OHIO'S VEHICLE EMISSIONS TESTING PROGRAM

2004 Annual Report

Ohio E✓Check

Vehicle Emissions Testing Program

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Acronym List

CAA..... Clean Air Act

CO..... carbon monoxide

EPA..... Environmental Protection Agency

HC..... hydrocarbon

I/M ..... inspection and maintenance

NAAQS..... national ambient air quality standards

NOx..... oxides of nitrogen

OBD ..... on-board diagnostics

Ohio EPA .... Ohio Environmental Protection Agency

PPB..... parts per billion

RSD..... remote sensing device

SIP ..... state implementation plan

VOC..... volatile organic compound

Introduction

Ohio EPA has measured air quality benefits from the State's vehicle emissions testing program. In 2004, vehicles that failed the initial test and eventually passed a subsequent test showed an average improvement of 64 percent for hydrocarbon (HC), an average improvement of 85 percent for carbon monoxide (CO), and an average improvement of 53 percent for oxides of nitrogen (NOx). These numbers are lower than they were in previous years, but that is because only data from vehicles that received the tailpipe test went into the calculation. On-Board Diagnostics (OBD) testing began in 2004. During OBD, test results are not based on what is coming out of the tailpipe, like it is for the test given to older vehicles. OBD retrieves the stored emission control system information from the vehicle's on-board computer. OBD-equipped vehicles, 1996 model year and newer, represent 58 percent of the fleet statewide.

Air monitors in Ohio also indicate that air quality is improving in the E-Check counties. On average, one exceedance of the 1-hour standard is allowed each year. The ozone levels were much higher in the 14 E-Check counties than in the rest of the state before automobile emissions testing began. Since E-Check was implemented, ozone levels have decreased, although they remain slightly higher than in the rest of the state. E-Check is part of a comprehensive air quality plan that is helping to improve air quality in these areas.

I. 2004 Test Results

The following table shows the test volume and pass/fail statistics for all tests, including retests. The total fails include all vehicles that failed for one or more factors including emissions, gas cap or missing catalytic converter. The HC, CO, NOx, gas cap and catalytic converter fails show how many times such a failure occurred. These totals equal more than the total fails because one vehicle can fail for multiple reasons. The percentages are calculated for total tests conducted.

Table 1: Total Test Results from 2004

Total Vehicles Tested:	Total Vehicles Passed:	Total Vehicle Fails:	HC Only Fails:	CO Only Fails:	NOx Only Fails:	Gas Cap Only Fails:	Catalytic Converter Only Fails:
1,985,915	1,728,594	257,321	50,048	51,094	117,279	44,705	1,002
	87.04%	12.96%	2.52%	2.57%	5.91%	2.25%	0.05%

Figure 1 on the next page shows how the fail rate varies depending on model year. Model years from the early- to mid-1980s comprise the highest percentage of failures. Once vehicles reach 10 to 15 years old, they begin to need more than normal maintenance to keep them in good working order.

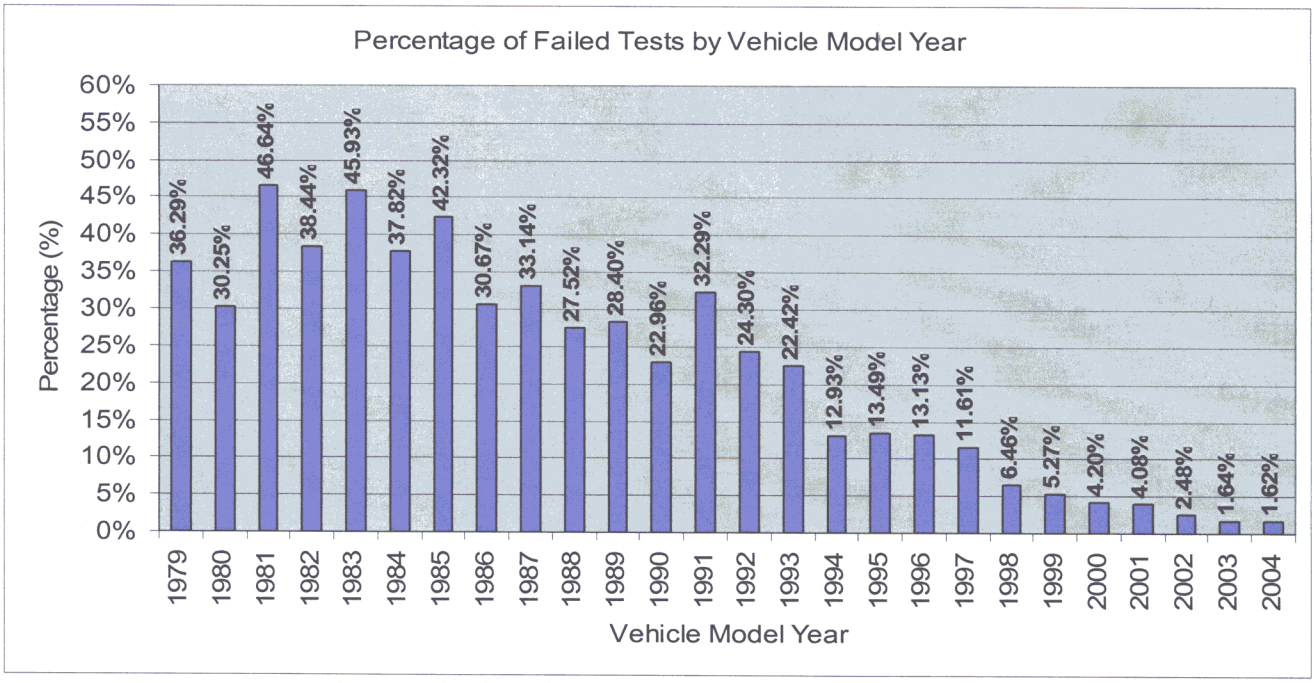

Figure 1: Percentage of Failed Tests by Model Year

Figure 2 shows the actual number of failures for each model year. Model years from the late 1980s and early-to mid-90s comprise the highest number of failures in the E-Check program. This is primarily due to the large number of vehicles that are tested in this age group.

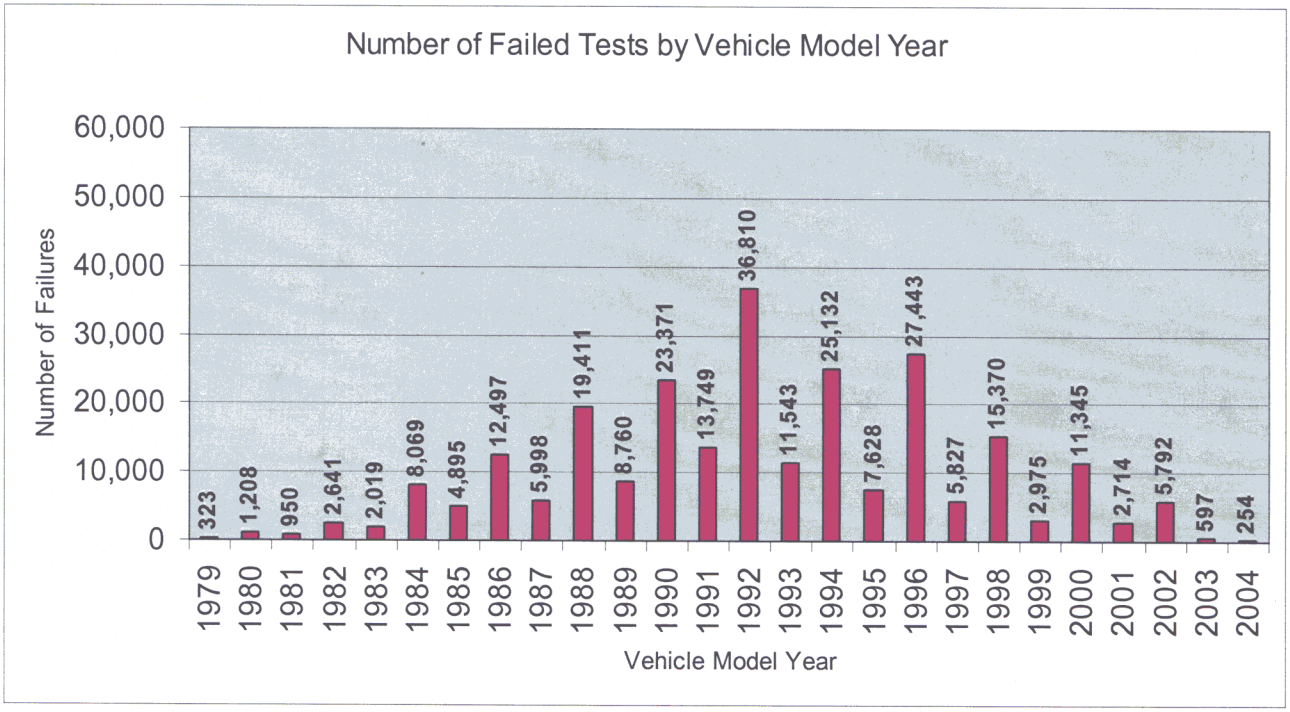

Figure 2: Number of Failed Tests by Vehicle Model Year

The following three graphs show the average hydrocarbon (HC), carbon monoxide (CO) and oxides of nitrogen (NOx) readings for each model year. There is an average reading for vehicles that passed E-Check during the first test (initial pass), failed E-Check during the first test (initial fail) and failed the initial test but passed a later test after repairs were made.

