Two-speed idle tests are used for gasoline-fueled vehicles that cannot receive an OBD II or transient test. This test measures emissions while the engine is operating at an elevated idle of 2,500 revolutions per minute (rpm) with no load on the engine which is followed with checking the vehicle emissions at idle upon failure of the loaded portion. The test measures HC and CO concentrations. This test does not measure NOx emissions. In 2007, 3.6 percent of vehicles receiving emissions tests were tested using the TSI test.

5. Opacity tests use opacity meters to determine the "density" of the exhaust emitted from the vehicle's tailpipe. In 2007, 0.4 percent of vehicles receiving emissions tests were tested using the opacity test.

2.2 Do the right vehicles get tested?

2.2.1 Overall motorist compliance with testing requirements

40 CFR 51.366 (d) (1) (ii): The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles:

In Ohio, the inspection lane computers determine which test a vehicle will receive based on model year and make information. Table 2 summarizes the 2007 overall compliance rate of the total number of vehicles receiving an I/M test and the number of unique registered vehicles in 2007 subjected to the test. In 2007, the compliance rate was 97.9 percent

Table 2: Motorist Compliance with Testing Requirements

	Vehicle Count	Compliance %
Overall Testing Compliance		
Vehicles Subject to 2007 Test	807,799	
Vehicles Tested in 2007	790,581	97.9%

In 2007, 13,030 of the 68,558 vehicles that failed their initial test did not receive a passing test, exemption, extension, or waiver before March 1, 2008.

2.2 Motorist Time Extensions

40 CFR 51.366 (d) (1) (v) The number of time extensions and other exemptions granted to motorists;

The E-Check program offers waivers to individuals who make an effort to repair their vehicles but cannot get them to pass E-Check. In most cases, a waiver will allow the vehicle to be registered with the State and allow the motorist two years to make emissions repairs. If an individual spends at least \$200 on emissions-related repairs for a 1995 or older vehicle, shows a 30 percent improvement in emissions readings between at least two failed tests, and passes a visual anti-tampering inspection he or

she may qualify for a conditional pass waiver. There is also a repair cap waiver that allows the motorist to register the vehicle if he or she spends at least \$300 on emissions-related repairs, regardless of emissions improvements and passes a visual tampering inspection. When a waiver is issued, the vehicle does not need to test for two years, or the next scheduled E-Check test, whichever comes first.

Ohio EPA offers a variety of extensions and exemptions to individuals who need more time to repair a vehicle or cannot have the vehicle tested at the current time.

- Non-permanent exemptions only apply to those individuals who can have their vehicle tested out-of-state, are in the military, are currently a student outside of Ohio, or have a vehicle that will not return to Ohio within one year. The exemption allows a motorist to register the vehicle without receiving an E-Check test.
- Extensions are only available to individuals who need more time to have repairs performed, have difficulty affording repairs for the vehicle or are temporarily located out-of-state in an area that does not have emissions testing and will return within one year. Extensions only extend the period of time that a vehicle has to comply with the program. A motorist has up to four to six months, depending on the type of extension, to comply with the current testing cycle.
- Permanent exemptions from testing are issued for vehicles with a gross vehicle weight rating (GVWR) over 10,000 pounds or operating on an alternative fuel source such as electric power, natural gas, butane, propane, and 100 percent alcohol.

Out-of-state exemptions, which require the motorist to have the vehicle tested in another state's testing program, account for the highest number of exemptions issued. The remaining exemptions allow the motorist to renew the vehicle's registration without ever receiving a test.

The extensions require that a vehicle receive a test, but more time is provided to have it completed. The category of "other" in Table 3 includes special circumstances such as survivor and trust non-permanent exemptions that would require a vehicle to be tested out of its normal test cycle.

Vehicles that run on electricity or alternative fuel, such as propane or natural gas, may receive a permanent exemption from the emission test requirement. Prior to receiving any permanent exemption, the vehicle must be inspected by authorized Ohio EPA Mobile Source Section personnel. The inspection will include an anti-tampering inspection to ensure that all necessary emission control equipment is correctly installed on the vehicle. Any vehicle that does not pass the necessary inspection will be subject to the vehicle emission testing requirements. Vehicles that are more than 10,000 pounds gross vehicle weight and are plated with non-commercial plates also will be

subject to inspection by authorized Ohio EPA Mobile Sources Section personnel prior to receiving a permanent exemption from the vehicle emission testing requirement.

