

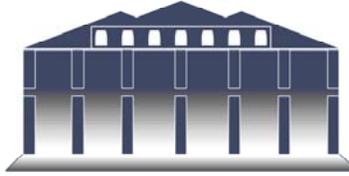
**Doubtful Return on the
Public's \$141 Million Investment in
Poorly Managed Vehicle Inspection Programs**



**Final Report to the Joint Legislative
Program Evaluation Oversight Committee**

Report Number 2008-12-06

December 16, 2008



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Director

December 1, 2008

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Senator Daniel G. Clodfelter, Co-Chair, Joint Legislative Program Evaluation Oversight Committee

Senator Fletcher L. Hartsell, Jr., Co-Chair, Joint Legislative Program Evaluation Oversight Committee

North Carolina General Assembly

Legislative Building

16 West Jones Street

Raleigh, NC 27601

Honorable Co-Chairs:

The Program Evaluation Division 2007-2008 Work Plan, approved December 5th, 2007, directed the Program Evaluation Division to evaluate the effectiveness and efficiency of the vehicle safety and emissions inspection programs. This study examined how North Carolina operates and manages the two vehicle inspection programs, and what impact these programs have on motorist safety and air quality.

I am pleased to report that the Department of Transportation, the Department of Environment and Natural Resources, the Division of Motor Vehicles and the Division of Air Quality cooperated with us fully and were at all times courteous to our evaluators during the evaluation.

Sincerely,

A handwritten signature in black ink, appearing to read "John W. Turcotte".

John W. Turcotte
Director



PROGRAM EVALUATION DIVISION

NORTH CAROLINA GENERAL ASSEMBLY

December 2008

Report No. 2008-12-06

Doubtful Return on the Public's \$141 Million Investment in Poorly Managed Vehicle Inspection Programs

Summary

The Joint Legislative Program Evaluation Oversight Committee directed the Program Evaluation Division to determine if the state's vehicle safety and emissions inspection programs are effective and if the management and oversight of the programs are efficient.

Vehicles registered in North Carolina are subject to two types of inspections.

- **Safety Inspection.** An inspection of various mechanical systems required by state law in all 100 counties of North Carolina for vehicles less than 35 years old.
- **Emissions Inspection.** An inspection utilizing the On Board Diagnostic system for electronic readings to ensure proper functioning of pollution controls for all 1996 and newer model year vehicles. Only vehicles registered in 48 counties are subject to the emissions inspection.

North Carolinians spend \$141 million annually on inspections. It costs the Division of Motor Vehicles (DMV) and the Division of Air Quality \$40.8 million to administer both inspection programs. The Program Evaluation Division found

- no evidence exists showing the safety inspection program is effective,
- it is not possible to determine how much vehicle emissions inspections contribute to the improvement of overall air quality, and
- program oversight by DMV is inadequate.

In light of taxpayers' and the state's substantial investment in the inspection programs, the Program Evaluation Division recommends the North Carolina General Assembly

- reevaluate the need for a safety inspection program;
- consider exempting vehicles from the three newest model years from safety and emissions inspections;
- require DMV to manage the programs to ensure results by setting program goals, defining performance metrics, and reporting on progress to these goals using data analysis; and
- direct the Fiscal Research Division to do a fiscal review of both inspection programs to ensure efficiency and appropriate allocation of resources.

Scope

The North Carolina General Assembly's Joint Legislative Program Evaluation Oversight Committee directed¹ the Program Evaluation Division to determine if

- the state's vehicle safety and emissions inspection programs are effective and,
- if the management and oversight of the inspection programs is efficient.

The North Carolina vehicle safety inspection program has been in existence for 42 years and the emissions inspection program for 28 years. In late 2008 and early 2009, several programmatic changes affecting both programs are scheduled to take effect. However, the efficacy of the inspection programs has not been independently reviewed since the mid-1990s.

The Program Evaluation Division collected and analyzed data from a variety of sources including

- 6.3 million inspection records from the Division of Motor Vehicles (DMV) Verizon database for Calendar Year 2007;²
- vehicle registration data from the DMV State Titling and Registration System database;
- interviews with the Department of Transportation's DMV and the Department of Environment and Natural Resources's Division of Air Quality management and personnel;
- interviews with other stakeholders including the State Highway Patrol, the Independent Garage Owners of North Carolina, and the University of North Carolina Highway Safety Research Center;
- review of relevant legislation, program and agency regulations, federal regulations, reports, and fiscal documentation;
- observations of actual safety and emissions inspections;
- interviews with administrators in other states; and
- reviews of other states' safety and emissions inspection programs.

Background

Vehicles registered in North Carolina are subject to one of two types of inspections.

- **Safety Inspection.** An inspection of various mechanical systems required by state law in all 100 counties of North Carolina for vehicles less than 35 years old.³
- **Emissions Inspection.** An inspection utilizing the On Board Diagnostic system for electronic readings to ensure proper functioning of pollution controls for all 1996 and newer model year

¹ The Joint Legislative Program Evaluation Oversight Committee establishes the Program Evaluation Division's work plan in accordance with N.C. Gen. Stat. § 120-36.13.

² The 6.3 million inspection records reviewed represent data from 48 counties. As of October 2008, DMV did not have the capacity to collect inspection data electronically across all 100 counties. Inspection data collected in the 52 counties where the emissions test is not required is paper-based and, according to DMV officials, highly unreliable.

³ N.C. Gen. Stat. § 20-183.2(a1).

vehicles. Only vehicles registered in 48 counties are subject to the emissions inspection.⁴

North Carolina is one of 16 states plus the District of Columbia with both a safety and an emissions inspection program. As a point of comparison, Exhibit 1 shows which states require no inspections, a safety inspection, an emissions inspection, or both. In North Carolina, the safety inspection and emissions inspection are two distinct programs; however, in emissions counties, the two inspections are combined.

In November 2008, three changes affecting the state's safety inspection programs took effect. They include

- tying inspections to taxpayers' registration renewals,
- discontinuing the use of paper windshield stickers to signify whether a vehicle is in compliance (E-sticker program), and
- increasing the cost of vehicle safety inspections by \$4.50.

By changing the inspection cycle to coincide with vehicle registration and automating the collection of inspection data through the E-sticker program, the Division of Motor Vehicles (DMV) expects to increase inspection compliance for both inspection programs to 97%.⁵

The Safety Inspection Program

As the availability and popularity of automobiles grew, so did regulations regarding their operation and maintenance. In 1937, North Carolina passed legislation describing minimum operating standards for vehicle equipment. In 1947, North Carolina established its first vehicle safety inspection program requiring vehicle owners to submit their automobiles to annual safety inspections. However, the 1947 program was repealed in 1949.

The underlying assumption of the safety inspection program is that by identifying mechanical defects and requiring their repair, the state is keeping unsafe cars from operating on North Carolina roadways, thereby reducing loss of life and property damage. As cars evolved and manufacturers focused on improved speed and performance, state and federal officials grew increasingly concerned about the rate of injury, property damage, and death resulting from vehicle accidents. In the mid-1960s, several pieces of federal and state legislation were passed to address these concerns. Among these efforts was the adoption of state safety inspection programs.

⁴ Counties are subject to an emissions inspection program based on the United States Environmental Protection Agency standards, population density, and other criteria. N.C. Gen. Stat. Chapter 143, Article 21B lists the North Carolina counties subject to emissions inspections.

⁵ Compliance is defined as the percentage of vehicles subject to inspection that complete a valid initial inspection. Division of Air Quality. (2007). *North Carolina I/M Annual Report*. See also Fiscal Research Division. (2007). *Fiscal Note, Safety/emission inspection changes AB, HB 679 (5th ed.)*. Raleigh, NC: General Assembly. Current compliance rates for the safety-only and the emissions/safety inspections are 81% and 94%, respectively. DMV system to wipe out inspection stickers. (2008, September 9). *The Raleigh News & Observer*, p. B1.

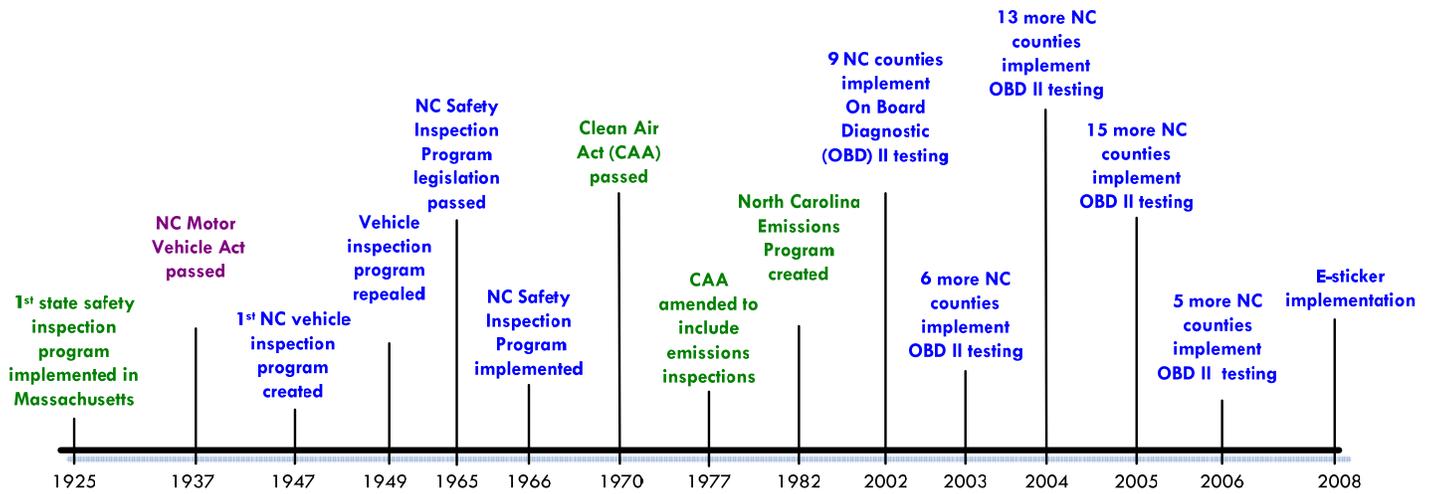
Exhibit 1: Safety and Emissions Inspections by State



Source: Program Evaluation Division based on states' web pages and data provided by the Division of Air Quality.

In April 1965, Governor Dan Moore made an impassioned speech before a joint session of the North Carolina General Assembly pushing for the passage of a state safety inspection program. The General Assembly passed House Bill 536, effective February 1966, laying the foundation for today’s vehicle safety inspection program. Exhibit 2 shows a timeline of key events in the evolution of national and state safety (and emissions) inspection laws.

Exhibit 2: Evolution of Safety and Emissions Inspection Programs



Source: Program Evaluation Division based on legislation and DMV documents.

Today, vehicles less than 35 years old are subject to a vehicle safety inspection in all 100 counties. The items subject to testing during a safety-only inspection include⁶

- brakes;
- lights (headlights, rear lights, stoplights);
- horn;
- steering mechanism;
- windshield wipers;
- directional signals;
- mirrors;
- exhaust emissions controls; and
- tires (added in 1969).

A properly certified technician inspects vehicles at a state-licensed inspection station.⁷ The inspection procedures for both the safety-only and the emissions inspection are detailed in Appendix A.

According to industry representatives, the chief value of the safety inspection program is that it compels motorists to annually assess the

⁶ 19A N.C. Admin. Code 03D. 0532-0542.

⁷ Businesses wishing to operate as inspection stations—whether safety or emissions inspection stations—must apply for a license from DMV and acquire appropriate equipment listed in DMV regulations. Technicians must complete eight hours of training to become a safety inspector, another eight hours to become an emissions inspector, and must receive a license from the state. One does not have to be a mechanic in order to be a safety or emissions inspector. Certification courses are offered at a number of North Carolina community colleges.

overall mechanical condition of their vehicles. The inspection program encourages preventative, holistic care versus addressing a specific issue or problem only when it occurs.

The Emissions Inspection Program

The passage of the federal Clean Air Act of 1970 added a new aspect to motor vehicle regulation. The act and its subsequent amendments mandated that states—in cooperation with the federal government—monitor and regulate pollution levels, especially in designated “non-attainment” areas for specified pollutants.⁸ The act directed the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards for criteria pollutants such as carbon monoxide, sulfur dioxide, nitrogen dioxide, total photochemical oxidants, total suspended particles, and hydrocarbons. In 1997, the National Ambient Air Quality Standards were revised to include fine particulate matter. In North Carolina, the chief mobile source pollutants include carbon monoxide as well as nitrogen oxides and hydrocarbons (both of which lead to the creation of ozone).

Depending on the level of non-attainment, the EPA permits states to determine how best to meet federal standards. States file a State Implementation Plan detailing how they plan to meet those standards. The State Implementation Plan includes air quality standards that apply to stationary as well as mobile sources and outlines the state’s overall strategy for monitoring and mitigating pollutant levels. The mobile emissions program, of which the vehicle emissions inspection is one facet, is part of the Division of Air Quality’s broader program for improving air quality in North Carolina.⁹

The Clean Air Act requires areas designated as having a moderate level of pollution implement a vehicle emissions program. Seven counties in North Carolina have been designated by the EPA as moderate: Gaston, Mecklenburg, Cabarrus, Iredell (partial), Lincoln, Rowan, and Union. An additional 41 counties are part of the emissions inspection program because the Division of Air Quality deemed participation in the inspection program as necessary to meet clean air standards.¹⁰ These counties were chosen based on their population and traffic volume. Senate Bill 953, passed in July 1999, stipulated counties with more than 40,000 people and daily vehicle miles traveled of more than 900,000 are subject to participation in the emissions inspection program.¹¹

North Carolina’s first vehicle emissions inspection program was established in Mecklenburg County in the early 1980s. The early emissions inspection program relied on a tailpipe test to determine which cars were releasing excess pollution. The tailpipe test was administered by inserting a probe

⁸ A non-attainment area is a geographic area in which the level of an air pollutant is higher than the level allowed by federal standards. A single geographic area may have acceptable levels of one air pollutant but unacceptable levels of another. Thus, an area can be both an attainment area and a non-attainment area at the same time. National Research Council. (2001). *Evaluating vehicle emissions inspection and maintenance programs*. Washington, DC.