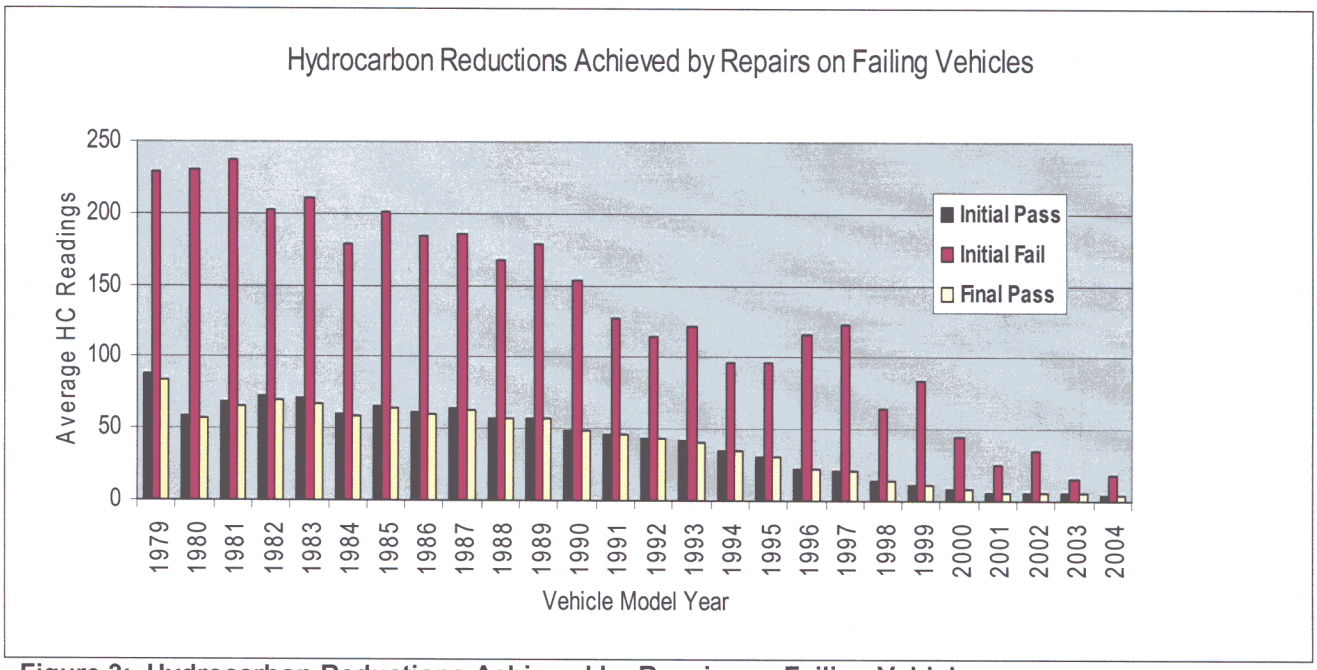

Figure 3: Hydrocarbon Reductions Achieved by Repairs on Failing Vehicles

Vehicles that failed the first test and passed at a later date following repairs show an average emission improvement of 64 percent for hydrocarbon. The newer the vehicle, the greater the likelihood the vehicle can be repaired and brought back to an emissions level close to that of a vehicle that passed its initial test. It is more difficult to repair older vehicles and get them to the emissions levels of vehicles that passed the initial test. *Note: This is not a trends chart. The average hydrocarbon readings for each model year are unique to that particular year and are not intended to be compared to earlier or later model years. A high average in a particular year could be the result of a small number of extremely high-polluting vehicles or a problem originating at the manufacturing level.*

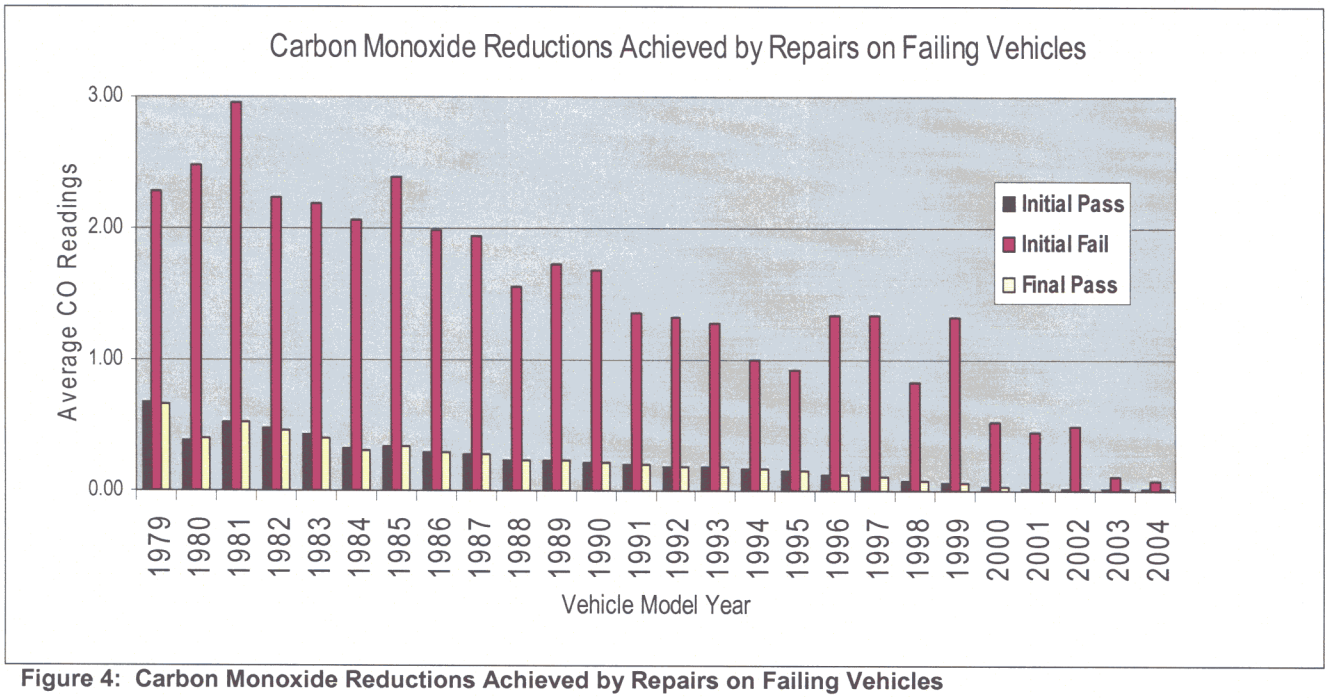

Figure 4: Carbon Monoxide Reductions Achieved by Repairs on Failing Vehicles

Vehicles that failed the first test and passed at a later date show an average emission improvement of 85 percent for carbon monoxide. As seen with hydrocarbons, the newer the vehicle, the greater the likelihood the vehicle can be repaired and brought back to an emissions level close to that of a vehicle that passed the initial test. It is more difficult to repair older vehicles and get them to the emissions levels of vehicles that passed the initial test. *Note: This is not a trends chart. The average carbon monoxide readings for each model year are unique to that particular year and are not intended to be compared to earlier or later model years. A high average in a particular year could be the result of a small number of extremely high-polluting vehicles or a problem originating at the manufacturing level.*