Table 3: Number of Extensions of Exemptions Issued in 2007

Type of Time Extensions or Exemptions	Number Issued
Extension	772
Waivers	9,230
Permanent Exemption	295
Out of State Exemption	2,034
Student Exemption	183
Military Exemption	447
Hardship Extension	509
Other	19
Total Number of Extensions of Exemptions Issues	13,489

2.3 Registration File Audits and Compliance and with Deadlines

40 CFR 51.366 (d)(2)(i) A report of the program’s efforts and actions to prevent motorists from falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration, and the results of special studies to investigate the frequency of such activity; and

(ii) The number of registration file audits, number of registrations reviewed, and compliance rates found in such audits

Ohio EPA works with Ohio Bureau of Motor Vehicles (BMV) Special Investigations Unit (SIU) to ensure that motorists are not falsely registering vehicles outside of a testing area to circumvent the testing requirements. When Ohio EPA receives a complaint regarding false registrations, Ohio EPA forwards the complaint to Ohio BMV SIU for investigation. Ohio BMV Registrar Offices also will forward any concerns they have about suspicious registrations along to the SIU Division. Overall in 2007, Ohio BMV SIU investigated 65 complaints regarding E-Check compliance. All 65 investigations demonstrated vehicle registration violations for E-Check.

At this time, no registration file audits are performed to determine compliance with the vehicle emission testing program in northeast Ohio.

3 Is the testing equipment reliable?

40 CFR 51.366 (c) Quality Control Report: The program shall submit ... basic statistics on the quality control program for January through December of the previous year, including:

- (1) The number of emission testing sites and lanes in use in the program;
- (2) The number of equipment audits by station and lane;
- (3) The number and percentage of stations that have failed equipment audits; and
- (4) Number and percentage of stations and lanes shut down as a result of equipment audits.

Within the Ohio I/M Program, there are 23 emission testing stations operating a total of 79 lanes.

Ohio EPA's equipment audit procedure is designed to verify the lane equipment is operating within the tolerances specified by federal and State guidelines. Equipment audits are inspections of emissions testing equipment performed overtly at least two times per year per lane. Ohio EPA's equipment audits are performed by Agency staff and a contractor representative. If a lane fails any one of the audit criteria, the audit result is a fail and the lane is shut down until the issue is resolved.

Envirotest Systems, Inc. equipment is required to undergo self-tests on either a per test, hourly, or weekly basis. The computer system will lock-down a lane if a self-test is not performed at the required time. The lane lock-down results in no additional vehicle testing occurring until the test is complete.

In 2007, each lane received a minimum of three equipment audits. A total of 310 equipment audits resulted in 291 audit passes and only 19 audit failures, or an overall failure rate of 6.5 percent. The 19 equipment audit failures occurred at 11 unique stations, or 47.8 percent of the stations, and across 17 unique lanes, or 21.5 percent of the lanes.

Table 4: Number of Equipment Audits at Each Testing Station

Facility	Number of Equipment Audits in 2007
WESTLAKE	16
BEREA	13
NORTH ROYALTON	12
PURITAS	20
EAST 55TH	15
VALLEY VIEW	16
ST. CLAIR	16

WARRENSVILLE	20
EUCLID	18
WILLOUGHBY	9
PAINESVILLE	6
CHARDON	7
AUBURN	6
ROOTSTOWN	10
KENT	13
TWINSBURG	13
CUYAHOGA FALLS	13
BROWN STREET	26
COPLEY	19
MEDINA	12
SPENCER	8
AMHERST	12
ELYRIA	15

4 Quality Assurance

4.1 Overt and Covert Audits

Ohio EPA performs overt and covert performance audits to assess station and inspector performance. The results of the different types of audits are detailed below.

4.1.1 Overt Audits

40 CFR 51.366 (b) (1) (i) The number of inspection stations and lanes operating throughout the year;

For 2007, there are 23 stations operating 79 emission testing lanes.

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:
 (i) Receiving overt performance audits in the year
 (ii) Not receiving overt performance audits in the year;

During overt performance audits, Ohio EPA staff verify that Envirotest Systems personnel are performing the emissions test in the proper manner, while providing adequate customer service to Ohio's motorists. The performance audit is broken into three sections. The first section is *Test Procedures*, designed to evaluate how well the inspectors perform the emissions test procedures and interact with the motorists. The second section is *Safety Conditions*, designed to evaluate if Envirotest provides motorists with a safe testing environment. The third section is *Station Appearance*, designed to evaluate if the stations are being kept in a customer friendly condition. Ohio EPA staff record audit findings on a form and conduct exit interviews with the station manager, informing the station manager of the results.

All 23 stations and 79 testing lanes operating in 2007 received overt performance audits. The number of overt audits per lane ranged from 1 audit to 19 audits in 2007. Upon arriving at a station, Ohio EPA staff will audit only the lanes that are open for testing during a performance audit.