⁹ The air quality program is a balance of tradeoffs. For example, if the state relaxed mobile source program requirements, the Division of Air Quality would have to modify the State Implementation Plan by creating more stringent stationary source controls.

¹⁰ The Division of Air Quality uses modeling to estimate the amount of pollutants resulting from various sources. This modeling data is then used to help the Division of Air Quality create the State Implementation Plan and design programs to improve air quality.

¹¹ 1999 N.C. Sess. Laws, 1999-328 § 3.1(d).

into a car's tailpipe and measuring the amount of pollution emitted. However, the tailpipe test could not identify which component of the vehicle's exhaust control system was causing problems. The tailpipe test was discontinued in December 2005 because it had become obsolete.

As a result of regulatory changes associated with the Clean Air Act, North Carolina adapted its emissions inspection program to use the On Board Diagnostic (OBD) test instead of the tailpipe test.¹² The OBD test is conducted by hooking up a vehicle to an analyzer machine via a cable that downloads diagnostic information from a car's onboard computers. The underlying assumption of the modern emissions inspection program is as long as a vehicle's onboard diagnostic systems are functioning properly and the OBD systems do not indicate an emissions problem, then a vehicle is not releasing excess pollutants.

North Carolina's transition from the tailpipe test to the OBD test to monitor emissions began in 2002, and the emissions inspection program was expanded to 48 counties by the end of 2006. Vehicles model year 1996 and newer are equipped with OBD systems designed to monitor emissions-related components.¹³ Therefore, only model year 1996 and newer vehicles in 48 counties are subject to the emissions inspection. Exhibit 3 depicts North Carolina counties with emissions inspection programs and those having safety-only inspection programs.

North Carolina has made strides in attaining and maintaining the ozone standards established in 1997 in the face of population growth and increased vehicle traffic. Whereas the state once had all or parts of 32 counties designated as non-attainment areas for ozone, today only the Charlotte area's ozone levels are too high.¹⁴

The emissions inspection program is managed by DMV, which is responsible for the day-to-day operation of the program and various oversight activities (e.g., licensing of stations, audits, enforcement). The Division of Air Quality is responsible for the overall design of the state's air quality strategy and audits DMV's management of the program. The two divisions have a memorandum of understanding delineating roles and responsibilities. The management of the emissions program is discussed on page 12.

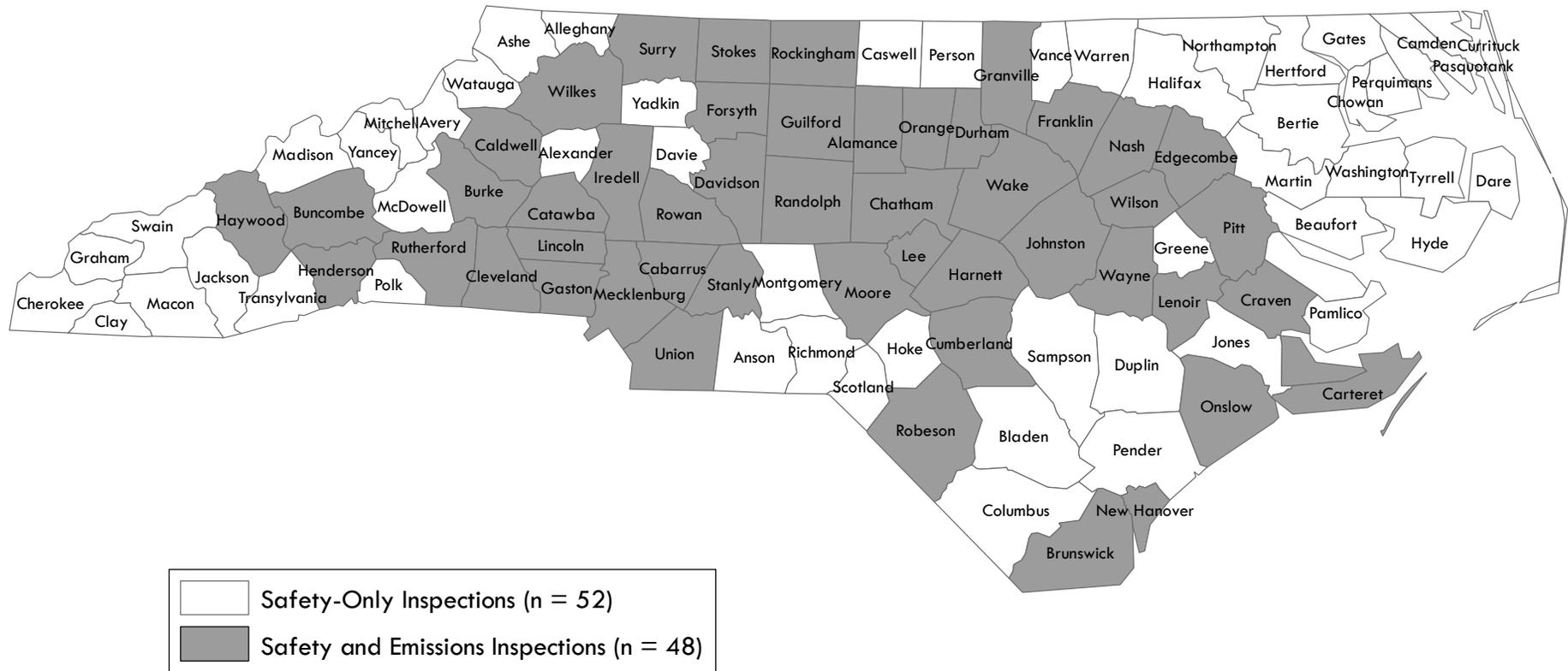
The emissions inspection is enforced by registration denial, which was initiated in 1999. Registration denial requires DMV to match electronic registration records with electronic emissions inspection records to determine which registered vehicles have submitted to inspections and have passed. Vehicles that either have not undergone an inspection or have not passed are unable to obtain registration.

¹² In this report the use of the term OBD, unless otherwise specified, refers to the OBD II test used to complete the emissions inspection.

¹³ A dashboard-mounted malfunction indicator lamp illuminates to alert the driver of malfunctions or deterioration.

¹⁴ In 2008, the EPA once again made the standard for ozone more stringent. As a result, the Division of Air Quality anticipates more areas of the state will be designated as non-attainment areas under the new standard.

Exhibit 3: Safety and Emissions Inspections by County



Source: Program Evaluation Division based on information provided by the Department of Transportation.

Cost of Inspection Programs

The current safety-only inspection costs \$13.60,¹⁵ with \$12.75 being retained by the inspection station and \$0.85 going to the state. Comparatively, the emissions inspection costs \$30 dollars, with \$23.75 being retained by the inspection station and \$6.25 going to the state. The cost of the inspections is determined by the General Assembly and is codified in statute. Exhibit 4 shows the number of vehicles subject to safety and emissions inspections.

Exhibit 4

Registered Vehicles Subject to Safety and Emissions Inspections in Calendar Year 2007

Vehicle Model Year	48 Emissions Counties	52 Non-Emissions Counties
1995 and older	1,321,463 vehicles subject to safety-only inspection	344,356 vehicles subject to safety-only inspection
1996 and newer	3,959,068 vehicles subject to emissions inspection	756,257 vehicles subject to safety-only inspection
Total	5,280,531 vehicles subject to inspection	1,100,613 vehicles subject to inspection

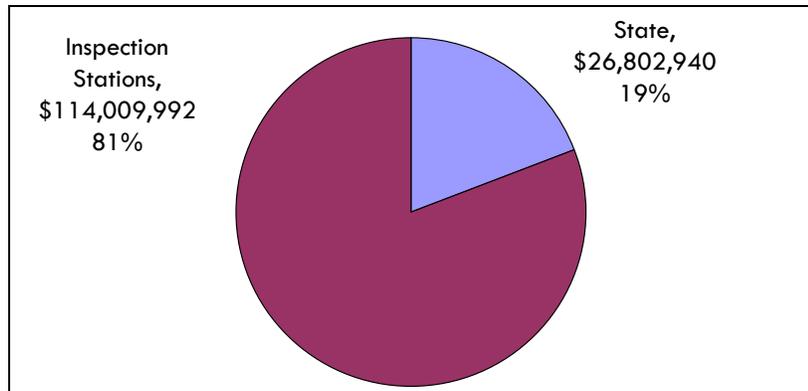
Note: All model years does not include vehicles with missing county information.

Source: Program Evaluation Division based on DMV registration data.

Based on the number of vehicles subject to inspection, the Program Evaluation Division estimated North Carolinians spend \$141 million per year on vehicle inspections. Exhibit 5 shows what portion of the \$141 million is retained by the state and what amount goes to inspection stations.

Exhibit 5

Distribution of the Public's \$141 Million Spent on Inspection Programs Between Inspection Stations and the State



Source: Program Evaluation Division based on inspection costs and DMV data.

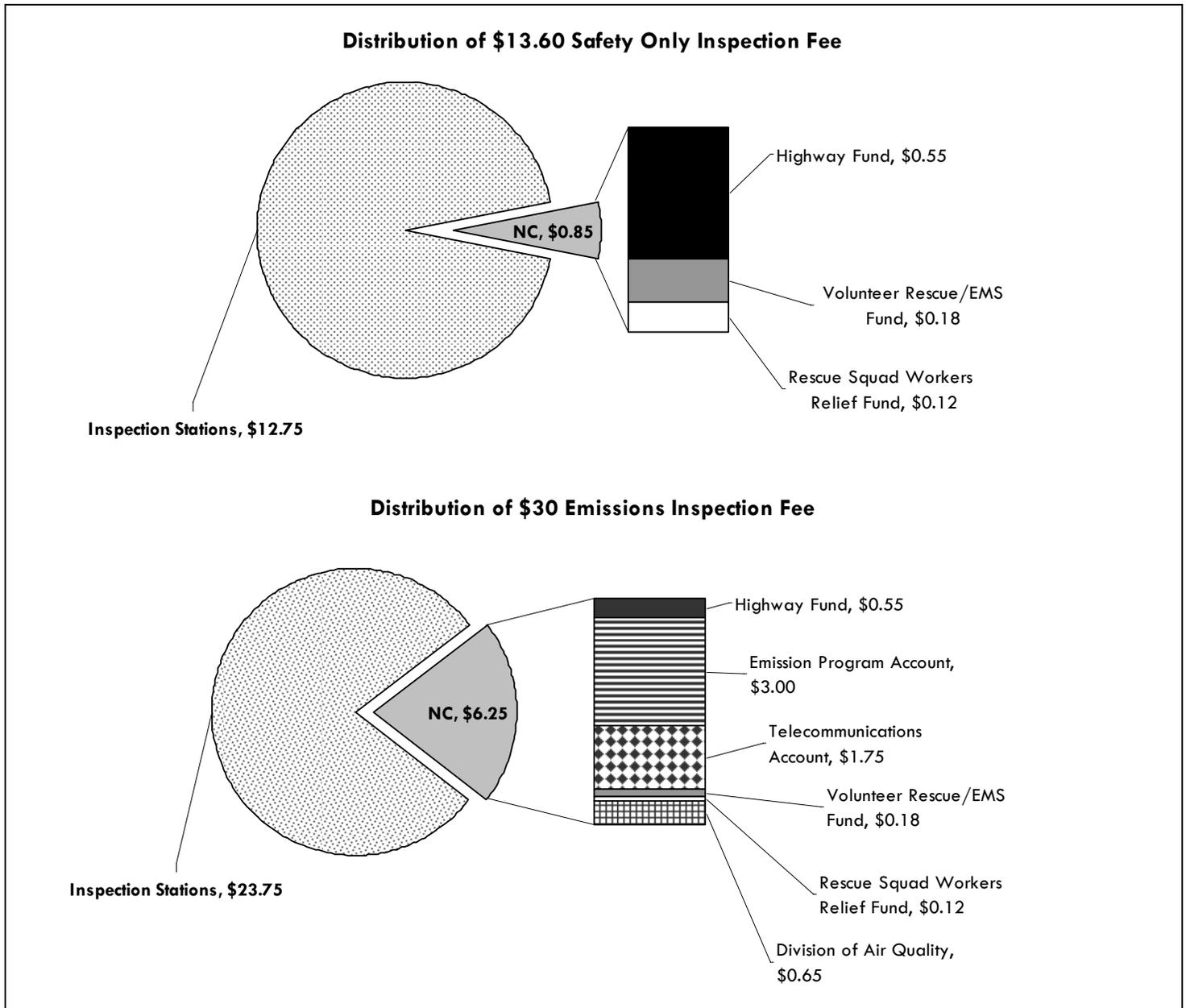
In addition to the price of the inspection, motorists also incur other costs associated with getting an inspection. Travel time, wait time, and time away from work or other activities are costs incurred by individuals who must get a vehicle inspection. The Program Evaluation Division estimates the indirect costs associated with getting an emissions inspection are approximately \$21 million.¹⁶

¹⁵ In November 2008, the safety inspection fee was raised from \$9.10 to \$13.60, nearly a 50% increase. The \$4.50 increase will go to inspection stations.

¹⁶ For this calculation, the Program Evaluation Division assumed it takes half an hour to drive to and from an inspection station, wait in line, and get an inspection done. The value of half an hour of a person's time was set at \$3.28, or half of North Carolina's hourly minimum wage (\$6.55). The 6,381,144 vehicles subject to inspection was multiplied by \$3.28 to arrive at \$20,930,152 as the indirect cost of inspections to North Carolinians.