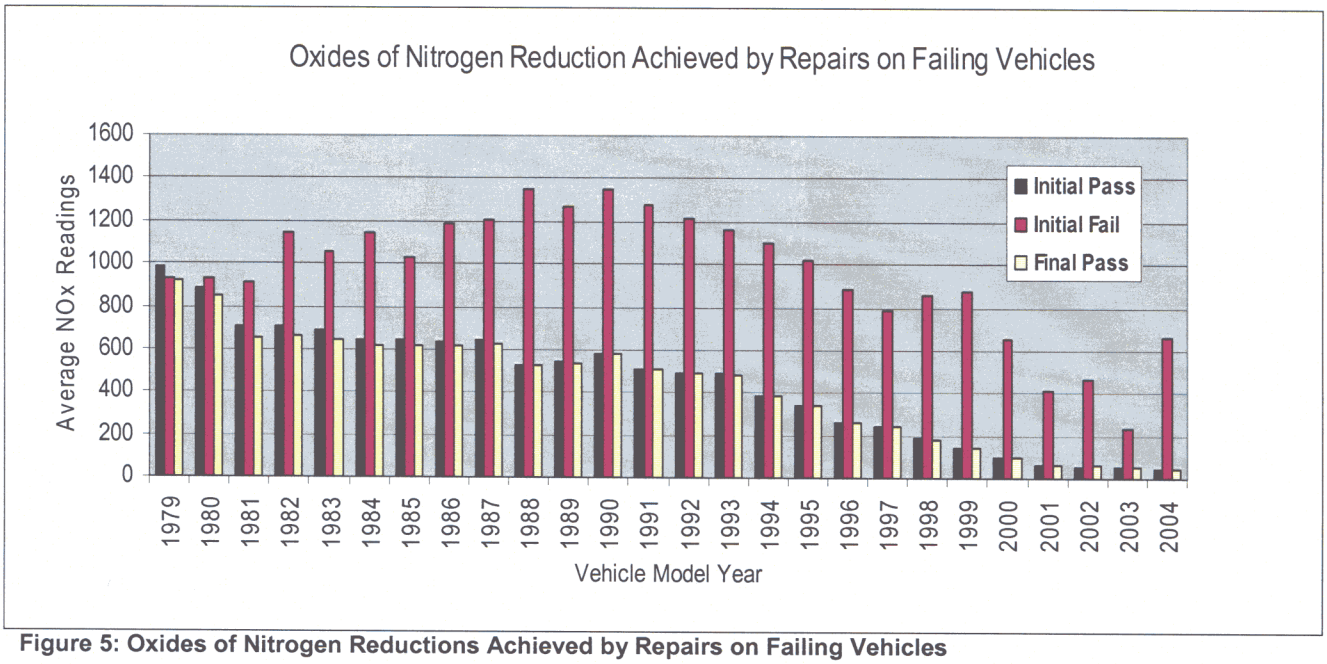

Figure 5: Oxides of Nitrogen Reductions Achieved by Repairs on Failing Vehicles

Vehicles that failed the first test and passed at a later date show an average emission improvement of 53 percent for oxides of nitrogen. As seen with hydrocarbons and carbon monoxide, the newer the vehicle, the greater the likelihood the vehicle can be repaired and brought back to an emissions level close to that of a vehicle that passed its initial test. It is more difficult to repair older vehicles and get them to the emissions levels of vehicles that passed the initial test. *Note: This is not a trends chart. The average oxides of nitrogen readings for each model year are unique to that particular year and are not intended to be compared to earlier or later model years. A high average in a particular year could be the result of a small number of extremely high-polluting vehicles or a problem originating at the manufacturing level.*

II. Air Quality Benefits from Ohio E-Check

An objective of this report is to indicate the program's overall effectiveness in reducing Ohio's ground-level ozone problem. It is difficult to obtain a tons-per-day reduction figure for each pollutant without using computer modeling. However, modeling has its limitations, posing problems for accurate results. This report concentrates on a more qualitative assessment based on a logical examination of how the E-Check program affects the decrease of automobile emissions in the E-Check counties.

Has E-Check caused Ohio's motorists to better maintain their vehicles?

A further indication of the program's effectiveness comes from a motorist opinion survey conducted for Ohio EPA by The Ohio State University Center for Survey Research in Spring 2004. One objective of the survey was to determine whether the emissions testing requirement helped motivate motorists to have vehicle repairs or maintenance performed prior to testing. Six percent (33 out of 547 motorists) of the survey respondents in 2004 replied "yes" to that question. Six percent of the total test population is 119,155 vehicles.

Are polluting vehicles being removed from ground-level ozone problem areas?

Of the 177,229 vehicles that failed the initial test, 41,728 did not receive a subsequent passing test or a waiver. Although it is difficult to track what happens to these vehicles, some are taken out of service entirely and others 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 their failing vehicle in a non-E-Check county, but Ohio EPA and BMV work together to stop these illegal registrations.

III. The Ohio E-Check Program

Which vehicles must be tested?

An emission inspection is required every two years on all gasoline and diesel-powered vehicles, 25-years-old and newer and registered in the 14 E-Check counties (see figure 6). Odd-model-year vehicles are tested in odd-numbered years and even-model-year vehicles are tested in even-numbered years. For example, a 1998 vehicle is tested in 2004, 2006, etc., and a 1999 vehicle is tested in 2005, 2007, etc. Vehicles exempt from testing are those less than two years old from the original title date, or those with a gross vehicle weight greater than 10,000 pounds. Motorists purchasing a used vehicle must obtain a valid passing certificate prior to registration. However, passing certificates are transferable to a new owner and may be used prior to the certificate's expiration date.

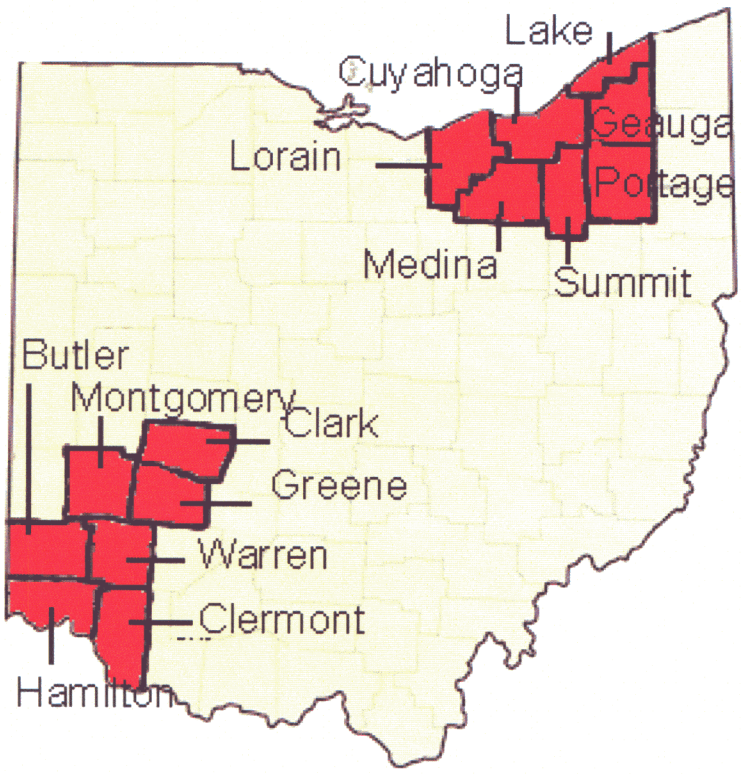

Figure 6: Ohio's 14 E-Check counties

Redesignation actions

The federal 1990 Clean Air Act Amendments required all moderate nonattainment areas to reach attainment with the national ozone standard by November 1996. The only area in Ohio that did not meet this deadline was Cincinnati. The Cincinnati metropolitan area has now reached acceptable air quality levels. However, U.S. EPA has finalized a more stringent eight-hour ozone standard that 33 counties in Ohio do not meet.

Test fee

The Ohio E-Check vehicle emissions inspection costs $19.50, one of the nation's lowest fees for enhanced emissions testing. This fee is not assessed on vehicles that fail the inspection on the first or second test. Duplicate certificates for passing tests within the previous 12 months are available for $4.85. An average of 56 cents from each test across the state goes to Ohio EPA to cover the administrative costs of the program. The majority of the test fee goes to the contractor, Envirotest Systems, to cover program operating costs.