40 CFR 51.366 (b) (2) (v) Number of stations and lanes ... that have been shut down as a result of overt performance audits;

No station or lane was shut down as the result of an overt performance audit in 2007.

4.1.2 Covert audits

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:
(iii) Receiving covert performance audits in the year;
(iv) Not receiving covert performance audits in the year;

During covert audits, Ohio EPA staff will verify that Envirotest Systems personnel are performing the emissions test in the proper manner, while providing adequate customer service to Ohio's motorists. The *Test Procedures* section of the covert audit is identical to the *Test Procedures* of the overt audit and is scored as such.

All stations received covert performance audits in 2007. Only 54 unique testing lanes received covert audits in 2007. The small number of covert audits performed is a result of staffing issues within the Mobile Sources Section of the Ohio EPA.

40 CFR 51.366 (b) (8) The total number of covert vehicles available for undercover audits over the year; and
(9) The number of covert auditors available for undercover audits.

Ohio EPA dedicates three vehicles for covert audits. The vehicles are tampered prior to testing to ensure that the vehicle fails the proper emission tests. Ohio EPA has two auditors to perform covert audits. In addition, interns are hired to work during a three to six month period to supplement and assist in trying to achieve covert audit goals.

4.1.3 Covert audit results

- 40 CFR 51.366 (b) (3) The number of covert audits:
- (i) Conducted with the vehicle set to fail per test type;
 - (ii) Conducted with the vehicle set to fail any combination of two or more tests;
 - (iii) Resulting in a false pass per test type;
 - (iv) Resulting in a false pass for any combination of two or more test types;

Most covert vehicles are set up to fail the tailpipe test, and, if applicable, not allow the OBD II test to be performed by clearing the readiness monitors. A “false pass” during a covert audit is an inspection pass when the vehicle was set to fail. The audit does not directly indicate whether the false pass was a result of the equipment or the inspector. If a false pass was the result of the improper test being performed on the vehicle, Ohio EPA initiates enforcement action against Envirotest Systems. Most times, Envirotest Systems provides proper test procedures and/or additional training as follow-up action against false passes.

Table 5: 2007 covert audit results

Conducted with the vehicle set to fail per test type	
ASM	46
OBD	0
Conducted with the vehicle set to fail any combination of two or more test types	
ASM & OBD	26
Resulting in a false pass per test type	
ASM	0
OBD	0
Resulting in a false pass for any combination of two or more test types	
ASM & OBD	5

As seen in table 5, five of the 72, or seven percent, of the covert audits resulted in false passes.

4.2 *Inspector Performance*

As stated in Section 2.1.3, 359 inspectors were licensed or certified to conduct testing in 2007.

40 CFR 51.366 (b) (4) The number of inspectors and stations:
 (i) That were suspended or fired or otherwise prohibited from testing as a result of covert audits
 (ii) That were suspended, fired, or otherwise prohibited from testing for other causes, and
 (iii) That received fines;

40 CFR 51.366 (b) (6) The number of hearings:
 (i) Held to consider adverse actions against inspectors and stations; and
 (ii) Resulting in adverse actions against inspectors and stations;

Ohio EPA and Envirotest Systems, Corp. keep record of all fraud and bribery issues occurring at the testing stations. All cases brought to either Ohio EPA or Envirotest Systems, Inc. are investigated thoroughly. If the situation warrants use of other agencies, such as the Ohio State Highway Patrol, the agencies work together to resolve these cases. Many of the fraud and bribery cases involve customers attempting to bribe an inspector for a passing test. Few cases involve fraud or bribery on the part of a station inspector. The table below summarizes the results of Ohio EPA's enforcement actions against stations and inspectors.

Table 6: Non-customer initiated fraud and bribery cases

The number of inspectors and stations	# inspectors	# stations
That were suspended, fired, or otherwise prohibited from testing as a result of covert audits	0	0
That were suspended, fired, or otherwise prohibited from testing for other causes	1	1

4.3 *Fines collected*

40 CFR 51.366 (b) (4) The number of inspectors and stations:... (iii) that received fines
 40 CFR 51.366 (b) (7) The total amount collected in fines from inspectors and stations;

Ohio EPA has not collected fines from stations or inspectors.

4.4 Station Compliance Documents

40 CFR 51.366 (d) (1) (iii) The total number of compliance documents issued to inspections stations;
(iv) The number of missing compliance documents;
(vi) The number of compliance surveys conducted, number of vehicles surveyed in each, and the compliance rates found.