Exhibit 6 shows how the state's portion of the safety and emissions inspection fees is distributed. In Fiscal Year 2007-08, the state's portion of the inspection fees totaled more than \$30 million—\$27.3 million from emissions inspections and \$2.9 million from safety inspections. Inspection stations receive \$12.75 and the state receives \$0.85 for each safety inspection performed. Meanwhile, inspection stations receive \$23.75 and the state receives \$6.25 for each emissions inspection performed. For either inspection type, the state's portion is further subdivided among various accounts as depicted in Exhibit 6.

Exhibit 6: Distribution of Inspection Fees as of November 2008



Source: Program Evaluation Division based on fees listed in N.C. Gen. Stat. §20-183.

The distribution of state fees collected from the safety and emissions inspection programs is mandated by law.¹⁷ Revenues from the inspection programs go to the following funds:

- **Highway Fund.** The Highway Fund provides funding for road maintenance, DMV, and other transportation programs and services. The Highway Fund receives \$0.55 from every safety and emissions inspection. In Fiscal Year 2007-08, the fund received nearly \$4.3 million.
- **Telecommunications Account.** From each emissions inspection, \$1.75 goes to the Telecommunications Account, which was created as a non-reverting account within the Highway Fund. In Fiscal Year 2007-08, the account received \$7.6 million from inspection revenue. This account pays for the hardware, software, and communications costs for inspection stations to interface with the state. Of the \$1.75, \$1.30 covers current data transmittal between inspection stations in the 48 counties and the state. The remaining \$0.45 has been held in reserve to pay for the automation of the remaining 52 counties, which includes the purchase of approximately 3,000 analyzer machines provided to stations by the state. As of November 2008, \$0.05 of the \$1.75 is held in reserve to pay for future program enhancements; \$0.05 equates to approximately \$2 million reserved per fiscal year.¹⁸
- **Volunteer Rescue/EMS Fund.** Created within the Department of Insurance, this fund provides grants for equipment and capital improvements to volunteer rescue and Emergency Medical Services squads. The fund, which receives \$0.18 from every safety and emissions inspection, is resourced wholly by the inspection programs. In Fiscal Year 2007-08, the fund received a total of \$1.4 million.
- **Rescue Squad Workers' Relief Fund.** This fund receives \$0.12 from every safety and emissions inspection. Revenues credited to this account fund over 400 scholarships and provide financial support for rescue and Emergency Medical Services personnel and their dependents. This account is funded completely by revenue from inspection fees, which in Fiscal Year 2007-08 totaled over \$924,000.
- **Emissions Program Account.** This account was created as a non-reverting account within the Highway Fund and receives \$3 from every emissions inspection. DMV administers the account and may only use it to fund the emissions inspection program. In Fiscal Year 2007-08, the account received \$13 million from inspection fees.
- **Division of Air Quality.** The Division of Air Quality receives \$0.65 from every emissions inspection. Revenues are used to pay for auditing and management of the emissions program. In Fiscal Year 2007-08, the account received \$2.8 million from the inspection program.

¹⁷ N.C. Gen. Stat. § 20-183.7.

¹⁸ This amount is based on the 3,959,068 vehicles subject to emissions inspection in the 48 emissions counties in Calendar Year 2007 multiplied by \$0.05, which equals \$1,979,534.

Funding for the safety inspection program is appropriated by the General Assembly and is part of DMV's License and Theft Bureau's \$20.8 million operating budget. The budget includes 343 employees—88 of whom are involved in the enforcement of the safety inspection program. Funds appropriated for the License and Theft Bureau that are not used by the end of the fiscal year revert back to the Department of Transportation Highway Fund. Unlike the safety-only inspection program, the emissions program is a receipt-based program, meaning money generated through the inspection fee covers personnel and operating costs.

In Fiscal Year 2007-08, it cost DMV \$17.8 million to operate the emissions program. The DMV emissions budget pays for 61 emissions specialists and 61 emissions inspectors in addition to covering program administration costs. DMV emissions inspection program funds not used by the end of the fiscal year remain in DMV's emissions program account. For example, for Fiscal Year 2007-2008 DMV had budgeted \$30 million for the emissions inspection program. However, at the close of the fiscal year, DMV showed an available budget of \$13 million in the emissions inspection program account.

During the same fiscal year, it cost the Division of Air Quality \$2.2 million to run its portion of the emissions inspection program. Revenues accrued to the Division of Air Quality from the emissions inspection program pay for

- seven auditors to audit DMV,
- program administration, and
- outreach and education.

The Division of Air Quality currently has a \$3.6 million balance in its emissions inspection program account. The Division of Air Quality plans to use this balance to support aspects of its mobile source program such as ambient monitoring, modeling, transportation planning, and infrastructure.

Program Management

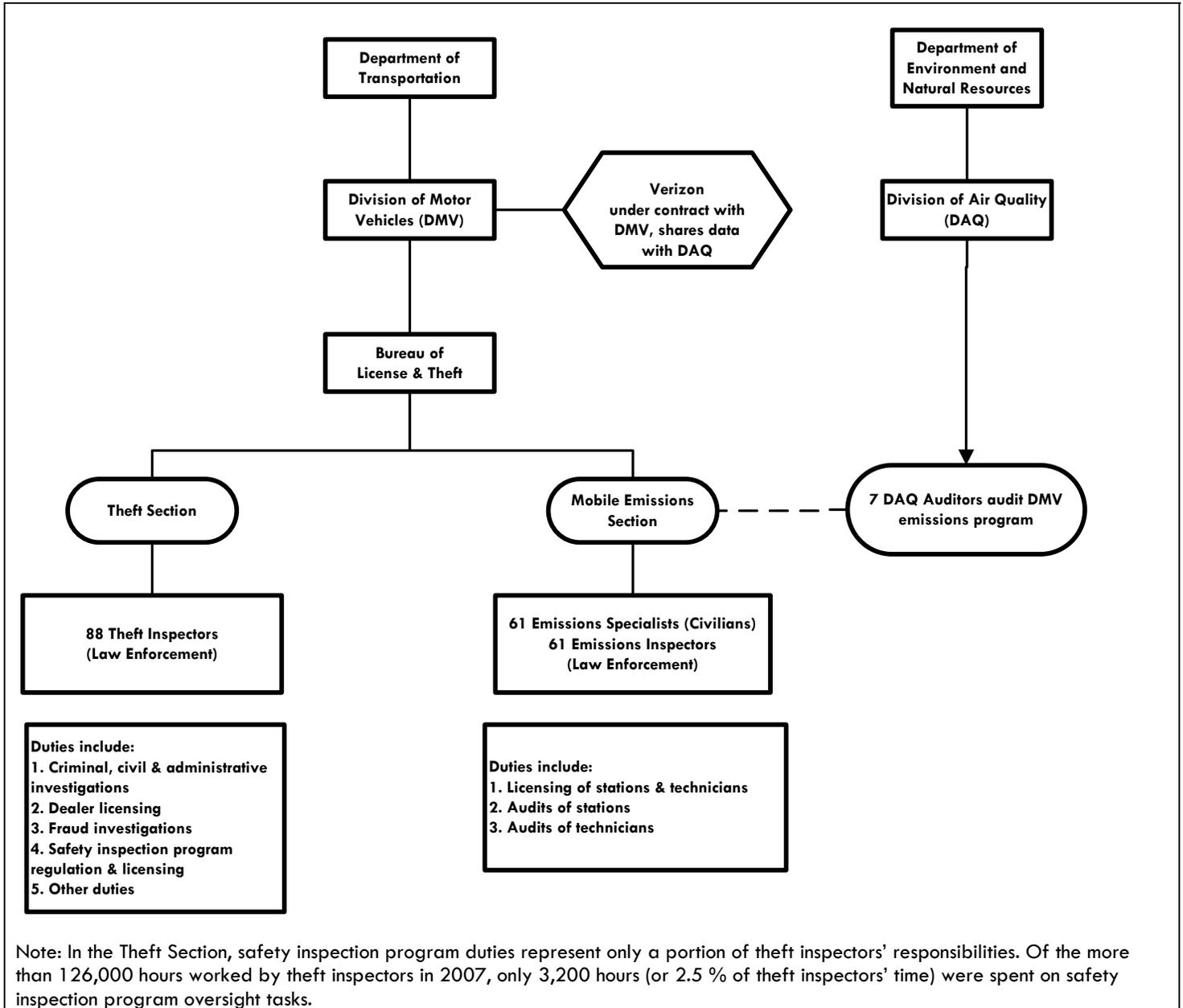
North Carolina is one of 20 states operating a decentralized safety and emissions inspection program.¹⁹ A decentralized program was adopted in North Carolina because it was seen as more convenient for the public (e.g., easier access, greater choice).²⁰ The state sets policies and procedures for the conduct of the inspection programs and provides oversight, but privately owned and operated facilities actually do the inspections.

As illustrated in Exhibit 7, DMV's License and Theft Bureau is responsible for the oversight and regulation of both the safety and emissions inspection programs. DMV oversees the network of inspection stations that perform both types of inspections. Due to federal requirements, the emissions inspection program is handled by a separate section of DMV's License and Theft Bureau. The Division of Air Quality audits DMV's operation of the emissions inspection program, as required by federal regulations.

¹⁹ A decentralized program is made up of a large number of stations responsible for the inspection of vehicles. Program enforcement and quality control are more difficult in a decentralized network because of the large number of stations in the network. National Research Council. (2001). *Evaluating vehicle emission inspection and maintenance programs*. Washington, DC.

²⁰ Air Quality Legislative Study Commission. (1980, February). *Implementation of a motor vehicle inspection/maintenance program*. Raleigh, NC: General Assembly.

Exhibit 7: Safety and Emissions Inspection Program Management Structure



Source: Program Evaluation Division based on data from DMV and the Division of Air Quality.

Safety Inspection Program Management. In the safety inspection program, there are 88 DMV theft inspectors (sworn law enforcement officers) who are responsible for the licensing and oversight of safety inspection stations. In addition to monitoring safety inspection stations, theft inspectors have the following duties:

- conducting criminal, civil, and administrative investigations;
- investigating vehicle theft, salvage, and dealer licensing investigations;
- investigating drivers' license fraud and identity theft;
- investigating odometer fraud; and
- conducting other special investigations.

Of the more than 126,000 hours worked by DMV theft inspectors, only 3,200 hours (or 2.5% of theft inspectors' time) were spent on safety inspection program oversight tasks. Although it is DMV's practice to audit safety inspection stations annually, the requirement to do so is not codified in any regulations.

Emissions Inspection Program Management. The North Carolina vehicle emissions inspection program was implemented under EPA regulations.²¹ Federal guidelines stipulate a state with an emissions inspection program must engage in a quality assurance program to ensure facilities providing inspections are following the law and doing inspections as required. The Division of Air Quality and DMV have signed a memorandum of understanding delineating the roles and responsibilities regarding the emissions inspection program.

DMV's License and Theft Bureau has created rules for implementing and monitoring the emissions inspection program.²² There are 61 DMV emissions specialists (civilian personnel) and 61 emissions inspectors (sworn law enforcement officers) responsible for conducting audits of inspection stations.²³

DMV personnel are required to perform a minimum of four overt and two covert audits per year on every emissions inspection station.²⁴ DMV also is supposed to conduct at least one overt technician audit per year to certify technicians possess the appropriate skills to conduct an emissions inspection. According to DMV data, emissions specialists perform 96% of overt audits and emissions inspectors (law enforcement) perform 89% of covert audits.²⁵

An overt audit is an unannounced assessment of a station to ensure it has the necessary equipment to conduct inspections and technicians employed by the station know how to properly administer an emissions inspection. A checklist of what DMV inspectors and emissions specialists look for in conducting an overt audit can be found in the License and Theft Bureau's Policy and Procedure Manual. During a covert audit, DMV emissions inspectors bring a vehicle that has been tampered with to a station to determine if the station and technicians conduct a thorough and fair inspection and report accurate results.

Under state law, both technicians and stations can be penalized for performing improper inspections. Penalties can range from administrative infractions to criminal charges if stations or individual technicians are engaged in clean scanning, inspection sticker fraud, or passing vehicles that should fail inspection. Violations are categorized by severity as Type I, Type II, or Type III violations, with Type I violations being the most serious. Penalties include warnings, suspensions, and fines known as civil penalties.

²¹ Inspection/Maintenance Program Requirements, 40 CFR Part 51 (1992).

²² 19A N.C. Admin. Code 03D. 0532-0542.

²³ Not all of these positions are currently filled.

²⁴ North Carolina's auditing requirements are different from those stated in 40 CFR, Part 51. The Division of Air Quality worked with the EPA to amend its auditing requirements in accordance to how North Carolina operates its emission inspection program.

²⁵ Of the more than 60,000 audits performed by DMV personnel in Calendar Year 2007, 20,171 were overt audits; 19,386 were completed by emissions specialists and 785 were performed by emissions inspectors. During the same time period, emissions specialists performed 456 of 4,308 covert audits and emissions inspectors performed the other 3,852. Other types of audits performed by DMV personnel include technician audits, follow-up investigations, and self-inspection audits.

According to DMV records, \$16.3 million in penalties were collected in Fiscal Year 2007-08.

The Division of Air Quality is charged with auditing DMV's adherence to federal guidelines and reports data about North Carolina's emissions inspection program to the EPA annually.²⁶ In addition, the Division of Air Quality develops specifications for the program and certifies the emissions testing equipment used in the program. The Division of Air Quality employs seven auditors to verify DMV personnel are properly trained and execute oversight duties correctly.

Data from DMV's oversight activities are collected and stored in a database created and maintained by Verizon, an outside contractor. Verizon was hired by the state after an EPA audit of the emissions program found fault with data management. Verizon has designed several data reporting packages to help DMV track audits and investigations, station and technician licensing, and enforcement activity. Although Verizon's contract is with DMV, the Division of Air Quality is able to access data from Verizon for the Division of Air Quality's reporting and analytic needs.