Testing network and provider

The 14-county E-Check program has 44 testing stations and 157 testing lanes. This inspection network supports an annual testing volume of 1.9 million vehicles. Envirotest Systems Corporation employs 700 Ohioans under a 10-year contract with Ohio EPA to conduct the State's vehicle emissions inspection program. Envirotest is an operating unit of Environmental Systems Products Holdings, Inc. (ESP). ESP is the largest U.S. emissions testing service provider, performing more than 25 million vehicle tests worldwide each year. Emission testing is widespread across the United States with approximately 34 inspection/maintenance programs currently in existence, as shown in figure 7.

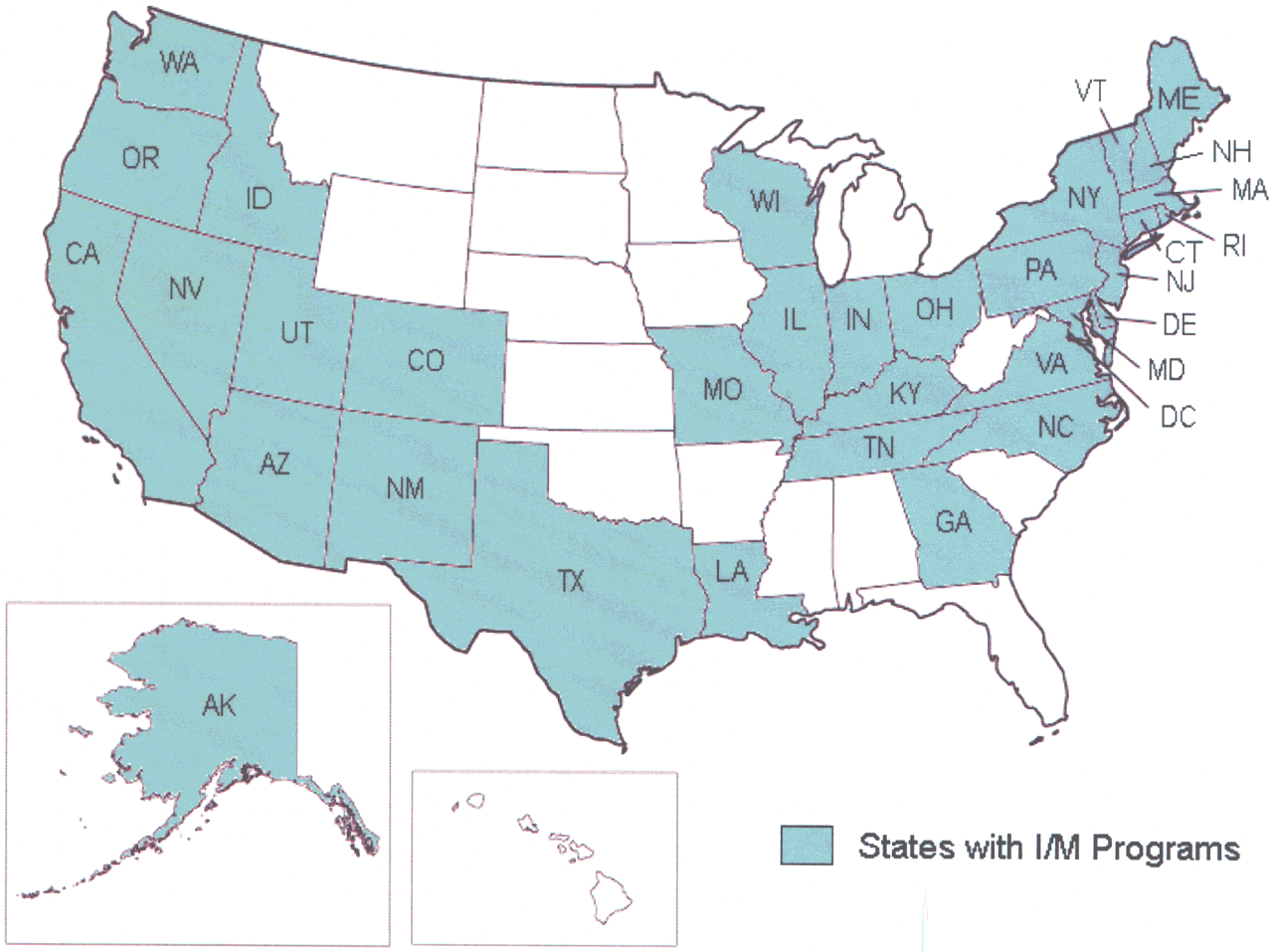

Figure 7: States with Inspection/Maintenance Programs

Test procedures

For model year vehicles 1995 and older, the current test method is Acceleration Simulation Mode (ASM 2525). ASM 2525 is a steady-state test during which vehicles are driven on a dynamometer (rolling wheel) at a maximum speed of 25 mph. Vehicles that cannot be driven on the dynamometer are given the two-speed idle test.

For model year 1996 and newer cars and light duty trucks, and 1997 and newer diesel vehicles, the On-Board Diagnostic (OBD) test is performed. OBD is a complex computer package installed on these vehicles that serves as an advanced warning to alert vehicle owners and auto technicians of potentially high emissions. OBD testing began on January 5, 2005.

There are three stages to the current emissions testing process. First, a visual inspection is conducted to determine if the vehicle may pose a hazard (e.g. bald tires, obvious fluid leaks, etc.) If problems are present, the vehicle will be turned away from testing. An anti-tampering inspection also is performed to ensure that a catalytic converter and gas cap are present. If either of these items is missing, the vehicle will not receive a complete test.

Second, each vehicle is given one of two types of emissions tests: ASM 2525 or OBD II. During the ASM 2525 test, an exhaust analyzer measures the emission concentrations. Gases are measured and concentrations are calculated so that a reading can be printed out on the vehicle inspection report. Before each emissions test, the analyzer is calibrated back to a zero emissions concentration, any previous exhaust samples are removed, and the ambient (surrounding) air is measured to calculate concentrations for the next test.

The OBD test includes two basic steps. With the engine off, an inspector turns the key on to verify that the emissions malfunction light works. The inspector then turns the engine on. If the malfunction light stays on, the vehicle will not pass the E-Check test. If the malfunction light does not come on with the engine on, the inspector plugs an OBD hand-held reader device into the vehicle's on-board computer port to check the OBD system status.

Third, the pressure of each vehicle's gas cap is tested. If the gas cap is not maintaining the correct pressure, gasoline vapor may be escaping from the tank, polluting the air and causing poor gas mileage.

Vehicles that fail any portion of the test must be repaired and retested. Vehicles can be taken to a repair facility of the motorist's choice. Owners of failed vehicles are provided a list of repair facilities that have been licensed by the State to diagnose and correct emissions-related problems. The licensing process is described in Section V of this report, "Repair and Maintenance." When a vehicle continues to fail after minimum repair expenditures, motorists may obtain a waiver allowing registration until the next inspection is required.

Waivers, extensions, and exemptions

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 on a 1981 or newer vehicle and shows a 30 percent improvement in emissions readings between two failed tests, he or she may qualify for a conditional pass waiver. For vehicles with model

year 1980 or older, the individual must spend at least $100 in emissions-related repairs and show a 30 percent improvement. 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. 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.

Figure 8 below shows the number of waivers issued at each of the 44 testing facilities in 2004. The number of waivers issued per station ranges from 77 to 1,163.