Ohio EPA works with Envirotest Systems and Ohio BMV to ensure that no false compliance documents may be passed to Ohio BMV, resulting in vehicle registrations being approved. Each compliance document is printed with a specific type of printer, making the print difficult to copy. Furthermore, each compliance document issued contains a code that the BMV will verify prior to registration issuance. If the compliance code on the compliance certificate cannot be verified, Ohio BMV will reject the vehicle registration attempt.

5 Emission Tests Results

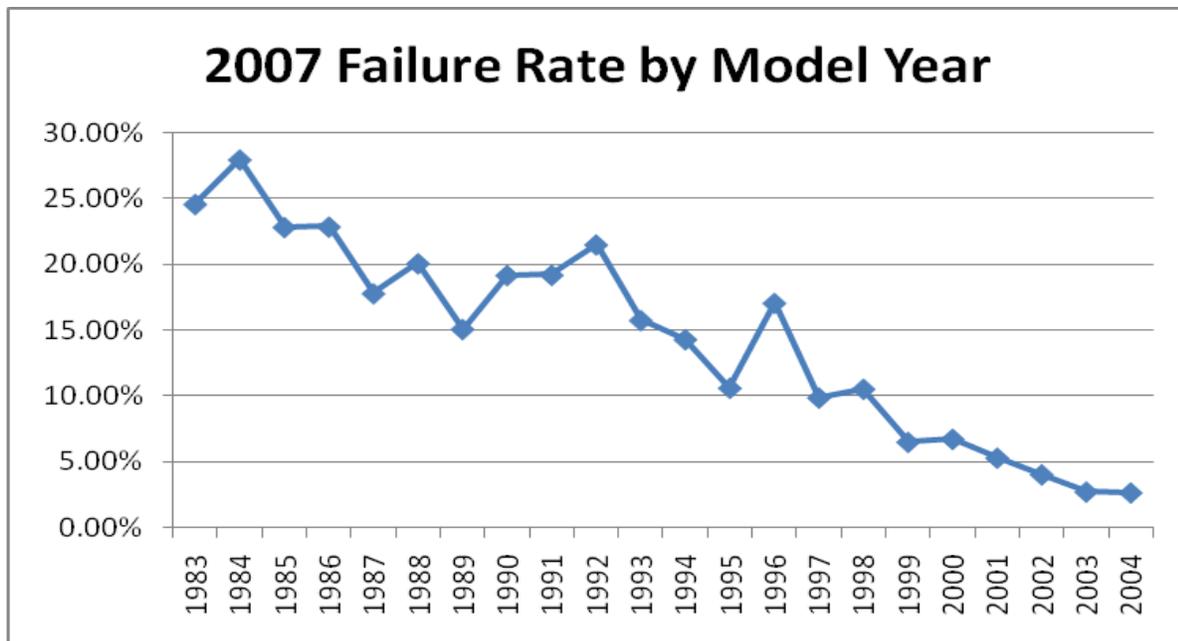
Of the 807,799 unique vehicles that received an emissions test in 2007, 68,558 vehicles, or 8.5 percent, failed their initial test. The Ohio E-Check program requires that vehicles repair the vehicle and receive a passing test, waiver, or extension prior to the vehicle registration date.

Please note:

- Waivers were issued to vehicles that had repairs performed and were still unable to pass a re-test. In 2007, waivers were granted to 9,230 vehicles, or 13.5 percent, that initially failed the vehicle test.
- Of the vehicles that failed the initial test during 2007, 13,030 vehicles, or 19.0 percent, had neither passed a re-test, obtained a waiver, or obtained an extension as of March 1, 2008.

Details of all 2007 emission test results are available on the Ohio EPA web site at <http://www.epa.state.oh.us/dapc/echeck/whycheck/ar2007sd.html>.

The following figure shows 2007 emission failure rates by model year. As can be seen, the age of a vehicle has a significant impact on failure rate.



5.1 Emission Reductions from Repaired Transient-tested Vehicles in 2007

40 CFR 51.366 (a) (5) The average increase or decrease in tailpipe emission levels for HC, CO, and NOx after repairs by model year and vehicle type for vehicles receiving a mass emissions test.

U.S. EPA requires states to calculate emissions reductions from vehicles that are repaired after failing a transient test. Approximately 30,500 transient-tested vehicles that failed their initial test were successfully repaired and passed a transient retest. Vehicles showed an average reduction of 68 percent for hydrocarbons (HC), 87 percent for carbon monoxide (CO), and 47 percent for oxides of nitrogen (NOx). A breakdown of average improvement by vehicle model year and type is shown in Attachment B.