The \$1.75 portion of the emissions inspection fee that goes to the Telecommunications Account pays for the Verizon contract. The Verizon contract was recently renewed through 2012. The estimated value of the contract is \$51 million, to be paid between 2008 and 2012.²⁷

Findings

The Program Evaluation Division sought to determine whether the safety and emissions inspection programs are reliably and effectively achieving their stated objectives of

- identifying mechanical defects and requiring their repair to keep unsafe cars from operating on North Carolina roadways, thereby reducing loss of life and property damage; and
- controlling the pollutants from mobile source emissions.

Finding 1. The safety inspection program is not effective. Lower rates of traffic accidents, injuries, and deaths stemming from faulty vehicle equipment should be attributable to the existence of a valid and reliable safety inspection program.

Since the 1970s, several analyses have estimated approximately 6% of accidents are caused by mechanical failure; however, the validity of those analyses has been questioned due to sample size and other issues. Some states have challenged the assumption that safety inspections reduce accidents. In fact, nearly three decades of research has failed to conclusively show that mechanical defects are a significant cause of motor vehicle accidents or that safety inspections significantly reduce accident rates. Please see Appendix B for an annotated bibliography of relevant research and studies.

²⁶ 40 CFR § 51.366.

²⁷ The \$51 million is used as a planning figure. The Verizon contract stipulates the amount received by Verizon is dependent on the fees generated by the number of vehicles inspected.

Due to the elusive connection between inspection programs and accident prevention, Congress rescinded the requirement for states to have a safety inspection program in order to receive federal highway funds in 1973.²⁸ As a result, more than a dozen states have repealed their safety inspection programs in whole or in part since 1975.

Although states differ in their population sizes, vehicle mix, and driving habits, Nebraska is an example of a state that repealed its safety program. The Nebraska State Highway Patrol, Division of Motor Vehicles, and Department of Transportation monitored crash data in which mechanical defects were a contributing factor to determine

- whether accidents due to mechanical defects increased after the program was repealed, and
- whether mechanical defects contributing to an accident would have been inspected during a safety inspection.

Nebraska's three-year average of reported crashes involving a vehicle defect was 1,759 before the program was repealed in 1982. The three-year average of crashes involving a vehicle defect after the inspection program was cancelled was 1,486.²⁹

North Carolina's crash data—as collected and reported by the Division of Motor Vehicles (DMV)—shows the number of cases in which a vehicle's mechanical condition may have contributed to an accident equalled 1% of all crashes statewide.³⁰ Furthermore, because law enforcement personnel are not mechanics and receive a minimal amount of training in compiling and reporting accident data, it is unlikely a true assessment of how many accidents result from mechanical defects is possible.

Finding 2. It is difficult to quantify the degree to which the emissions inspection program contributes to improving North Carolina's air quality. Lower pollution levels for a region should be attributable to the existence of a reliable and valid emissions inspection program. According to news reports, in 2007—a year marked by severe drought and record-breaking heat—North Carolina violated ozone level on 66 days, compared with 101 “bad ozone” days a decade ago. Although this improvement suggests the state's efforts to control pollutants and improve air quality is working, it is not clear how much of the improvement can be attributed to the mobile emissions inspection program.

Air quality is determined by measuring pollutant levels. Pollution data is compared to federal standards to determine whether or not an area has exceeded the National Ambient Air Quality Standard. However, the ambient monitoring data collected is not source-specific but rather an aggregate of all source sectors. Attainment demonstrations are based on the totality of all of the Division of Air Quality's control strategies, including the vehicle emissions inspection program.

²⁸ Comptroller General of the United States. (1977, December). *Effectiveness of vehicle safety inspections neither proven nor unproven*. Washington, DC: United States Congress.

²⁹ F. Zwonechek, Nebraska Office of Highway Safety Administrator (personal communication, August 2008).

³⁰ DMV, Traffic Records Section. (2005). *North Carolina traffic crash facts*, p81. In 2005, the total number of crashes statewide was 383,625, and the total number of crashes where vehicle condition was a factor was 5,426.

Finding 3. Inspection duration indicates lack of thoroughness. A reliable inspection program ensures all stations conduct inspections systematically. It should make no difference what inspection station or what time of year a vehicle is inspected because all stations should use the same procedures and equipment and apply identical standards for pass/fail decisions. The state’s management and oversight of the inspection programs is the primary way to ensure the reliability of inspections.

One of the major criticisms of a decentralized inspection program such as North Carolina’s is the difficulty the state has in ensuring the quality and uniformity of inspections. Program managers and industry representatives told the Program Evaluation Division a thorough inspection should take between 15 and 30 minutes. Analysis and direct observations show, on average, inspections fail to meet this standard. The Program Evaluation Division analysis of inspection times shows a wide fluctuation in inspection duration, as illustrated in Exhibit 8. It is reasonable for the On Board Diagnostic portion of an inspection to take only a few minutes, but the safety inspection and the visual tamper check portion of the emissions inspection—if done according to regulations—should take more time. Given the average inspection lasted between five and six minutes, it is questionable how thorough an inspection the average consumer is receiving.

Exhibit 8

On Average, Inspections Last Only Five to Six Minutes

Type of Inspection	Total Inspections Performed in CY 2007 ⁱ	Range ⁱⁱ	Average Time to Complete Inspection
Safety-Only	1,786,901	1-28 minutes	5 minutes
Emissions	4,336,020	1-28 minutes	6 minutes
Notes: ⁱ Includes 95% of the inspections performed in Calendar Year 2007. ⁱⁱ Negative-time and positive-time outliers were excluded from analyses, which restricted inspection times to this range.			

Source: Program Evaluation Division based on DMV inspection data.

Informal, firsthand, and unannounced observation by the Program Evaluation Division of actual inspections revealed technicians omitted several required steps and took less than 15 minutes.³¹ During one of the observations, the technician told the customer that even if there was something wrong with the customer’s vehicle, he would still pass it because this customer is a “regular.”

Evaluation team observations are consistent with previous research suggesting the reliability of safety inspections is questionable. One study, done in Pittsburgh, Pennsylvania, found when test vehicles with some 13 known defects were taken to 20 different inspection stations, most stations only found 7 out of 13 defects and in some cases found non-existent defects.

³¹ Evaluation team members informally observed inspections to increase their understanding of station operations. Evaluation team members accompanied volunteers who were having their vehicles inspected. In order not to artificially influence the inspection process, stations were not notified of the presence of evaluation team members. The observations were insufficient in number to estimate statewide rates of compliance and were not intended for that purpose.

Finding 4. The Division of Motor Vehicles's oversight of the inspection programs is insufficient. The Division of Air Quality audits the Division of Motor Vehicles's (DMV's) operation of the emissions inspection program. The Division of Air Quality uses data from the Verizon database to evaluate DMV in the following areas:

- enforcement,
- inspection waiver processing,
- DMV emissions specialists and inspectors' job knowledge,³²
- number of overt audits performed,
- number of covert audits performed,
- number of vehicles that submit and pass emissions inspections, and
- DMV performance of overt audits.

The Division of Air Quality annual reports have graded DMV's performance of covert audits and registration denial activities as deficient. The Division of Air Quality also has noted the ability to track penalties resulting from audits (suspensions, fines, license revocation) is not currently available.

Finally, neither DMV nor the Division of Air Quality use trend analysis or other methods to examine program outcomes. Additionally, DMV has not made serious efforts to report program performance (to the public or to the North Carolina General Assembly) or assess if the program could be improved.

Stations are not inspected at the required frequency. The need for quality oversight is necessary to ensure a reliable decentralized inspection program. In the case of North Carolina's emissions inspection program, the federal government requires a specific number of audits of both inspection stations and technicians. The United States Environmental Protection Agency requires the state to do a minimum of four overt and two covert audits of all emissions inspection stations. As mentioned earlier in the report, there is no regulatory mandate for safety-only audits, but it is DMV's practice to do at least one annual overt audit of each safety-only inspection station.

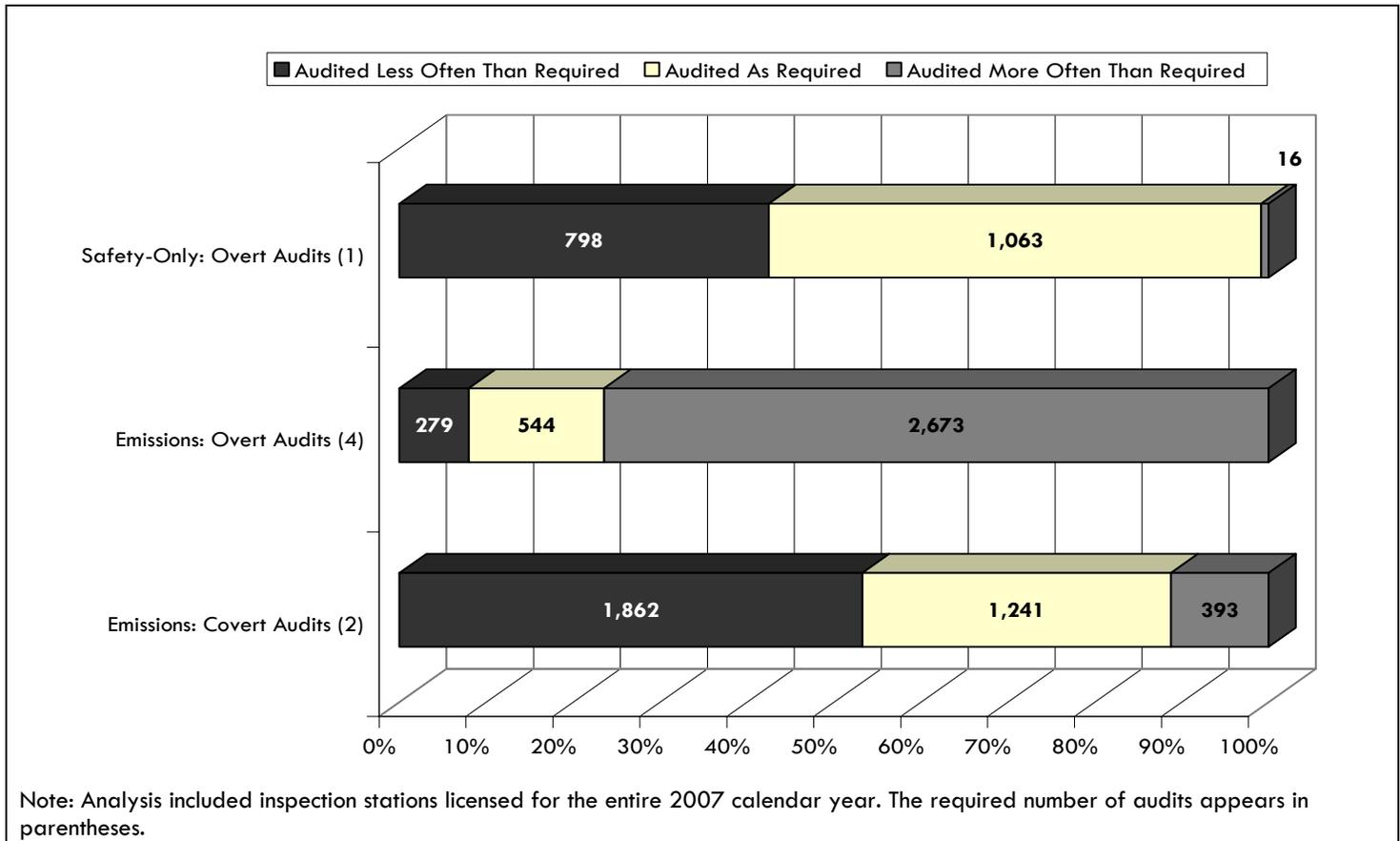
The Program Evaluation Division analyzed safety and emissions audit data from the Verizon database for all stations operating and licensed to perform either safety inspections or emissions inspections in North Carolina during Calendar Year 2007.³³ This analysis revealed some stations are not audited as required by DMV.

The Program Evaluation Division conducted an analysis of inspection records for 5,373 stations—1,877 safety and 3,496 emissions stations. Exhibit 9 shows 43% of the 1,877 safety-only inspection stations did not receive an overt audit at all during Calendar Year 2007, whereas 57% were audited at least once. Although there is no requirement to perform a set number of covert audits on safety-only stations, analysis showed approximately 5% of these stations received covert audits during 2007.

³² DMV emissions personnel are tested annually on emissions component identification and other job-related knowledge.

³³ Only public inspection stations—stations that are accessible to the general public—were analyzed to determine if they have been audited the correct number of times. Inspection stations can be self-inspection stations or public inspection station. Self-inspection stations are used by government entities or business organizations operating a fleet of their own vehicles (e.g., Federal Express, Wake County School District). The average motorist gets his or her vehicle inspected at a public inspection station such as a car dealership, an inspection-only facility, or an automotive garage.

Exhibit 9: Many Inspection Stations Are Not Audited As Required



Source: Program Evaluation Division based on data from DMV audit data.

Analysis of audit data for the 3,496 emissions stations shows approximately 8% of stations received fewer than four overt audits; nearly 53% of these stations also received fewer than the required two covert audits stipulated by federal and state requirements. Although it is reasonable to expect some stations will be audited more than others due to ongoing investigations, this level of auditing cannot ensure program reliability. Additionally, an internal DMV analysis suggests DMV’s emissions program may be overstaffed.³⁴ If there are more than sufficient personnel to conduct emissions inspection program oversight activities, it is unclear why all stations do not receive the minimum required number of covert audits.

DMV told the Program Evaluation Division the License and Theft Bureau does not have enough vehicles to properly conduct all required covert audits. Furthermore, a glitch in the way the Department of Transportation reimburses DMV inspectors for expenses associated with conducting covert audits means DMV loses about a month of audit activity annually. However, DMV managers told the Program Evaluation Division the reimbursement issue is being reviewed within the Department of Transportation.