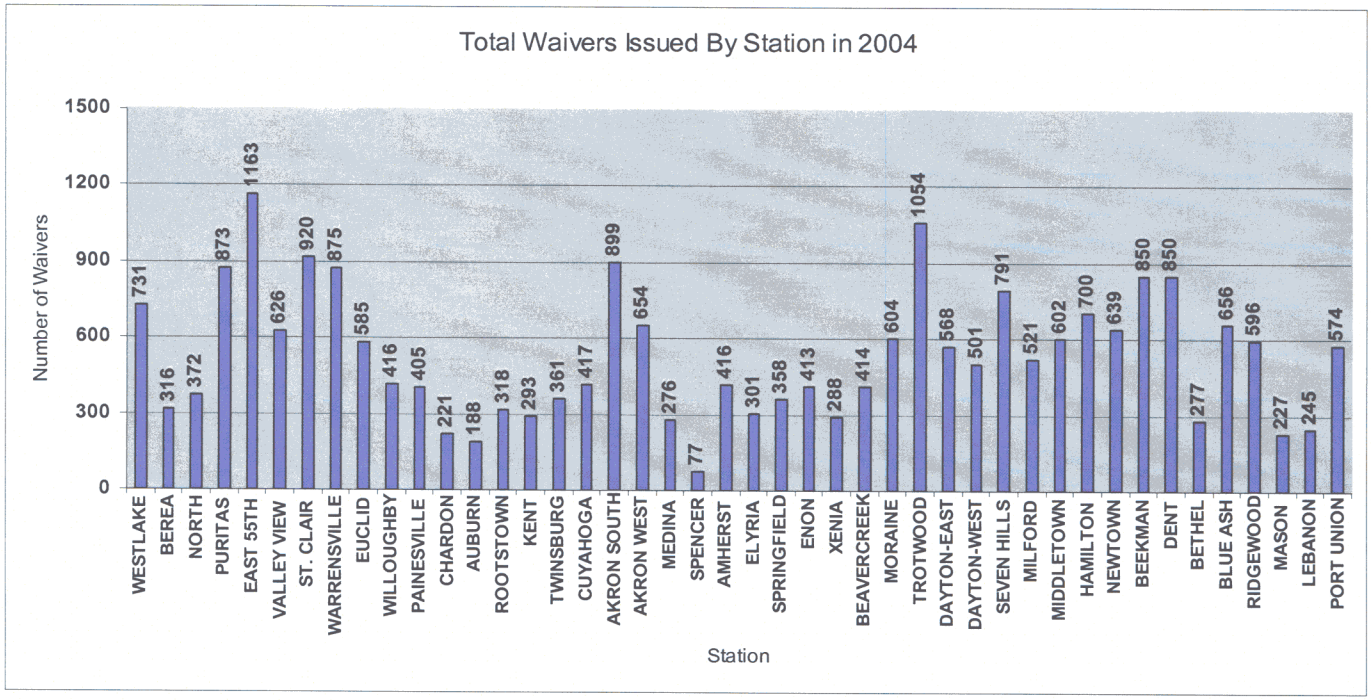

Figure 8: Total Waivers Issued by Station in 2004

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.

- Exemptions only apply to those individuals who can have their vehicle tested out-of-state, are in the military or are currently a student outside of Ohio. 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. 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 get their vehicle to pass E-Check after receiving an extension in order to comply with the current testing cycle.
- Vehicles operating on electric power or an alternative fuel such as natural gas, butane, propane and 100 percent alcohol are permanently exempt from testing.

Figure 9 below shows the number and type of extensions and exemptions issued in 2004. The 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.

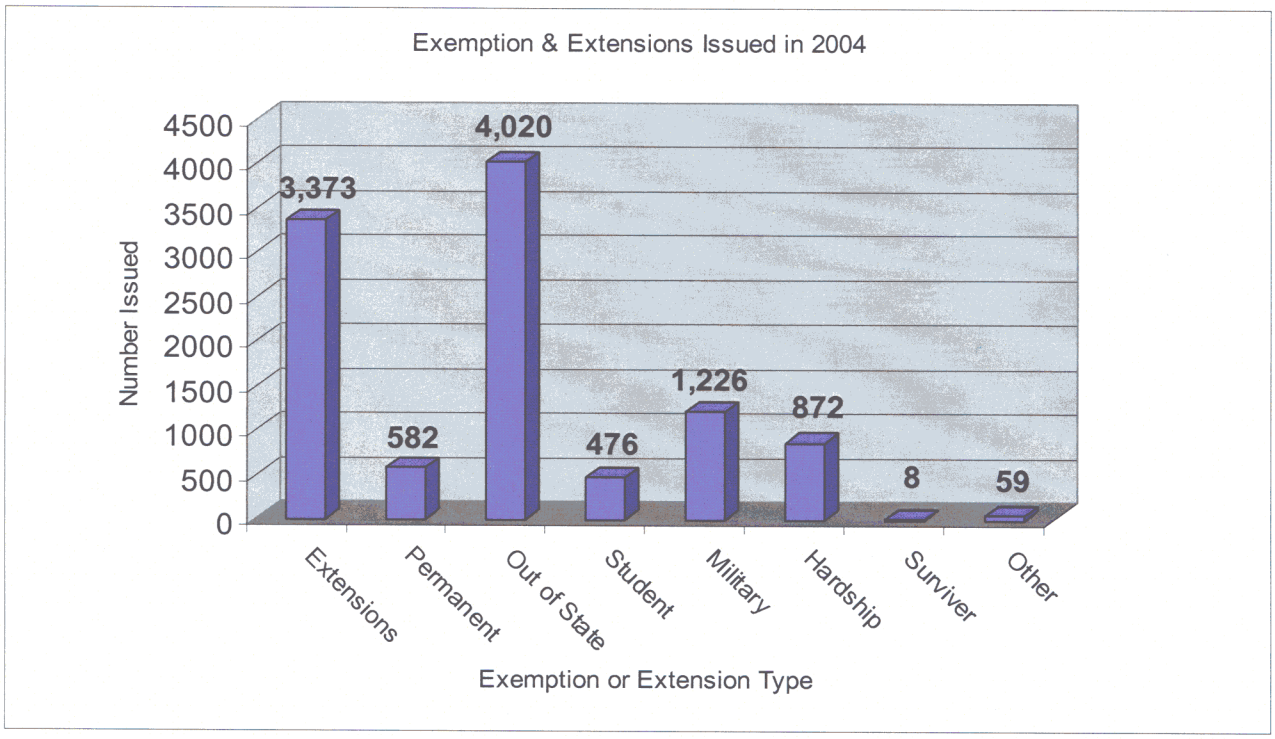

Figure 9: Extensions and Exemptions Issued in 2004

IV. Quality Assurance

A fair and accurate test is one in which the equipment functions properly and the correct test is performed. Inconveniences are avoided when both the equipment and employees are meeting expectations and motorists are able to move quickly through the testing process. It is the duty of Ohio EPA and Envirotest to provide the best customer service possible and identify areas of the program that need improvement. This section describes the measures taken by Envirotest and Ohio EPA to make sure Ohio's motorists receive a fair and accurate test with the least inconvenience.

Envirotest quality control

Quality control is defined as the checks or procedures performed by the party producing a product or service to demonstrate quality. Envirotest's quality control consists of hourly, daily and monthly checks performed on the testing equipment. The computer system will automatically prohibit the testing of vehicles if the required quality control procedures are not performed.

Ohio EPA quality assurance

Ohio EPA strives to provide a high quality test through an extensive auditing program. Staff at four field offices located throughout the 14 E-Check counties perform the audits. The auditors spend the majority of their time in the field, auditing station, equipment and inspector performance. This information is then provided to Envirotest to improve testing accuracy and customer service.

The five types of audits performed by field office staff are the equipment audit, calibration audit, lane status audit, performance audit and covert audit.

E-Check equipment audit

The objective of this audit is to verify that lane equipment is operating within the tolerances specified by federal and state guidelines. This audit is extremely important for providing a fair and accurate test because faulty equipment can cause inaccurate emissions tests.

E-Check calibration audit

During the calibration audit, Ohio EPA verifies that emissions testing equipment is properly maintained in accordance with the quality control requirements specified in federal and state guidelines.

E-Check lane status audit

The lane status audit verifies that Envirotest's testing stations are operating efficiently to lower motorist wait times.

E-Check performance audit

Ohio EPA uses the performance audit to verify that Envirotest personnel are performing the emissions test in the proper manner, and providing excellent customer service to Ohio's motorists.

E-Check covert audit

The covert audit provides Ohio EPA with the opportunity to experience the test as the general public does. The Agency uses this audit to ensure that Envirotest personnel are performing the emissions test in the proper manner and providing excellent customer service when they are unaware that Ohio EPA is watching.

The following graph depicts the number of lane status, performance, equipment, covert and calibration audits performed by Ohio EPA staff in 2004. Ohio EPA met the 2004 audit schedule for the lane status, equipment and calibration records audits. The number of covert audits performed in 2004 was reduced due to funding constraints.