DMV does not use available data for program management. DMV management told the Program Evaluation Division the data DMV collects is

³⁴ DMV, License and Theft Bureau. (2009, July 29). *Staffing/workload assessment*.

not routinely analyzed. There is a considerable amount of data collected and stored in the DMV/Verizon database. Station information, audit information, inspection results, enforcement information, and more is collected and stored in the database. Although Verizon provides DMV with reports, the Program Evaluation Division was told these reports are provided on an ad hoc basis. When the evaluation team reviewed a sample of reports provided by DMV, all were uniformly brief and were reporting tools rather than analytic reports designed to aid program leadership in making decisions about program progress and in identifying areas needing improvement.

The Verizon contract has an estimated cost of \$51 million for the years 2008 to 2012. Information is available within the database that could be valuable to program management. However, DMV underutilizes program data to assess, track, and manage the inspection programs.

Finding 5. Older vehicles are more likely to fail inspection. The University of North Carolina's Highway Safety Research Center's descriptive study on the periodic motor vehicle inspections program found the older a vehicle was, the more likely it was to fail the safety inspection. However, these analyses have not been updated since the report was issued in 1969. For emissions inspections, research by the United States Department of Transportation found mobile emissions increase as a vehicle ages.³⁵ Also, evaluations of emissions inspection programs in other states have found vehicle age to be a contributing factor to failure rate.

The Program Evaluation Division analyzed data from the 6.3 million inspections performed in the 48 counties for which the Division of Motor Vehicles (DMV) collects data electronically.³⁶ Of the 6.3 million inspections, 1.9 million were safety-only and 4.4 million were emissions inspections. Failed inspections accounted for only 5% of all inspections overall.

The Program Evaluation Division analyzed the relationship between inspection outcome and vehicle age by

- calculating failure rates for safety inspections for all vehicles by model year (1973-2007), and
- calculating failure rates for emissions inspections for all vehicles by model year (1996-2007).

Analyses showed older vehicles are more likely to fail safety and emissions inspections. For safety inspections, vehicles from model year 1981 to 2001 had a higher failure rate than the overall safety failure rate (3.3%), whereas vehicles from model year 2002 and newer had lower failure rates.³⁷ Similar results were found for emissions inspections. Vehicles from model year 1996 to 2001 had a higher failure rate than the overall emissions failure rate (2.6%), whereas failure rates for vehicles from model year 2002 to 2007 were lower. Exhibit 10 shows the failure rates by model year. These findings indicate greater emphasis should be placed on

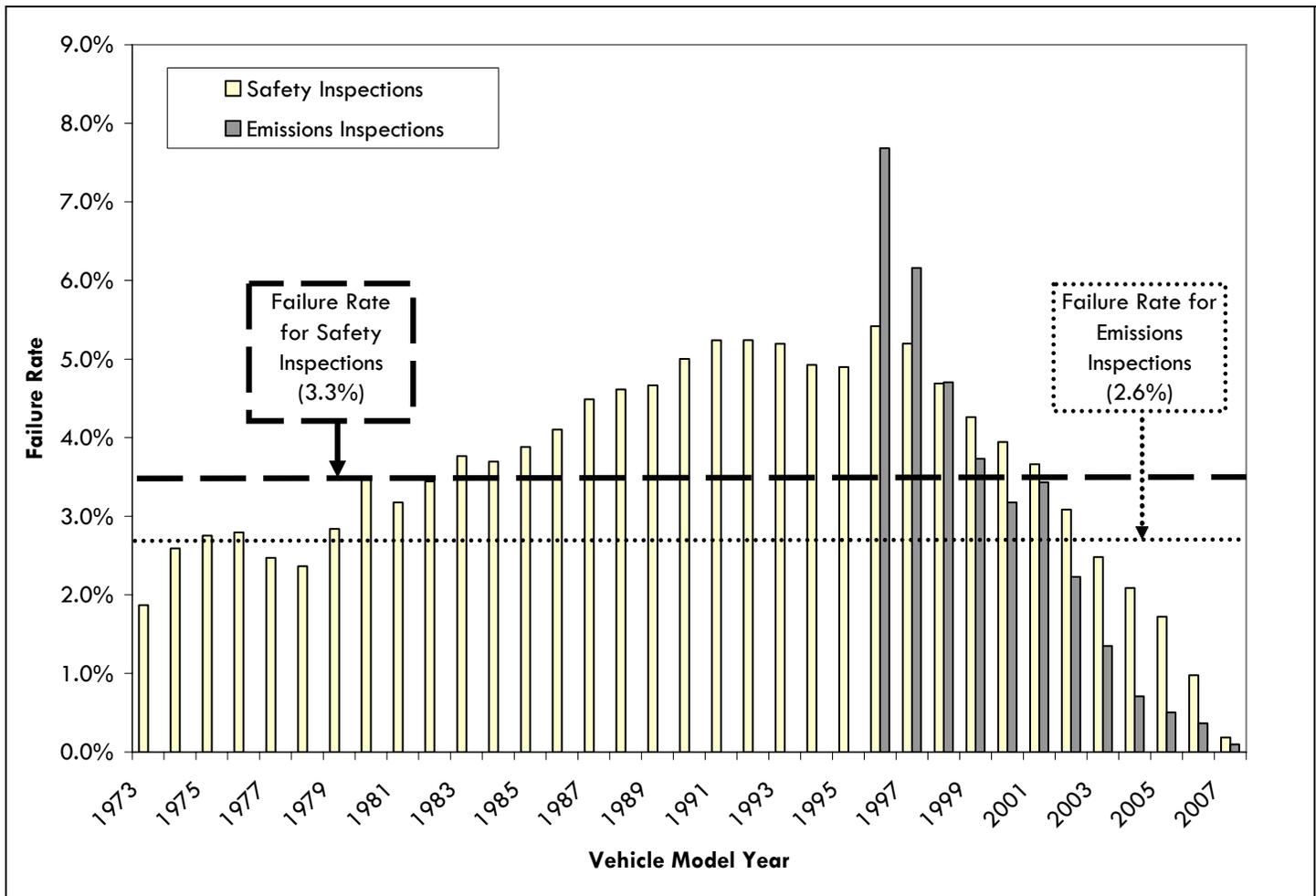
³⁵ United States Department of Transportation. (1994, June). *Evaluation of MOBILE Emissions Vehicle Model*. Retrieved from <http://ntl.bts.gov/DOCS/mob.html>.

³⁶ DMV collects inspection results in paper form from inspection stations in the 52 non-emissions counties.

³⁷ Inspections of 1980 and older model year vehicles also had lower failure rates, but they represented less than 1% of the total inspections in CY 2007.

monitoring the safety components and emissions functioning of older vehicles.

Exhibit 10: Older Cars Were More Likely to Fail Inspection in Calendar Year 2007



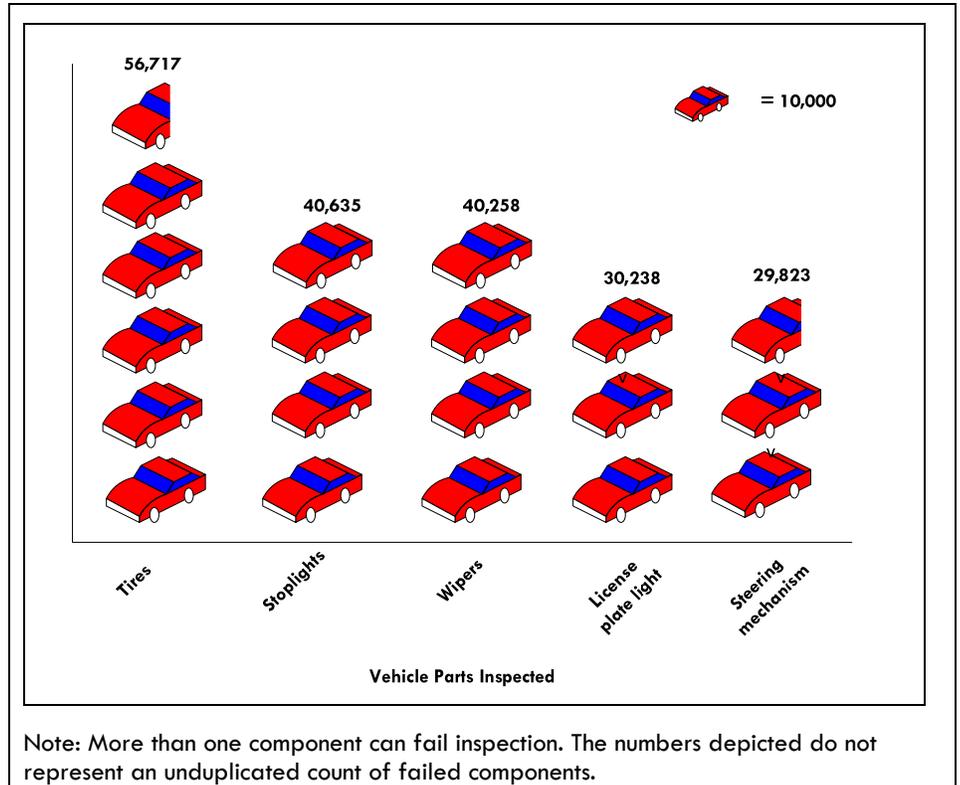
Source: Program Evaluation Division based on DMV inspection data.

Other states exempt newer vehicles from inspections. Among the 33 states with an emissions inspection program, 21 states exempt at least current model year vehicles from inspection; 10 states exempt at least vehicles from the three newest model years. North Carolina only exempts current model year vehicles from its inspection programs. Because newer vehicles (model years 2002-2007) were found to be less likely to fail inspection, it may be unnecessary to require them to undergo annual safety and emissions inspections.

Additional analyses were done on safety inspections data to determine which components failed most often. Vehicles failing the safety inspection were most likely to have defective tires (26%), stoplights (20%), windshield wipers (20%), license plate lights (15%) or steering mechanisms (14%). Exhibit 11 displays these results.

Exhibit 11

Top Five Failed Components of a Safety Inspection



Source: Program Evaluation Division analysis of data provided by Verizon.

Finding 6. Inspection program costs have not been reviewed since 2000. Fees for both safety and emissions inspections are set by the North Carolina General Assembly. In 2000, the inspection service industry, the Division of Motor Vehicles (DMV), and the Department of Environment and Natural Resources conducted analyses of fees charged for both the safety inspection and the newly expanded emissions inspection programs. At the time, the industry recommended a safety inspection fee of \$14.25 and an emissions inspection fee of up to \$50.33.³⁸ However, neither the Department of Environment and Natural Resources nor DMV accepted industry proposals. Instead, the agencies recommended raising the safety inspection fee to \$11 and the emissions inspection fee up to \$29.95.³⁹ All fee proposals accounted for inflation over time, the cost of new analyzer equipment for emissions inspection stations, and a profit margin for inspection stations ranging between 19% and 24%. Underlying the fee proposals were two assumptions:

- stations could perform two emissions inspections an hour, and
- stations could perform three safety inspections per hour.

Additionally, it was estimated most inspection stations would perform between 50 and 200 emissions inspections a month. No estimate of the

³⁸ DMV and Department of Environment and Natural Resources. (2008, March). *Recommendations for the fee charged for the North Carolina Vehicle Inspection and Maintenance Program*. Raleigh, NC: General Assembly. At the time this report was prepared the state was considering several fee options for the emissions programs. The emissions costs cited represent the upper range of industry proposals.

³⁹ At the time of this report, the safety inspection fee was \$9.25 and the emissions inspection fee was \$19.40.

number of safety inspections performed per month was provided. Since the 2000 analysis was done, several things have changed:

- there are more cars subject to inspection,
- the state currently utilizes a less time-consuming procedure for emissions inspections, and
- Program Evaluation Division analysis has shown the time spent performing inspections is substantially less than originally assumed.

DMV is automating inspection data collection in the 52 counties without it. The equipment necessary to implement the electronic interface between stations and the state is being covered by funds already collected through the Telecommunications Account. It is important that inspection stations receive a fair price for the services they provide; nevertheless, it is difficult to understand why taxpayers should have to pay an additional \$4.50 for a safety inspection program that has not been proven effective.

When the emissions inspection program was expanded from 9 to 48 counties in 2001, the North Carolina General Assembly's Fiscal Research Division recommended a periodic review of the emissions program's financial status due to the uncertainty of revenue and expenditure projections. As of this report, a review of that nature has not been conducted.

In July 2008, the Department of Transportation was directed to conduct a review of expenditure patterns and realign its budget at the division level.⁴⁰ A review of the inspection fees, the amount of revenues generated, and the cost to run both the safety and emissions inspection programs should be part of this larger review.

Recommendations

Recommendation 1. The North Carolina General Assembly should reevaluate the need for a safety inspection program.

Analysis has shown the impact of the safety program is difficult to measure. Only a small percentage of vehicles fail inspection, with newer model year vehicles being least likely to have problems with mechanical defects. Furthermore, vehicles on the roads in the 1960s—when the safety inspection program was first implemented—are very different than the ones on the roads today. Safety features such as seat belts, air bags, crumple zones, and anti-lock brakes are just some of the features standard in most cars today. In effect, the circumstances that made the safety inspection an imperative no longer exist.

Option 1. Repeal the safety inspection program. One option available to the General Assembly is to repeal the safety inspection program completely. Exercising this option would have the following impacts:

- the state would collect \$2 million less in fees,
- approximately 38% of all registered vehicles would be free from any inspection requirement,⁴¹
- a small percentage of inspection stations—stations whose primary business is inspections—may not be able to stay in business.

⁴⁰ 2008 N.C. Sess. Laws, 2008-107, § 25.4.

⁴¹ This assumes that the nearly 4 million vehicles subject to an emissions inspection would still be required to get one.