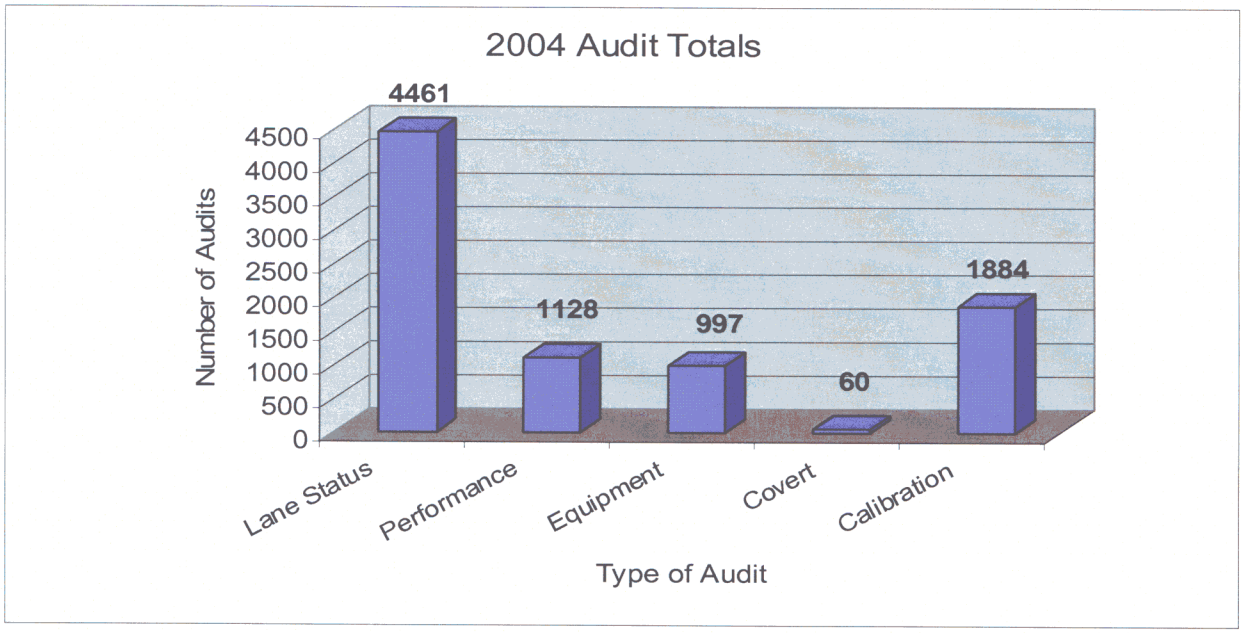

Figure 10: Total audits performed by Ohio EPA in 2004

Damage to customer vehicles

Ohio E-Check inspection procedures are prescribed by U.S. Environmental Protection Agency technical protocols and are detailed in Ohio EPA's contract with Envirotest. While occasional operator error can result in damage to vehicles, the ASM 2525 and OBD II test procedures are not stressful to vehicles in normal operating condition. Customers who wish to submit a claim for damages are asked to submit a statement in writing. A qualified claims administrator promptly investigates each claim. Vehicles with apparent mechanical damage are often given an independent evaluation by a certified automotive technician at the testing contractor's expense. Customers who are not satisfied with the contractor's proposed resolution are offered arbitration through a local Better Business Bureau. Most paid damage claims are for minor damage. In 2004, 464 damage claims were filed with Envirotest. Approximately 32 percent of reported claims prove valid. The ratio of paid claims to total tests in 2004 was 1:13,901 or .007 percent of all vehicles tested. This represents a 21 percent reduction in damage claims compared to 2003.

Figure 11 shows the total number of damage claims reported by each station during 2004. Only one-third of reported claims prove valid.

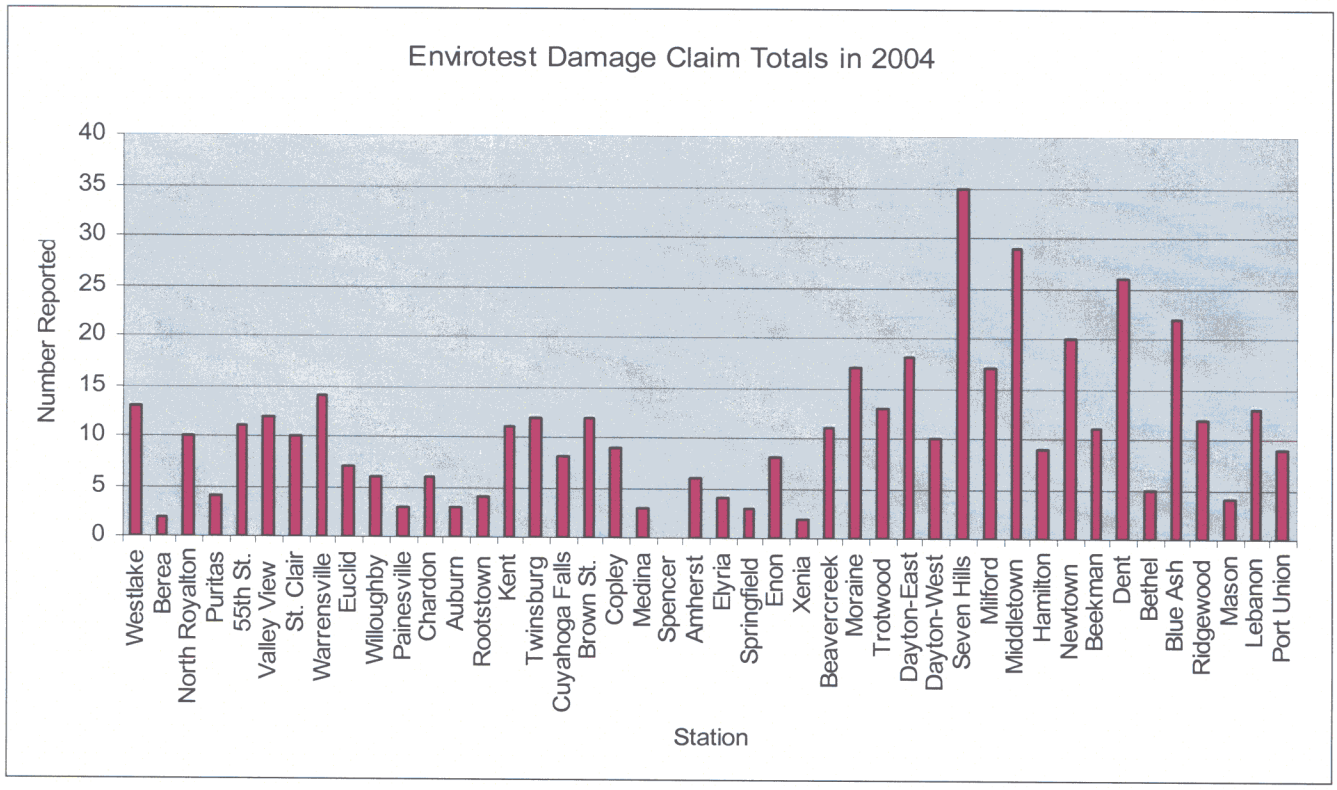

Figure 11: Total damage claims per station in 2004

Customer complaints

Customer feedback plays an important role in enabling Ohio EPA and Envirotest to deliver both quality customer service and effective public information. Ohio EPA tracks all correspondence received regarding the E-Check program in a central database. Customer complaints tend to be related to service received at the station and general program issues. The majority of program-related complaints (see figure 12) allege program is unfair, the rules are not effective and the program is not cleaning the air. The majority of service-related complaints (see Figure 13) allege rude treatment, long wait times and inattentive station employees.

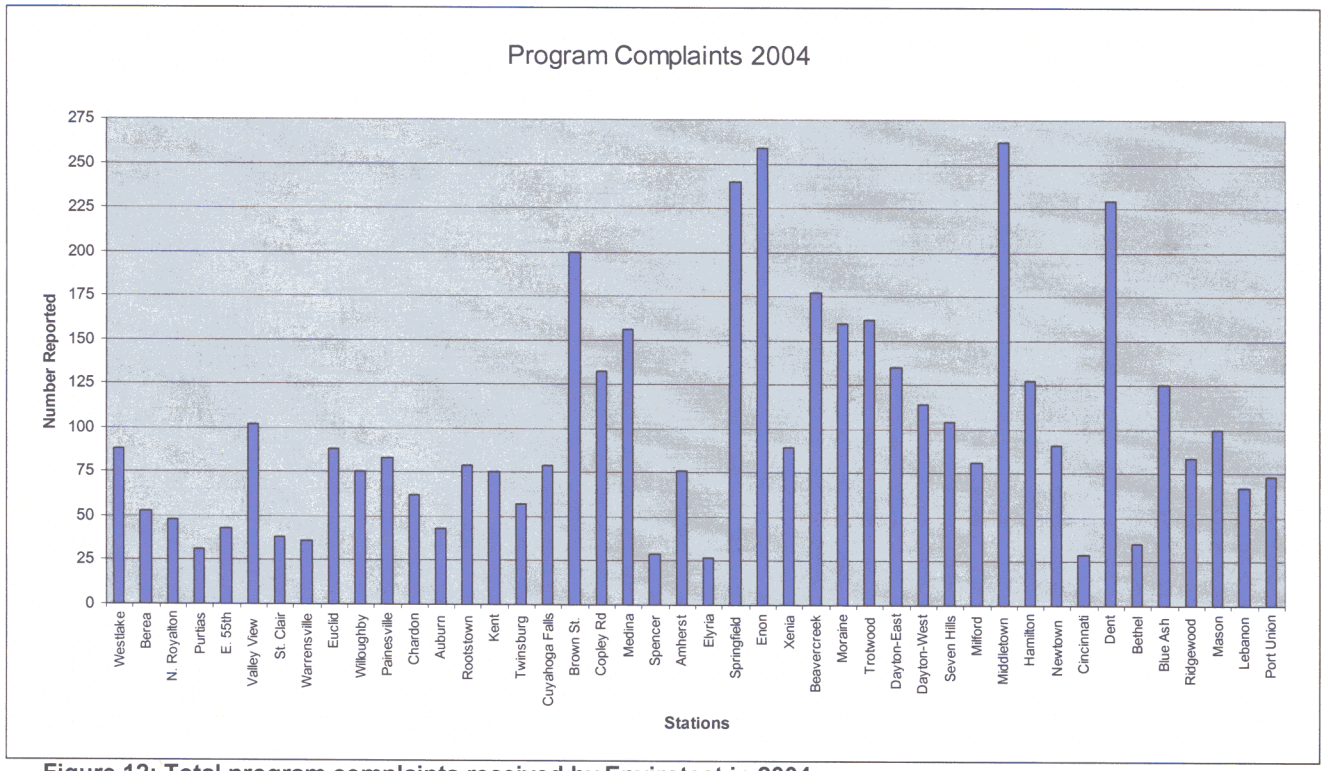

Figure 12: Total program complaints received by Envirotest in 2004

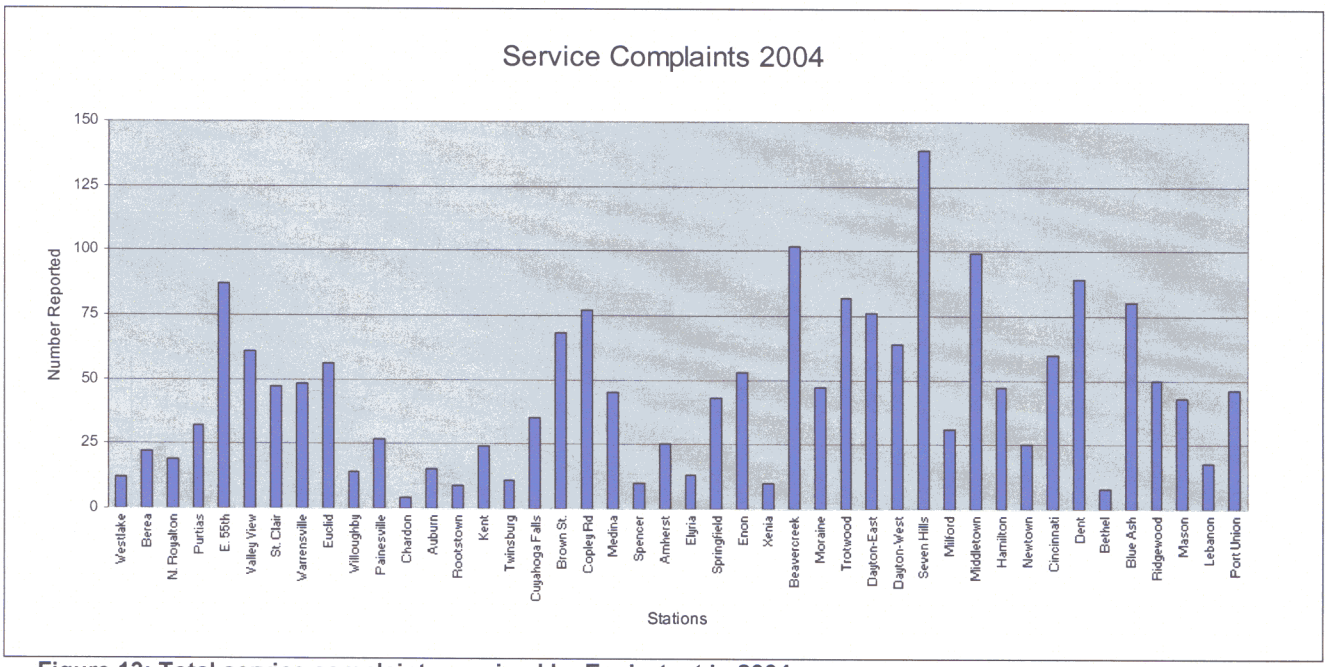

Figure 13: Total service complaints received by Envirotest in 2004

Motorist opinion survey

A motorist opinion survey was conducted for Ohio EPA by Ohio University's Voinovich Center for Leadership and Public Affairs. This survey was directed toward motorists whose vehicles underwent the new OBDII test between August and October 2004. One object of the survey was to determine motorist's satisfaction with the overall test experience. Eighty-four percent (399 of 475 motorists) of the survey respondents in this survey replied "yes" to that question. Eighty-four percent of the total test population is 1,668,169 vehicles.

V. Repair and Maintenance

Training Repair Industry Advisory Group (TRIAG)

TRIAG is made up of a cross section of industry leaders and emission repair technician trainers in addition to representatives from Envirotest and Ohio EPA. TRIAG provides critical feedback on how industry and repair technicians are being affected by various changes in the E-Check program. This communication also allows Ohio EPA and Envirotest to provide better strategic assistance and support to the repair industry. Air quality benefits are dependent on the ability of the repair industry to repair vehicles. In 2004, TRIAG met quarterly and worked on issues critical to both the repair industry and the E-Check program.

Repair facility licensing

To be licensed as an Ohio E-Check repair facility, a repair shop must have at least one E-Check-certified repair technician working at the shop. A certified technician must complete numerous hours of training and certification programs. The shop also must have specific equipment to guarantee that the emissions failure can be properly diagnosed and repaired. In 2004, there were 206 licensed repair facilities in Ohio.

Tech Talk

Tech Talk is a newsletter published by the E-Check program to educate and inform automotive repair technicians about the vehicle emissions inspection program in Ohio. Three issues of *Tech Talk* were published in 2004, covering topics such as current industry news, NOx testing and repairs, on-board diagnostic testing, anti-tampering, advisories and repair shop profiles.

VI. Public Education

An effective public education program is essential to the success of an inspection and maintenance (I/M) program. Public education activities conducted by Ohio EPA and Envirotest Systems range from direct mailings to informational materials at the E-Check testing stations and deputy registrar locations. The goal is to give motorists the information they need to know to complete the test and help the public understand the need for vehicle emissions testing.

Advertising

The toll-free consumer hotline (1-800-CAR-TEST) was published in telephone business white pages under "E-Check Ohio vehicle emission testing program."

Public Education

An essential component of Ohio E-Check's public education initiatives involves disseminating program information through brochures, point-of-sale materials and the news media. Informational brochures with vehicle maintenance tips, waiver information and station locations are available at testing facilities and Bureau of Motor Vehicles offices in the 14 testing counties. Signage and posters provide useful program information in customer waiting booths. Periodic news releases are sent to radio and TV stations and newspapers announcing Ohio E-Check developments. The Bureau of Motor Vehicles also has a video slide show at license bureau offices that explains program requirements.

Direct mail

Ohio motorists with vehicles subject to emissions inspections receive a notice in the mail 60-90 days before their registration expires. Between 125,518 and 184,427 notices are sent each month. These mailings contained helpful information for motorists about the testing process.

Internet

The Ohio E-Check Web site provides information on testing, station locations, wait times, repair shops, and extensions and exemptions, among other topics. There is also a feedback form where the public can submit questions and concerns directly to Ohio EPA. The E-Check home page receives an average of 11,200 visits per month. The Web address is: www.ohioecheck.org.

Consumer Hotline

The 1-800-CAR-TEST toll-free consumer hotline serves as a two-way channel for information about Ohio E-Check and feedback from motorists. Operators received 558,744 calls in 2004. The majority of these calls were from motorists seeking information about station hours of operation and testing requirements. In addition to assistance by operators during regular office hours, callers may access recorded information about the testing program 24 hours a day, seven days a week.