If the state did repeal the safety inspection program, analysis suggests funds earmarked for the Highway Fund, Emergency Management Services Fund, and Rescue Workers Relief Fund could be recouped by increasing the emissions inspection fee by \$0.52 or the vehicle registration fee by \$0.32 to maintain current funding levels. Alternatively, the General Assembly could decide to not raise inspection fees and, thereby, discontinue distributions to the above funds. Finally, doing away with safety inspection could potentially save citizens \$33 million in annual inspection costs.⁴²

Option 2. Exempt vehicles from the three newest model years from safety inspections. Alternatively, if legislators believe that keeping the safety inspection program ensures a minimum standard of vehicle maintenance, then, based on this analysis, the Program Evaluation Division recommends the General Assembly consider exempting a segment of the vehicle population from annual safety inspections. This exemption would

- relieve the burden of an annual inspection on roughly 15% of the public,⁴³ and
- allow the state to focus on ensuring cars that are more likely to fail are getting inspected.

Program Evaluation Division analysis shows exempting vehicles from the three newest model years from a safety inspection does not reduce inspection program effectiveness if effectiveness is measured in terms of percentage of vehicles with identified mechanical defects. However, exempting vehicles from the three newest model years ($n = 168,182$) from a safety inspection would reduce revenue earmarked for other programs. Similar to the effect of repealing the safety inspection program completely, if the state limited inspections to older vehicles, there would be a \$142,955 reduction in revenue for the Highway Fund, the Emergency Management Services Fund, and Rescue Workers Relief Fund.⁴⁴ In order for North Carolina to recoup the revenue lost by exempting vehicles from the three newest model years from inspection, the state would need to make up \$0.06 on every safety inspection performed in non-emissions counties.

The state could make up the revenue by one or a combination of

- retaining a larger portion of the inspection fee to make up the difference,
- increasing the inspection fee, or
- raising registration fees.

Alternatively, the General Assembly could decide not to recoup the revenue and reduce program funds by \$142,955.

⁴² This amount was derived by multiplying the 2,421,976 registered vehicles subject to safety inspection by the current safety inspection fee of \$13.60, which equals \$32,938,873.

⁴³ There are 1.2 million vehicles from model year 2005 to 2007 that get safety inspections; 168,182 of those vehicles are in non-emissions counties. Cost savings from repealing the safety inspection program were calculated based on those vehicles registered in non-emissions counties.

⁴⁴ This amount was derived by multiplying the 168,182 vehicles from model year 2005 to 2007 exempted from safety inspection by the \$0.85 the state receives from inspection fees, which equals \$142,955.

Recommendation 2. The North Carolina General Assembly should consider exempting vehicles from the three newest model years from emissions inspections. Program Evaluation Division analysis shows newer vehicles are less likely to fail emissions inspections. Analysis also shows exempting vehicles from the three newest model years does not affect the overall failure rate for the state. By exempting vehicles from the three newest model years, the state would relieve the annual emissions requirement for 19% of vehicles.

If the state limited emissions inspections to older vehicles, there would be a \$6.3 million reduction in fees collected. If the state wanted to maintain the current level of funding for emissions operations and other programs funded through emissions fees, the state would need to make up \$2.16 for every emissions inspection performed. The state could make up the revenue by one or a combination of

- retaining a larger portion of the \$30 inspection fee and reducing amounts retained by inspection stations,
- raising the inspection fee by any amount up to \$2,
- using the balance of \$3.6 million as of the end of Fiscal Year 2007-08 from the Division of Air Quality's emissions inspection fund, or
- using the projected balance of \$1.98 million from the Division of Motor Vehicles (DMV) Telecommunications Account.

It is important to note that the fund balances are a non-recurring source of revenue and using them to cover program operating costs is a short-term solution.

Alternatively, the General Assembly may decide not to recoup the revenue lost as a result of the exemption and, instead, reduce funding for emissions programs and other funds that receive earmarks from emissions inspections fees.

The Division of Air Quality should perform an in-depth analysis to determine if exemption of vehicles from the three newest model years will affect North Carolina's ability to meet federal air quality standards.

Program Evaluation Division analysis focused on the emissions inspection failure rate, but other factors affect the measurement of mobile source emissions (e.g., road type, vehicle miles traveled, vehicle fleet mix). The Division of Air Quality uses a model approved by the United States Environmental Protection Agency (EPA) that accounts for these factors to estimate how various emissions sources affect North Carolina's air quality.⁴⁵

In light of the Program Evaluation Division's recommendation and new air quality standards released by the EPA, the Division of Air Quality should do a full analysis in order to ensure the state can continue to comply with federal requirements. The Program Evaluation Division recommends the Division of Air Quality perform this analysis and report its findings to the General Assembly by May 2009. If North Carolina can maintain air quality standards while exempting vehicles from the three newest model years, the state should request permission from the EPA to adjust its mobile source emissions program.

⁴⁵ EPA. MOBILE6 Vehicle Emission Modeling Software. Retrieved November 12, 2008, from <http://www.epa.gov/OMS/m6.htm>.

Recommendation 3. The North Carolina General Assembly should require the Division of Motor Vehicles to prepare a plan to improve management of inspection programs.

Despite the amount of information available about the inspection programs, the Division of Motor Vehicles (DMV) does not analyze the information collected and makes little effort to use that information to make improvements to either inspection program. Although the Division of Air Quality sends an annual report to the United States Environmental Protection Agency (EPA), it is strictly a reporting mechanism rather than a performance-based analysis of the program.

Management for results is the active effort of setting program goals, defining performance metrics to measure progress towards those goals, and collecting and analyzing information that allows the public and legislative leadership to know how well the program is doing in achieving those goals. Managing for results would allow DMV to

- educate drivers about what components tend to fail and how to better maintain safe cars,
- adequately monitor stations to assure they are properly conducting inspections,
- provide trend analysis and insight about program performance to legislative, Department of Transportation, and Division of Air Quality leadership,
- assess the quality and effectiveness of enforcement activities,
- improve inspection technician training programs, and
- better allocate resources and manpower for more effective and efficient oversight.

The General Assembly should require DMV, in collaboration with the Division of Air Quality and Verizon, to prepare a plan by June 30, 2009 that

- reviews how inspection program data is managed and analyzed;
- defines performance metrics for program assessment;
- assesses the type of reports that would be most useful to agencies (including field staff and management), the General Assembly, industry (inspection station) personnel, and the public;
- provides a roadmap for how program information will be collected, analyzed, monitored, and presented; and
- determines whether the distribution of personnel is appropriate for accomplishing program oversight tasks.

By March 2010, DMV—having implemented the above plan and having collected data statewide for a full year—should begin annual reporting to the General Assembly on program performance. DMV already supplies data to the Division of Air Quality for their annual report to the EPA. Both agencies should assess the content of the report and adapt it to meet both federal and proposed state reporting requirements. Agency management should work with staff from the North Carolina Office of State Budget and Management to identify appropriate performance metrics for gauging progress toward program objectives.

Additionally, the General Assembly should direct the Fiscal Research Division to complete a fiscal review of both inspection programs by May 2009. The review should

- determine if current inspection fees are appropriate,
- assess revenue projections,
- determine if adjustments need to be made to current inspection fees,
- propose how fee increases should be determined, and
- assess how inspection program budgets are planned and managed and what changes are needed to improve efficiency.

Appendixes

Appendix A: State Procedures for Safety and Emissions Inspections

Appendix B: Annotated Bibliography of Research on Safety Inspection Programs

Agency Response

A draft of our report was submitted to the North Carolina Department of Transportation, Division of Motor Vehicles and the North Carolina Department of Environment and Natural Resources, Division of Air Quality. Their responses are provided following the appendixes.

PED Contact and Staff Acknowledgments

For more information on this report, please contact the lead evaluator, Yana Ginburg Samberg, at yanas@ncleg.net. Staff members who made key contributions to this report include Michelle Beck, Sean Hamel, Pamela L. Taylor, Kelly Quick, and Larry Yates. John W. Turcotte is the director of the Program Evaluation Division.

Appendix A: State Procedures for Safety and Emissions Inspections¹

Safety Inspection Procedures

Brakes

1. Foot brakes shall not be approved if:

- When applying brakes to moving vehicle, braking force is not distributed evenly to all wheels originally equipped with brakes by the manufacturer. (The inspection mechanic/technician must drive vehicle to perform this test. The inspection mechanic/technician may check the brakes while driving vehicle forward into the inspection area.)
- There is audible indication (metal on metal) that the brake lining is worn to the extent that it is no longer serviceable. (The wheel must be pulled and the brake lining examined when this occurs.)
- Pedal reserve is less than 1/3 of the total possible travel when the brakes are fully applied, or does not meet the manufacturer's specification for power brakes or air brakes.
- The reservoir of the master cylinder is not at normal operating level. (Only brake fluid meeting SAE specifications for heavy-duty hydraulic brake fluid shall be used when adding or changing brake fluid.) [Reservoir filled according to the manufacturers specifications.]
- There is a visible leakage or audible seepage in hydraulic, vacuum or air lines and cylinders, or visible cracked, chafed, worn, or weakened hoses.
- The vehicle has any part of the brake system removed or disconnected.
- The brake pedal moves slowly toward the toe-board (indicating fluid leakage) while pedal pressure is maintained for one minute.

2. Inspection mechanics/technicians are not expected to remove wheels in order to inspect the brakes. (Except as provided in item (1) (b) of this section.) Inspection mechanic/technician must raise vehicle to get beneath to check underside.

3. Handbrakes (auxiliary, parking or holding) shall not be approved if:

- There is no lever reserve when the brake is fully applied.
- Cables are visibly frayed or frozen, or there are missing or defective cotter pins or broken or missing retracting springs or worn rods or couplings.
- The operating mechanism, when fully applied, fails to hold the brakes in the applied position without manual effort.
- When emergency or handbrakes are applied they fail to hold vehicle.
- Fails to release after set.

Lights

1. Headlights shall not be approved if:

- There are not at least two head lamps (at least four on dual head lamp systems which require four units) on all self-propelled vehicles except motorcycles and motor driven cycles need only one.
- The lens produces other than a white or yellow light.
- Any lens is cracked, broken, discolored, missing, or rotated away from the proper position, or any reflector is not clean and bright.
- The high-beam, low-beam dimmer switch does not operate properly or the high beam indicator light does not burn on vehicles manufactured after January 1, 1956.
- Lights can be moved easily by hand, due to a broken fender or loose support, or if the mounting does not make a good ground.
- Foreign materials (such as shields, half of lens painted, brush guards, etc.) are placed on the head lamp lens that interferes with light beam of lamp.
- Lights are improperly aimed using an approved light-testing device.
- Lights project a dazzling or glaring light when on low beam.

¹ North Carolina Department of Transportation, Division of Motor Vehicles, License and Theft Bureau. (2006, August). *Safety inspection, emissions inspection, and windshield certificate replacement regulations, Version 1.12.*

- Mechanical/wall chart aimer tolerance range is 4 inches up, down, left, and right. On board aimers tolerance is 8 degrees up, down, left and right. Optical aimers are either go or no go.

2. Rear Lights shall conform to the requirements of G.S. 20-129(d).

Taillights shall not be approved if:

- All original equipped rear lamps or the equivalent are not in working order.
- The lens is cracked, discolored, or of a color other than red.
- License plate light must operate properly. [If manufactured with more than one, all must operate properly.]
- They are not securely mounted.
- The lens is clear and the bulb is colored.
- The lens is covered, smoke tinted, lettering or logos, etc.

3. Stoplights shall conform to the requirements of G.S. 20-129(g).

Stoplight shall not be approved if:

- The lens is cracked, discolored or of a color other than red or amber.
- It does not come on when pressure is applied to foot brake.
- It is not securely mounted so as to project a light to the rear. If additional third brake light is installed, it must be operational at all times.

Horns

1. The horn shall not be approved if:

- It will not emit a sound audible for a distance of at least 200 feet, or it emits an unusually loud or harsh sound. Original equipment in working order will meet these requirements.
- It has frayed, broken, or missing wiring; if wiring harnesses are broken or missing; if horn button is not mounted securely and in a position which is easily accessible to the driver; or if the horn is not securely mounted to the motor vehicle.
- Operation of the horn interferes with the operation of any other mechanism.

2. Vehicles equipped with sirens shall not be approved unless they are within the class listed in G.S. 20-125(b) as being authorized to carry a siren.

3. Vehicles authorized to have sirens: Law Enforcement and Fire/Rescue; volunteer chief and assistant chief on personal vehicles.

Steering Mechanism

1. The inspection mechanic/technician must raise vehicle to get beneath to check steering mechanism.

2. The steering mechanism shall not be approved if:

- With front wheels in straight-ahead position there is more than three inches of free play in steering wheels up to 18 inches in diameter or more than four inches of free play in steering wheels over 18 inches in diameter. If vehicle is equipped with power steering, the engine must be operating.
- Either front or rear springs are noticeably sagging or broken, cut, heated or removed/missing.
- The front wheels or front-end assembly is bent or twisted or bolts, nuts, or rivets are loose or missing.
- Power steering system shows visible leaks or the power steering belt is loose or worn or missing.
- Shocks and struts are part of the steering mechanism inspection.
- The CV joints make a popping or clicking noise when vehicle is driven into inspection area. [A torn, worn CV boot is not justification for failure.]

Windshield Wipers

Windshield wipers shall not be approved if:

- The vehicle is not equipped with a windshield wiper or wipers, provided the vehicle has a windshield.
- The wiper or wipers do not operate freely.
- The wiper controls are not so constructed and located that the driver may operate them.
- The wiper or wipers are not adequate to clean rain, snow, and other matter from the windshield.

- Parts of blades or arms are missing or show evidence of damage.
- Windshields that are cracked and impedes wiper blade operation. [Wipers on rear windows are not part of the safety inspection.]