VII. Goals and Initiatives for 2004

Last year's E-Check annual report contained the program's goals and initiatives for 2004. This section examines the success of Envirotest and Ohio EPA at achieving those goals.

The goals of the E-Check program are to identify gross-polluting vehicles for repair, and to provide a fair and accurate test with minimum inconvenience to Ohio's motorists. Ohio EPA and Envirotest are committed to asking for customer feedback, and using the feedback to make substantial program improvements. The E-Check program takes the suggestions received from the customer comment cards and direct correspondence (phone calls, letters and e-mails) and analyzes the information for any patterns. Survey research is used to determine motorists' opinions about the program and air quality issues in general.

The following is a list of goals and initiatives for 2004 with a brief explanation of whether or not the E-Check program achieved the goal:

1. **Meet the 2004 audit frequency schedule.**
   Audits are vital to ensure all areas of the program are in compliance and being operated to the highest standards. The frequency schedule for lane status, performance, equipment, and calibration audits was met in 2004.

2. **Make improvements to customer service in the Cincinnati area.**
   The number of customer service complaints received in the Cincinnati area decreased by 64 percent since 2003.

3. **Begin On-Board Diagnostic (OBD) testing in January 2004.**
   The OBD start up went smoothly. Training was provided to Ohio EPA staff, contractor employees and the repair industry in a timely and effective manner.

4. **Continue to improve and update the Ohio E-Check Web site.**
   The Web site was updated on a continual basis during 2004. Providing current and accurate information is imperative to maintaining effective and quality customer service to motorists and repair industry.

VIII. Goals and Initiatives for 2005

Building on the successes of the past year, the following goals are set for 2005:

1. **Meet the 2004 audit frequency schedule.**
   Audits are vital to ensure all areas of the program are in compliance and being operated to the highest standards. Therefore, every effort will be made to ensure the frequency schedule is met. Table 2 below shows the planned audit frequency for 2005.

Table 2: Ohio EPA Planned Audit Frequency in 2005

Type of Audit	Planned Frequency of Audit
Equipment	Quarterly on all 157 lanes assuming passing results
Calibration	Records once per month per lane; observations half the lanes once a year
Lane Status	As needed
Performance	Three times per station each month
Covert	As resources are available

2. **Continue to make improvements to customer service overall.**
Providing quality customer service at the testing stations is critical to the motorists' overall experience. Ohio EPA will continue to work with the contractor to provide customer service training for Cincinnati station employees.

3. **Develop and implement training for the repair industry.**
A significant amount of outreach and training has already been accomplished in regard to OBD repairs, however, more is needed. Ohio EPA will provide more training and education to the repair industry, station employees and Ohio EPA staff on OBD repairs and customer service.

4. **Participate and assist in diesel programs and initiatives.**
Diesel emissions are a major source of oxides of nitrogen and particulate matter. Ohio EPA will participate in groups to evaluate retrofit, anti-idling and other initiatives for mobile sources. Assistance also will be provided on developing the state implementation plan for diesel programs.

5. **Continue to improve and update the Ohio E-Check Web site.**
The Web site is a vital resource for motorists and the repair industry. Providing current and accurate information is imperative to maintaining effective and quality customer service to motorists and the repair industry. Improvements will be made based on customer feedback.

Appendix: History of the Ohio E-Check Program

In 1990, Congress amended the Clean Air Act (CAA) to require states with excessive air pollution to reduce emissions from industry, businesses and motor vehicles. Under this federal law, 16 counties in Ohio were found to have violated the federal health-based air quality standard for ozone at a frequency and magnitude that would classify these areas as moderate nonattainment. This classification carried with it a Clean Air Act mandate for basic vehicle emissions testing. In addition, the Clean Air Act mandated that each of these moderate ozone nonattainment areas develop a plan to reduce overall VOC emissions by 15 percent by 1996. (VOCs are volatile organic compounds, which interact with sunlight to form ground-level ozone or smog.) Ohio and 32 other states filed 10-year state implementation plans (SIPs) indicating the steps they would use to improve and maintain air quality. Two of the 16 counties were able to achieve the 15 percent reduction without implementing an emissions program. However, in consultation with regional planning agencies and county governments, Ohio EPA and the Ohio General Assembly chose to make motor vehicle emissions inspections a key component of Ohio's actions to reduce air pollution in the remaining 14 counties.

Why were vehicle emissions inspections chosen? Both government and private research concluded that motor vehicles are the largest single source of the pollutants that cause ground-level ozone, which is a serious threat to public health. Ohio EPA estimates that passenger car and light truck emissions are responsible for as much as 45 percent of hydrocarbons and oxides of nitrogen (NOx) -- the main components of ozone. The Ohio E-Check program accounts for approximately 50 percent of the pollution reductions that Ohio is credited for under its SIP.

Ohio has had vehicle emissions testing in Hamilton, Butler, Lake, Lorain and Cuyahoga counties since 1988. This original automobile inspection and maintenance program was known as AIM. The Ohio E-Check program, a continuation and expansion of AIM, began in 1996. E-Check identifies motor vehicles emitting high levels of VOCs, NOx and CO. The program reduces air pollution from vehicles by encouraging better ongoing maintenance of vehicles, and ensuring the repair of vehicles with excessive emissions resulting from malfunctioning or tampered emissions control systems.

Ohio E-Check was implemented in major metropolitan areas of Ohio that were not in compliance with federal CAA standards. Those areas, comprising 14 counties, are:

- Cleveland/Akron area: Cuyahoga, Geauga, Lake, Lorain, Medina, Portage and Summit;
- Dayton/Springfield area: Clark, Greene and Montgomery; and
- Cincinnati area: Butler, Clermont, Hamilton and Warren.

How Testing Areas Were Determined

Ohio EPA quickly realized that Ohio needed to target vehicle emissions. In Ohio's urban areas, vehicles represent the largest contribution to VOC emissions. In Northeast Ohio, vehicles contribute 45 percent of the problem, while industries are responsible for only 19

percent. The remainder of VOC emissions can be attributed to small sources such as dry cleaners, commercial painting, lawnmowers and outboard motors. Ohio EPA concluded that Ohio needed to choose between adding an alternative fuels program along with an annual basic tailpipe test, or substitute a biennial enhanced vehicle emissions test which provides twice the emissions reduction as the basic test. According to U.S. EPA at the time, enhanced testing was the most cost-effective way to reduce VOC emissions at $879 per ton of emissions reduced. This cost was compared to $5,410 per ton for the basic test and $1,000-$2,500 per ton for alternative fuels.

In 1993, Senate Bill 18 created an option for local elected officials to choose enhanced emissions testing as the way to make up the emissions reductions required under the Clean Air Act. As required by that law, the State went to the metropolitan planning organizations (MPO) in each county. These organizations represent the municipal corporations, counties, and townships in each nonattainment area. Each MPO voted on whether or not they wanted an enhanced motor vehicle inspection and maintenance program in their area. As long as the majority of counties in each Metropolitan Statistical Area (MSA) voted yes for the resolution, then the Ohio EPA director had the jurisdiction to implement and supervise an enhanced emissions inspection program in that area. Each of the three areas chose enhanced emissions testing, which we now call the E-Check program.

Contract Description

In 1994, Ohio EPA sent out a Request for Proposal (RFP) to contract the emissions inspection program. The RFP contained detailed requirements that the contractor must meet to be considered. In response to Ohio EPA's RFP, potential contractors sent a response. This document included such items as station specifications, operation and management styles that would be incorporated, and the equipment that would be used to carry out the program. Once the contractors were chosen, Ohio EPA developed a contract from the RFP and the contractor's response. The contract holds the contractor to conditions such as keeping the hourly average wait time under 15 minutes and providing a minimum of 40 hours of training for their inspectors.

When the program started, I/M 240 was the primary vehicle emission test used by Ohio EPA. Vehicles were tested with a two-speed idle test, a steady-state loaded mode test, or a transient dynamometer test (I/M 240). The two-speed idle test ran an engine at 2,500 rpm with no load on the engine and did not require use of a dynamometer. The steady-state test ran a vehicle on the dynamometer with a load at constant speed and was followed by an idle test. The transient test, which was considered superior to the other two forms, ran a vehicle on the dynamometer at varying speeds simulating normal driving conditions. The maximum speed reached with this type of test was 57 mph.

On May 18, 1998, the State Controlling Board approved a contract change to modify the emissions testing program. The modifications allowed the State to switch to the ASM 2525 test, which has been in use since summer 2001.