Directional Signals

1. All vehicles subject to the annual safety inspection must be equipped with turn signals. This does not apply to motorcycles.
2. Vehicles required to have signals shall be inspected and disapproved if:
 - Signals are not present and of a type approved by the Commissioner. Original directional signals on vehicles manufactured after July 1, 1953, are considered to be of a type approved by the Commissioner. Such signals shall be those which will allow the operator of the vehicle to clearly show another operator approaching from a distance of 200 feet from the front or rear his intention to turn the vehicle.
 - All lights do not operate properly, or if any lenses are broken, missing, or do not fit properly.
 - Signal lens color is other than red or amber on the rear and other than white or amber on the front.
 - Lamps are not securely mounted or wiring and connections are not in good condition.
 - Signals are not visible from front or back due to faulty or damaged mounting or due to manner in which mounted.
 - Switch is not so located as to be convenient for the driver to operate and so that its operation does not interfere with operation of other mechanisms. [Minor cracks on lenses shall not lead to disapproval unless water is likely to enter lens and lead to bulb failure.]

Tires

1. A vehicle shall be disapproved if:
 - Any tire has cuts or snags that expose the cords.
 - Any tire has a visible bump, bulge, or knot apparently related to tread or sidewall separation or partial failure of the tire structure including bead area.
2. A tread depth gauge shall measure tire depth, which shall be of a type calibrated in thirty-seconds of an inch. Readings shall be taken in two adjacent tread grooves of the tire around the circumference of the tire. Readings for a tire with a tread design that does not have two major adjacent grooves shall be taken at the center of the tire around the circumference of the tire. Each tire must be completely lifted from the ground for an inspection to be performed.

Mirrors

1. Mirrors shall not be approved if:
 - Loosely mounted.
 - Forward vision of the device is obstructed by mirror assembly.
 - They do not provide a clear view of the highway to the rear.
 - Cracked, broken, have sharp edges or cannot be cleaned such that rear vision is not obscured.
 - They are very difficult to adjust or they will not maintain a set adjustment.
 - Bus, truck or truck-tractor with a GVWR of 10,001 pounds or more is not equipped with a rear view mirror on each side.
 - Vehicles manufactured, assembled, or first sold after January 1, 1966 are not equipped with outside rear view mirrors on the driver's side.
 - All vehicles must have driver side outside mirror and inside rear view mirror with the exception of a truck. A truck must have both driver and passenger outside mirrors or driver side and rear inside mirror.

Exhaust Emission Controls

1. An exhaust emission shall not be approved if the vehicle is subject to a safety or safety emissions inspection and any of the visible emissions control devices placed thereon by the manufacturer are missing, disconnected, made inoperative or have been altered without approval of the Department of Environment, Health, and Natural Resources.

2. If a vehicle manufactured with an unleaded gas restrictor has been altered or removed a new or reconditioned catalytic converter and unleaded gas restrictor must be replaced before the vehicle passes inspection. (Some newer model vehicles are manufactured without unleaded gas restrictors).

3. An exhaust system shall not be approved if:

- The vehicle has no muffler.
- The muffler, exhaust or tailpipes have leaking joints.
- The exhaust or tailpipes have holes, leaking seams or leaking patches on muffler.
- The tailpipe end is pinched.
- The exhaust system is equipped with muffler cutout or muffler bypass.
- Any part of the system passes through the passenger compartment. [Many mufflers are manufactured with a seep hole. The presence of this hole does not constitute a failure.]

Emission Inspection Procedures

Note: A safety-only inspection is required for model year vehicles of 1996 and newer that are gas operated with a GVWR of 8500 pounds and greater. These vehicles are exempt from the OBD inspection.

Procedures for OBD emissions inspection shall be as follows:

1. Turn the ignition key to the "ON" position but do not start engine and check for Malfunction Indicator Light (MIL) illumination (illumination may be brief).
2. Turn the ignition switch to the "Off" position for at least 12 seconds.
3. Locate the Diagnostic Link Connector (DLC); connect the North Carolina Analyzer System's OBD link to the vehicle's Diagnostic Link Connector. If the Diagnostic Link Connector cannot be located, the test will be aborted.
4. Verify successful communication with the vehicle's OBD system.

Note: If successful communication cannot be established after three attempts, the vehicle fails.

5. Using the North Carolina Analyzer System, scan the vehicle's OBD system to obtain the status of the readiness monitors, Malfunction Indicator Light, and the presence of Diagnostic Trouble Codes (DTC).

6. A vehicle shall be Rejected from an OBD inspection if:

- The Diagnostic Link Connector can not be located and/or
- The number of supported readiness monitors set to "not completed" exceeds the maximum limits based on the vehicle's model year. (See note below)
- The North Carolina Analyzer System shall print out a special vehicle inspection receipt/statement (VIRS) listing the unset readiness codes and advising the motorist on how to proceed.

7. A vehicle shall Pass an OBD inspection if:

- The Malfunction Indicator Light bulb check status is ok and
- The Malfunction Indicator Light bulb is not "ON" with engine running and
- The Malfunction Indicator Light is not commanded on for any Diagnostic Trouble Code and
- The number of supported readiness monitors that are set to "not ready" does not exceed the maximum limits based on the vehicle's model year. (See note below)

8. A vehicle shall Fail an OBD inspection if:

- The Malfunction Indicator Light bulb check status is not ok and/or
- The Malfunction Indicator Light bulb is "ON" with engine running and/or
- The Malfunction Indicator Light is commanded on for any Diagnostic Trouble Code and/or
- The Diagnostic Link Connector has been damaged, tampered with, or is otherwise inoperable.

Note: For model years 1996-2000, a maximum of two (2) readiness monitors may be set to "not ready". For model years 2001 and newer, a maximum of one (1) not completed readiness monitor is allowed.

Appendix B: Annotated Bibliography of Research on Safety Inspection Programs

Comptroller General of the United States. (1977, December). *Effectiveness of vehicle safety inspections neither proven nor unproven*. Washington, DC: United States Congress.

The study discusses the difficulty the federal government had in convincing states that implementing a periodic motor vehicle inspection reduced accidents. The study also discusses the Safety Administration's inability to demonstrate federal standards for motor vehicle safety and inspections were effective at preventing accidents.

Wolfe, A.C., & O'Day, J. (1985). *Cost effectiveness of periodic motor vehicle inspections: A review of the literature*. Washington, DC: Office of State Program Assistance, National Highway Traffic Safety Administration.

The purpose of this review of 41 studies on periodic motor vehicle inspections was to determine whether the costs of requiring all motorists to have certain safety components on their vehicles inspected and repaired on a regular basis are less than the benefits gained from such inspections in terms of safer vehicles and fewer vehicle defect accidents. A number of the studies provided evidence that vehicles in some periodic motor vehicle inspection jurisdictions are in better condition on some components than vehicles in some non-periodic motor vehicle inspection jurisdictions, but none of the studies involved truly random samples of vehicles in use. Similarly, a number of studies reported some reduction in accidents in association with periodic motor vehicle inspections, but some reported the opposite. Ultimately, no credible evidence was found that demonstrates significant changes in vehicle defect-related accidents as a result of periodic motor vehicle inspections.

Grabacz, C., & Kelly, J.G. (1987). *Automobile safety inspection: New econometric and benefit/cost estimates*. *Applied Economics*, 19, 763-771.

Automobile safety inspections are not effective measures for reducing traffic fatalities (or injuries). The authors used a Peltzman¹ model with some modification of variables and the addition of inspection variables. The study is based on data from 1952 to 1982. The model found the inspection variables did not have a significant impact. The authors also completed a cost-benefit analysis and concluded, "With a large deadweight loss to society and no accountable benefits, automobile safety inspections are not cost effective."

Hemenway, D. (1989). *A failing grade for auto inspections: And motorists like it that way*. *Journal of Policy Analysis and Management*, 8, 321-325.

The authors suggest enforcement of inspection procedures in a decentralized program is difficult and motorists prefer being able to "shop" around for a station that will provide them with the desired outcome (i.e., a passed inspection). The study also questions the quality of inspections being performed.

United States Department of Transportation, National Highway Traffic Safety Administration. (1989). *Study of the effectiveness of state motor vehicle inspection programs*.

A government task force was established to determine if state motor vehicle inspection programs reduced highway crashes resulting in injury and death and if inspections limited the number of defective or unsafe vehicles on the highways. The study found inspections were effective in limiting the number of poorly maintained vehicles on the highways. However, attempts to correlate inspections with a reduction in crashes failed to show any significant effects.

United States Government Accounting Office. (1990). *Motor vehicle safety: NHTSA should resume its support of state periodic inspection programs (GAO RECD-90-175 Periodic Inspection Programs)*. Washington, DC: Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce.

Although the report concludes there is a safety benefit derived from vehicle safety inspection programs, the report is unable to determine how much of a benefit is derived from safety inspections. The report also noted the quality of data linking accidents to defective equipment is poor or may be underreported. The magnitude of accident reductions due to inspections could not be determined because of data limitations and methodological problems.

¹ The Peltzman effect is the tendency of people to react to a safety regulation by increasing other risky behavior, offsetting some or all of the benefit of the regulation.

Merrell, D., Poitras, M., & Sutter, D. (1999). The effectiveness of vehicle safety inspections: An analysis using panel data. *Southern Economics Journal*, 65, 571-583.

This study found no evidence that inspections significantly reduce fatality or injury rates. The authors used panel data for all 50 states from 1981 to 1993. The authors used a fixed-effects model to allow for state-specific effects and to reduce bias from omitted variables. The study used a large number of different variables and tested for both fatalities and non-fatal injuries. The study concluded inspections fail to reduce accidents because inspections may induce an offsetting increase in driving intensity, drivers have a strong incentive to perform maintenance to provide for their own safety, and inspections can at best prevent only a small fraction of accidents because most accidents do not involve mechanical failure (perhaps less than 1%). Inspections themselves may even be ineffective at spotting faulty parts, thus reducing their effectiveness even more.

Poitras, M., & Sutter, D. (2002). Policy ineffectiveness or offsetting behavior? An analysis of vehicle safety inspections. *Southern Economics Journal*, 68, 922-934.

The study found inspections are ineffective in reducing roadway casualties and are a poor instrument for achieving policy goals. The authors measured the effectiveness of inspections by estimating their impact on the number of old vehicles in use. If the number of old vehicles on the road declines but casualties do not, then a Peltzman-type offsetting behavior is at work. If the quantity of old cars does not fall, periodic inspection does not enhance maintenance. This study used data from 1953 to 1967. The authors claim one of the advantages of this period is that it predates emissions inspection, which could cloud the data. The data suggest inspection does not improve the mechanical condition of cars. The authors conclude the ineffectiveness of inspections arises from policy impotence rather than Peltzman effects.

Sutter, D., & Poitras, M. (2002). The political economy of automobile safety inspections. *Public Choice*, 113, 367-387.

Vehicle safety inspections are mandated not because they are in the public interest or because interest groups demand them but because of political transaction costs. The authors looked at the motives for state-mandated vehicle safety inspections and challenged the assumption that policies are adopted to further the public interest. They evaluated four possible rationales: inspections are in the public interest; they are a wealth transfer to repair shops; they are a way for safe drivers to compel increased maintenance from other drivers; and they serve an interest coalition between repair shops and auto clubs. The study stated, "Inspection persists because safety advocates misperceive the policies' effects or have not updated their beliefs to take account of recent scholarship. A lack of a systematic relationship between the interests examined here and the cross-state incidence of inspection would be consistent with a political transactions cost of persistence." The study found no significant correlation between predicted roadway casualties and inspection requirements. The authors suggest political transaction costs and inertia may be the driving force behind safety inspections.

Christensen, P., & Elvik, R. (2006). Effects on accidents of periodic motor vehicle inspection in Norway. *Accident Analysis and Prevention*, 39, 47-52.

An extensive program of periodic motor vehicle inspections was introduced in Norway in 1995. Inspections were found to strongly reduce the number of technical (mechanical) defects in cars; however, no effect of inspections on accident rates was found.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

DIVISION OF MOTOR VEHICLES

LYNDO TIPPETT
SECRETARY

November 24, 2008

MEMORANDUM

TO: John W. Turcotte, Director
Program Evaluation Division
N.C. General Assembly

FROM: William C. Gore, Commissioner
Division of Motor Vehicles

A handwritten signature in black ink that reads "William C. Gore, Jr.".

SUBJECT: DMV's Response to the Vehicle Inspection Program Evaluation

Thank you for the opportunity to respond to the Findings and Recommendations regarding the Division of Motor Vehicles' administration of the vehicle inspections programs.

After our review, we would like to offer the following responses to Finding 4 and recommendations 1 and 3.

In report **Finding 4**, it was determined that the DMV's oversight of the emissions program is insufficient.

Finding 4 states that the Division of Air Quality audits the Division of Motor Vehicle's (DMV's) operation of the emissions inspection program and evaluates DMV in the following areas:

- o Enforcement;
- o Inspection waiver processing;
- o DMV emissions specialists and inspectors' job knowledge;
- o number of overt audits performed;
- o number of vehicles that submit and pass emissions inspections; and
- o DMV performance of overt audits.

The report also states that the Division of Air Quality annual reports have graded DMV's performance of covert audits and registration denial activities as deficient.

ALL CORRESPONDENCE SUBMITTED TO:

NC DIVISION OF MOTOR VEHICLES
OFFICE OF THE COMMISSIONER
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LOCATION:

DMV HEADQUARTERS BUILDING
1100 NEW BERN AVENUE
RALEIGH NC

In response to this finding, DMV would like to note the following:

During the expansion of the Emissions Program 2002-2006, the Division of Air Quality suspended reportable program evaluations because of the effort required and the need for all entities involved to adapt to the new program requirements. **The 2007 DAQ program evaluation was the first reportable evaluation, since the implementation of OBD emissions test in 2002.**

Upon receipt of the 2007 evaluation in July 2008, I directed management to review the current program performance data defined in DAQ's evaluation and take the necessary steps to address all program deficiencies that would impact the current 2008 program evaluation. DMV staff's evaluation revealed that all program areas were on target for calendar year 2008, except for covert audits. As stated by the PED report, management identified two historical issues that have routinely impacted the timeliness and completion of the required covert audits.

First, the current acquisition process for obtaining covert funds creates a timing issue because DMV is required to use the department's Temporary and Permanent Travel Advance and SAP fund disbursement systems. Because of the time involved in the approval and issuance of these funds and the fund limits for an individual, the process has not worked efficiently in the past for DMV.

Secondly, DMV's acquisition of covert vehicles is problematic because the Division is required to purchase vehicles through the Department of Administration. The purchase of these vehicles does not fit the Motor Fleet Management normal new vehicle purchase process because the program requires a wide range of makes and year models to perform the covert audit function. Also, obtaining approval and actually getting repairs for these older vehicles causes significant downtime and timing issues for the performance of audits.

As a result of these problems, I have directed the License and Theft staff to increase its oversight of the problem areas and to identify solutions where applicable. To accomplish this, License and Theft managers are working closely with DOT's fiscal section to keep the covert monies available in a more timely manner, and to determine better ways to obtain funding for the program. DMV's staff is also working daily to expedite repairs to existing vehicles and has increased communication with the Department of Administration to acquire additional and replacement vehicles.

As a result of these efforts, DMV believes that it will achieve a commendable report from DAQ on the 2008 evaluation in this area.

Recommendation 1's suggestion to repeal North Carolina's safety inspection program at this time would counteract new legislation implemented November 1, 2008. Session Law 2007-503 has automated all licensed safety inspection stations on a real-time system, which should increase compliance from the current 81% to approximately 97% (additional 570,000 vehicles, which calculates to \$484,500.00 in additional revenue). By

repealing the safety inspection program, the state would never recoup the cost of the new legislation, which has enhanced the scrutiny of the safety program by enabling personnel to monitor inspection activities and results electronically. This could also put the Department of Transportation in violation of its contract with the vendor who runs the electronic system and maintains the database.

In response to option 2, it needs to be considered that some vehicles develop safety issues during transit from manufacturers (many from overseas) to their destinations. New vehicles are already exempt from the annual emissions inspection. States that exempt up to three-year models from an annual emissions test, such as California, mandate low emission vehicles (LEV). These are vehicles manufactured with additional anti-pollutant emission components. LEV-approved vehicles cost the consumers approximately \$1,200 to \$1,500 per vehicle more. If North Carolina eliminates two additional year models from its subject fleet, LEV legislation would have to be passed to comply with federal law. In conclusion, any changes would have to be approved by the U.S. Environmental Protection Agency to avoid potential sanctions on federal funding for North Carolina.

Additionally, the 21st Century Transportation Committee is considering a proposal to implement a vehicle mileage tax. If this proposal is enacted, each vehicle registered with the Division will be required to report its annual miles driven for highway tax purposes. Without all registered vehicles being subject to an annual inspection, the department will have to establish a reliable means of verifying the miles driven by a registered vehicle during a tax period. The current electronic safety and emissions inspection program procedures and infrastructure provides the most logical means to accomplish this task. Additionally, the current inspection systems could also be enhanced to provide the necessary consumer billing statements.

The Division supports **Recommendation 3** that management can improve its program oversight and performance through better goal setting and analysis of available data.

As documented in the report, the Verizon inspection system contains a great deal of data that could be more effectively used by management. As also documented by the report, the current system reports that were designed by program managers in the late 1990's (under the original contract) were not designed as an analytical tool to aid managers with planning and decision making in mind.

Under the new contract, managers will have the opportunity to re-engineer the current reporting tool and design reports to conduct better program evaluations and planning.

In 2007, Secretary Lyndo Tippet recognized the need for the department to reform its overall management philosophy and implemented an internal transformation process of changing its management culture to a new results-based, accountable, performance organization. Recommendation 3 and the related report findings are clearly consistent with the results-based performance management recommendations and the department's efforts to develop clear program and unit-level strategic goals and

performance metrics. With the assistance of the department's Strategic Planning Office, DMV is developing its unit-level goals and performance metrics to support the department's transformation effort. As our workgroups move forward, we will certainly incorporate the findings and recommendations of the PED.

The new Electronic Inspection Program will also provide DMV with a "Dashboard" reporting tool. This tool began implementation November 1, 2008 and is available on the program administrative Web portal. As we move forward into the implementation phase of the new program, the Division will validate the program's reporting requirements and expand the Dashboard into the public portal to provide more information to the public regarding program performance.

Should the General Assembly support Recommendation 3, DMV believes that it will be well on its way to identifying strategic goals and the development of a metrics-driven performance management system for the Safety and Emissions Inspection Programs.



North Carolina Department of Environment and Natural Resources
Division of Air Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E., Director

December 1, 2008

John W. Turcotte, Director
Program Evaluation Division
North Carolina General Assembly
Legislative Office Building, Suite 100
300 North Salisbury Street
Raleigh, NC 27603-5925

Subject: Formal Response to the Program Evaluation Division's "Evaluation of the Vehicle Safety and Emission Inspection Programs"

Dear Mr. Turcotte:

Thank you for the Program Evaluation Division's study of the Vehicle Safety and Emissions Inspection Programs and for the opportunity to comment on the report. It is important to look separately at the safety and the emissions programs -- they are performed concurrently as a convenience to the motorist, but the reasons for having each of them are distinct. The Division of Air Quality's (DAQ) remarks are limited to the emissions program, as the safety inspection is outside the mission and responsibility of DAQ.

First, we would like to review DAQ's reason for including an emissions inspection in North Carolina's overall air quality program. The United States Environmental Protection Agency (USEPA), under the federal Clean Air Act, establishes ambient air quality standards that the states must achieve. Failure to meet the standards can result in federal sanctions against transportation funding, industrial expansion, and grants to the state. North Carolina has made tremendous strides to attain and maintain the standard established for ozone in 1997. Where the state once had all or parts of 32 counties designated as nonattainment of the ozone standard, only the Charlotte-area, although improved, is still above the standard. However, earlier in 2008 the USEPA again tightened the ozone standard. DAQ expects that large areas of the state will be designated "nonattainment" of the new standard by the USEPA in 2010, including several smaller urban areas that have not previously had problem meeting air standards. Whereas 37 of North Carolina's 41 ozone monitors attain the old standard (84 parts per billion, or ppb), only 12 attain the new standard (75 ppb). This could mean that as many as 48 counties will be designated nonattainment with the new ozone standard in March 2010 when EPA finalizes designations under that standard.

Although ozone occurs naturally, the primary cause of high ozone levels is a photochemical reaction that occurs in the presence of nitrogen oxides (NOx) during certain meteorological conditions. DAQ's strategy to reduce ozone has been to reduce excess NOx, thereby reducing the amount of ozone formed on those days. In North Carolina, the significant majority of NOx emissions come from two sectors: automobiles and coal-fired electric generating plants. Federal programs to reduce NOx emissions from these two categories have not been enough. In 1999, the North Carolina General Assembly expanded the emissions inspection program to 48 counties and in 2000 required the use of on-board diagnostics (OBD) testing to address NOx emissions from automobiles. In 2002, the North Carolina General Assembly passed the Clean Smokestacks Act to reduce NOx emissions from our largest power plants. This balanced strategy

has clearly worked as the ambient ozone levels have fallen steadily. We believe that it is vital to continue this successful air quality strategy to protect our citizens' health and their livelihoods.

DAQ's specific comments on the report's findings and recommendations follow.

Finding 2. It is difficult to quantify the degree to which the emissions inspection program contributes to improving North Carolina's air quality.

DAQ Response: This statement could be misinterpreted to imply that the emissions inspection program does not contribute to cleaner air. A more accurate statement would be:

"Finding 2. It is clear that North Carolina's air quality is improving. It is difficult to quantify the contribution of the emissions inspection program -- or any other single aspect of North Carolina's multi-pronged program -- to attainment of the federal standards. The emissions inspection program has worked together with controls on stationary pollution sources to improve air quality even as population and vehicle miles traveled have significantly increased."

The report notes that North Carolina has reduced its number of "bad ozone" days from 101 a decade ago to 66 in 2007. It does not mention that this improvement is despite a population boom and exponential increases in vehicle miles traveled, and in the face of tightening air pollution standards. North Carolina's ambient air quality monitors show steady reductions in air pollutants. Unfortunately, the monitors cannot determine whether a specific molecule of ozone was formed by emissions from a car or from another source. This problem is not unique to North Carolina; it is true for every other state and for every other air quality regulation. Just like every other state, North Carolina determines the effectiveness of its individual air quality programs through computer modeling, field surveys, inspections, and -- indirectly -- through ambient air quality monitoring. In the real world, it is very difficult to segregate out the impacts of one type of pollution control on total pollution levels when there are multiple pollutant sources that have to be controlled in different ways. In the case of air quality, this is further complicated by the fact that neither the pollutants nor all of the sources remain stationary. The report fails to acknowledge these realities and ignores the use of computer modeling and other types of assessment in evaluating the effectiveness of emissions testing in addressing mobile source contributions to ozone pollution.

The point is that air monitors show that North Carolina's air quality IS improving, and the emissions program contributes to that improvement. The Division agrees that operation of the emissions program could be improved, but contends that the program design is valid and the program needs to be continued.

Finding 3. Inspection duration indicates lack of thoroughness.

DAQ response: Inspection duration has no bearing on thoroughness of an OBD inspection. The report accurately states that the OBD portion takes only a few minutes. There is no inspector judgment involved in determining whether or not the vehicle passes the OBD portion of the inspection. The vehicle essentially inspects itself, stores the data in its onboard computer, and then downloads the results upon request. The inspector's speed makes no difference in the result.

Finding 5. Older vehicles are more likely to fail inspection.

DAQ response: It is true that older vehicles are more likely to fail inspection, but any vehicle may have excess emissions. New car emissions controls are more efficient only if operating correctly. Although newer cars are individually less likely to fail emissions inspection, emissions control equipment in new cars can be defective or fail. As a group, new cars have the potential to be a larger contributor of air pollutants than older vehicles because there are many more of them; they are driven more often; and they are driven a greater number of miles. An effective vehicle emissions program needs to consider the pollutant contribution from the entire vehicle population, not just failure rate based on vehicle age.

Recommendation 1, Option 1. Repeal the safety inspection program.

DAQ response: DAQ has no comment on the merits of this recommendation. However, the emissions inspection is statutorily connected to the safety inspection. A repeal of the safety inspection program would require consideration of how to continue a standalone emissions inspection.

Recommendation 2. The North Carolina General Assembly should consider exempting vehicles from the three newest model years from emissions inspections. ... The Division of Air Quality should perform an in-depth analysis to determine if exemption of vehicles from the three newest model years will affect North Carolina's ability to meet federal air quality standards.

DAQ response: The Division disagrees with the recommendation to exempt the first three model years from emissions inspection.

The first concern is the potential impact on air quality. Although the air is getting cleaner, some areas of the state are still unable to meet the current federal ozone standard. Many more areas of the state will fail the new federal ozone standard announced earlier this year. The Division is in the process of determining which areas of the state should be designated "nonattainment" under the new ozone standard. The "nonattainment" designation restricts industrial expansion and the availability of federal funds for transportation projects. To meet the new standard will likely require more emissions reductions from our mobile and stationary sources. Exempting additional cars from emissions inspections will not help toward that goal. The total emissions contribution depends not only on failure rate of each model year vehicle (which is higher in older cars), but on the total number of cars on the road and how much they are driven -- factors that are skewed towards newer cars. Loss of emissions reductions in the mobile sector would have to be made up in the stationary source sector -- such as additional control devices on existing industrial facilities and expansion restrictions on others. Even then there is no assurance that the lost reductions in mobile emissions could be made up by additional controls on stationary sources. Motor vehicle emissions are often at ground-level in urban areas, while stationary source emissions are often out of a tall smokestack in a more remote area. It may be that ozone levels cannot be reduced in some areas without reducing ground level emissions such as from motor vehicle emissions.

Another concern is consumer protection. The federal Clean Air Act requires an 8-year or 80,000 mile warranty on the major emissions control components such as the catalytic converter, but only a 2-year or 24,000 mile warranty on other emissions control components. With a three-year exemption, a defective emissions control could be out of warranty before the vehicle was even subject to an inspection. The impact on both air quality and the consumer could be worse if an emissions control component failed, was ignored by the vehicle owner (because there was no inspection), and led to the subsequent failure of major emissions control equipment.

The Division will perform in-depth analyses to determine the effect of the emissions inspection on North Carolina's ability to meet the new federal air quality standards. This effort is required as part of the revised State Implementation Plan to meet the 2008 ozone standard, but will not be complete by May 2009. The SIP revision will undergo a formal public process to include ALL emissions sources and to determine an appropriately balanced mix of mobile source and stationary source controls. The US EPA mandates the revised plan be submitted by 2013. The Division recommends including the three-year exemption question in this comprehensive public process rather than rushing to a standalone decision by May 2009. This SIP revision process will likely be initiated and completed by 2011 for the Charlotte region if that area fails to meet the old ozone standard by next summer.

In conclusion, the DAQ welcomes this review of the vehicle safety and emissions inspection programs, but cautions that the two programs should be evaluated separately. Although DAQ has no position on the safety inspection program, the Division strongly supports the continued operation and

improvement of the vehicle emissions inspections. The emissions inspections are vital in our on-going efforts to sustain healthy air for our citizens and balanced reductions from both motor vehicles and industry.

Sincerely,



B. Keith Overcash, P.E.

BKO/dr

cc: Secretary Bill Ross, DENR
Assist. Secretary Robin Smith, DENR